

Understanding museum digital maturity through data collection and use

Thesis submitted for the degree of
Doctor of Philosophy
at the University of Leicester

by

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2019

Abstract

This thesis considers the question of whether digital maturity can be measured through a museum's data collection and use. Given that there are multiple components of such maturity, this research proposes if and how data might be used as a proxy to gauge a museum's overall digital maturity. Technology is a major influence of transformation in current museums and one of the sparks fuelling this transformation, is how museums collect and use data. Responding directly to this technological and business challenge, this thesis examines the experiential context for digital maturity by analysing how data is currently being used in the museum sector.

This research draws upon the human context for digital maturity over the past five decades of technological innovation in museology through the lens of a change agent's ethic and way of thinking to spark technological evolutions and revolutions. This approach is informed by the organisational context for digital maturity by researching how the digital landscape may be reimaged around existing physical community and urban planning principles. An outcome of the literature review and fieldwork is to enable cultural institutions a model to assess a panoramic view of their current digital business processes, strengths and weaknesses, define and overcome the paradox of the current digital maturity state, and establish pathways of actionable steps to achieve the desired level of digital maturity. Just as there are numerous ways to navigate through a physical city—taking short cuts or the scenic route—there are myriad paths to manoeuvre through the digital ecosystem. And, every move made, every twist and turn, has consequences.

Evidence presented here draws upon the insights of museums' use of technology over the past five decades and to test business tools that may be applied within museums to gauge their overall digital maturity through the understanding of how the museum collects and uses data. The thesis concludes that this mechanic may be used elsewhere in the sector and the framework scaled to include other components of digital maturity to conclude exact maturity levels across many capabilities. More broadly, what emerges is an insight in which applying data-informed decisions, museums of the present and future may be able to bridge the physical and digital institutions and attract a plethora of new visitors with new visitor experiences.

Acknowledgements

This PhD research has been possible thanks to the support and guidance of my supervisor, Professor Ross Parry. He was patient as I juggled a full-time position alongside my research. He helped me mature my writing style and skills and opened many doors, allowing me to explore possible career paths and publishing opportunities. Most recently, Professor Parry has helped me make the transition into academia as a Digital Fellow associated with the ‘One by One’ Project. I would also like to thank my second supervisor, Professor Sandra Dudley, for her advice and suggestions throughout my time as a Museum Studies student at the University of Leicester.

A special thank you to my case study participants: Nina Simon of the Santa Cruz Museum of Art and History; Ed Rodley of the Peabody Essex Museum; and Douglas Hegley of the Minneapolis Institute of Art. These change agents were generous with their time and made themselves accessible – all while forging new paths toward a digital-first future [OR the museum of the future]. Without them this research would not have been possible.

I would like to thank the editors of *The Routledge Handbook of Museums, Media and Communication* (Kristin Drotner, Vince Dziekan, Ross Parry, and Kim Christian Schroder) for the opportunity to publish an excerpt of this research focused on big data.

I would like to express my gratitude to John White, Chief Operating Officer of The Space, for the opportunity to continue applying my research of maturity models towards the creation of a digital maturity index (in response to the UK report, *Culture is Digital*).

On a personal note, I would like to thank my friends and family who have supported me during my ongoing studies. First, I would like to thank Sarah Hanninen for editing this work for correct use of citation style and grammar. Next, I would like to thank Samantha Dutra for her artistic skills creating the original hexagon and museum terroir images. Ultimately, I would like to thank my husband Leo, and daughters Merrick and Lyra who

are a steady source of strength and encouragement. They have had to endure early mornings, late nights of work and an intense travel schedule (that now includes being separated for 15 months between the United States and the United Kingdom).

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Chapter 1:

Introduction

A transformation by its very definition takes time and the result is a thorough and dramatic change in form or appearance. This change process occurs when one element, through induction or spontaneous development, is converted into another. Digital transformation occurs when emerging technologies merge with or overcome legacy systems. This thesis considers the question of whether digital maturity can be measured through a museum's data collection and use. Through understanding the state of digital readiness and innovation required to create a new order of things we will discover the 'museum of the future' – consisting of interacting elements that are more valuable when working together than when serving a single function. The 'museum of the future' is much more than an aspirational state and requires the creation of a new complex system to solve for multi-dimensional problems.

The construction of the 'museum of the future' requires scaffolding to shape and hold the pieces together during the transformation into an integrated whole. This scaffolding comes in the guise of applying private sector business tools, such as self-assessments to take stock of the maturity of the tools and governance of the new complex system being developed, and scenario planning exercises discussed later in this thesis in Chapters Five and Six. Taking stock of the present and envisioning the future is only one step toward building it. This thesis is the first step toward defining a new set of mechanics and capabilities that are needed to make sense of the 'museum of the future' conditions, contexts, constructs, and characteristics.

Change agents who have realized the potential of emerging technologies have guided museums through the digital age. The 'museum of the future' depends upon bringing about a desired future on purpose and this means infusing the spirit of change into the DNA of the museum's mission. Today, cultural institutions have the opportunity to

induce digital transformation consciously and proactively. Building the ‘museum of the future’ is an endeavour fuelled by a clear vision and realized through systematic experimentation and standardization of tools, governance, management, processes, measurement, and community engagement. This thesis examines how to determine the readiness of this built environment by gauging how data is collected, used, and flows through the museum’s digital and physical ecosystems. Future-building takes time and there is no one right way to navigate a museum’s journey; rather there are tools museums may pack and deploy, so that wherever their journey may lead and whatever path they seek, they will be able to chart where they are, how they navigate to their chosen path, and how to nimbly manoeuvre around or through any obstacles.

1.1. ‘Museum of the Future’: A new complex system

The ‘museum of the future’ is not a grey tower building devoid of life. Instead, the diversity of people and technology required to operate the museum is more reflective of a bazaar – colourful, charismatic, and curious experiences around every corner. The blending of people, technology, and strategy to create this rich environment is not uniform in structure and is susceptible to fracture if conditions, contexts, constructs, and characteristics are not thoughtfully integrated. Museums are being challenged to not only bridge cultural divides through their collections, but also connect business practices across various industries to carry out the museum mission. A new way of thinking, working, and being is required for this newly blended physical and digital ecosystem to thrive. The transformation induced by emerging technologies has been happening to and by museums for the past five decades.

This thesis begins by highlighting some of the major advances in museology over the past five decades that occurred along the same timeline as the birth of modern-day computing. This history features the development of digitisation of museum collections, the rise of visitor experience studies, and the change agents who helped to modernise museum practices and operations. Over the course of this thesis, I offer the reader a new language and set of tools to assist in the assessment of digital activities so that museum people may be able to assess the investment and resource needs of their institutions and determine what is needed to scale these activities within their institutions and into the greater cultural sector.

1.2. What it takes to build the ‘museum of the future’

In the first three chapters of this thesis, I examine the people context (and the potential that change agents might have on a museum’s digital transformation), the information context (and the complexity of the museum data as characteristics specific to the museum’s terroir), and identify the local and physical context of digital change (and the ecosystem mind-set that we will benefit from activating when planning and measuring for digital change). These chapters include knowledge necessary to understand before introducing the research methodologies and corresponding business tools. Upon analysing the evolution of technology in museums and the impact of data to improve the community and visitor experience, I have discovered the need for museums to adopt private sector business tools to improve the operational excellence of the museum. This thesis aims to address how digital maturity may be gauged and if there is one path to digital maturity through the understanding of how and why all museum data is collected and analysed together to inform how any museum – big or small and despite genre –operates and integrates into the physical and digital ecosystems. The framework chosen for the fieldwork is based on private sector maturity models established to assess business management processes and a more dynamic approach of leveraging real-time streams of data to identify and increase visitor interactions with a museum’s collection, staff, or visitor communities.

To benefit from applying the featured business management tools, I propose in this thesis the blending of the expertise of industry analysts with academic rigor, and offer museum professionals adaptive methods for team and technology organisation and workflow. This research sets out to propose how museum professionals may use for-profit business language and tools, in easy to understand and actionable ways, to assess a museum’s digital maturity and assist in the development of long-term strategies to assist cultural institutions in mastering the increasingly complex data-driven landscape.

Using information gleaned from these adapted business tools, I hypothesize we will begin to identify any missing pieces of the visitor engagement experience within the digital ecosystem and outline a plan to solve for any opportunity areas, whilst also pursuing any additional academic study to assess the role of analyst experience and tools in use in cultural institutions. The ultimate goal of this research is to gauge overall digital maturity by identifying gaps within the data collection process and solve for an integrated model to

collect and analyse data for greater insights into visitor behaviour within the museum walls and the digital ecosystem.

1.3. Case studies in future-building

This thesis follows three small-to-mid-sized art museums across the United States to identify how all museum data are preserved and if any trends, patterns, and connections are recognized in the technology used, business insights, volume of repeatable experiences derived from data, and how or if the data is connected to or impacts the museum's physical and virtual environments. The objective was not to compare the three museums to each other; rather, to document the differences in staff, budgets, technologies, and strategic goals to assess the possible, multiple pathways to digital maturity. Each of their particular approaches to digital data collection and use uncover insights about how a common framework to manage the challenges of digital data may be applied to museums of all sizes and types. As I will evidence in Chapter Eight, data and a digitally-competent workforce are the connective glue holding together many digital transformations. Rather than testing or analysing the ever-shifting trends of the digital evolution, this thesis and the accompanying case studies test the self-assessment of digital data maturity and the potential use of scenario planning frameworks that I will introduce in Chapters Five and Seven.

To better identify trends or patterns in the fieldwork analysis of the completed digital data maturity matrix and personal interviews, I developed four lenses or categories—referred to as the 4Ps—to group case study analysis. The category definitions were pre-determined before the analysis based on concepts gleaned during the literature review and the drafting of concept and research methodology chapters. The four categories are: personalization, platform, panoramic, and paradox (of change).

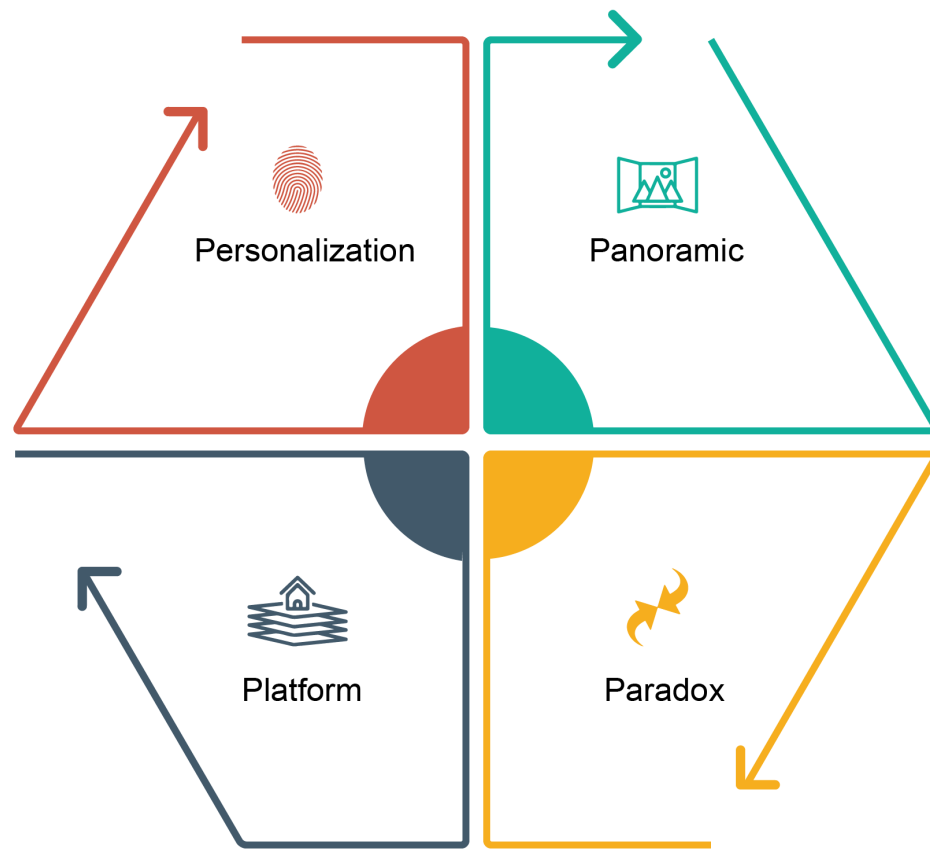


Figure 1: The 4Ps of digital data maturity.

The first category is that of *personalization*, meaning the museum is focusing on micro and hyper-local relevancy that may or may not be scalable. The second category is *platform*, meaning the museum is honing and expanding digital skills and literacies through connected systems and services. The third category is *panoramic*, meaning the museum is taking an integrated-first technology and services approach to build a holistic ecosystem of people, collections, and events. The fourth category is *paradox*, meaning persistent paradoxes of change are accepted, and viable options are explored and baked-into the museum's digital data strategy, allowing the museum to evolve with or within multiple

scenarios. For each of the museums interviewed for this thesis, I selected a core and secondary ‘P’ categorization to illustrate the depth and breadth of the work required to achieve any single level of digital data maturity. These 4Ps help us understand what differentiates one museum from another other than their collections.

1.4. Museum terroir: The built environment

This thesis seeks to understand how museums may develop and nurture their own information ecologies to conceptualize how visitor collection data and museum media might be seen as, in essence, the ‘terroir’ of the museum (Figure 2). Drawing from the maturing scholarship of ‘information ecologies’ (Nardi and O’Day, 1999) amongst other researchers and business pioneers who are transforming data-informed analytics, I explore how a museum constructs and learns from a system of people, practices, values, and technologies within their local and regional communities. Collectively the information produced within the museum and its community may be influenced by external variables that may or may not be within the museum’s control. Therefore, it is essential for a museum to understand and harness its current data landscape – what the museum has the power to control and has a responsibility to interpret and act upon insights learned. Within this research, I propose a process to organise and maximise the value of a museum’s data - in essence, making data the cornerstone and change agents the keystone of a museum and its place in the community.

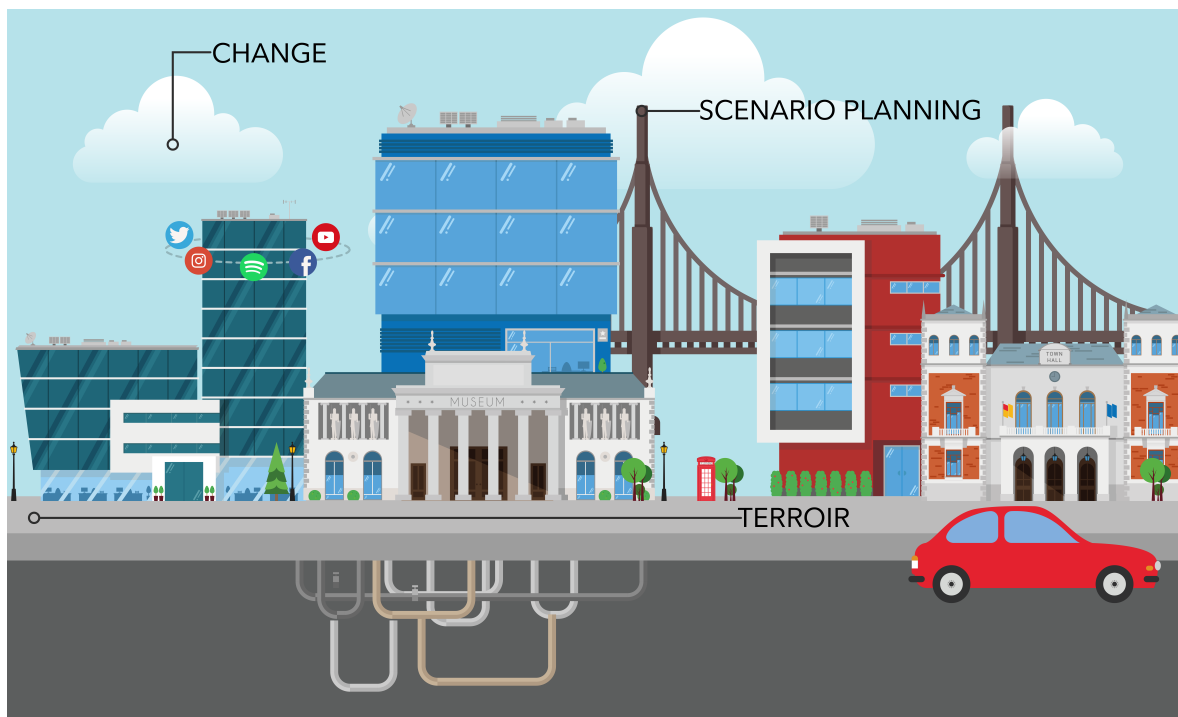


Figure 2: Museum terroir (Source: Author).

1.5. Museums as/with problems, museums as solutions

Throughout my 18-year career, I have worked as a communication professional at the crossroads between community management and technology within the federal government, health, financial services, and technology sectors. Despite having the opportunity to operate across many verticals and enjoying work on myriad and complex challenges, I have felt as if something was missing from my career development. My various roles and responsibilities contributed to the financial success for the companies I served, but there was little to no societal impact. Over time, this sense of not contributing towards a mission greater than the companies I served compounded with a lack of work-life balance, drove me to question how I wanted to continue my own professional evolution. I realized I needed to embrace a career transformation requiring me to apply my talent, skills, and what I have learned in the private sector towards a greater good.

Even as a child, museums were a place of solace and a cherished setting for me to learn new things and challenge assumptions. I was never forced or bribed to enjoy a day at any museum. As an adult, visits to a cultural institution are my first activity of choice when planning leisure time for family or myself. It was natural, then, for me to think about how I

could transfer my professional aspirations to the cultural sector and give back to the institutions that offered me the tools and space to think critically. The cultural sector is rich with talent yet due to funding constraints less able to continue investing in their physical and digital environments with emerging technologies at a rate that other competitors for leisure time are able to provide due to other funding and operations models. Through increased understanding of how a museum impacts its community, the museum is best able to serve its community. Let us examine the impact of museums and consider how this impact may increase with the overall digital maturity of museums.

According to an Oxford Economics (2017) study commissioned by the American Alliance of Museums (AAM) with support from the Andrew W. Mellon Foundation, museums are major economic engines for the United States of America. The study (Oxford Economics, 2017) reports that in 2016, “museums supported more than \$50 billion in U.S. GDP, supported more than 726,000 jobs, generated nearly \$16 billion in income and contributed \$12 billion in federal and state and local taxes”. The *Culture and Heritage Traveller Report* (2013) found that 76% of all U.S. leisure travellers participate in cultural or heritage activities such as visiting museums and these travellers spend 60% more on average than other leisure travellers. Museums and other non-profit cultural institutions return more than \$5 in tax revenues for every \$1 they receive in funding from all levels of the government (as quoted in American Alliance of Museums, 2018a). Museums generate tremendous value to the societies they serve, and communities are showing their love for their local and regional cultural institutions.

There are approximately 850 million visits each year to U.S. museums, which is more than the attendance for all major sporting league, events and theme parks combined (483 million in 2011) (as quoted in American Alliance of Museums, 2018a). These physical visitation numbers do not include the millions of site visits made to museum digital properties and online collections. Support for museums is robust regardless of political bias with 95% of Americans stating they would approve of lawmakers who acted to support museums (as quoted in American Alliance of Museums, 2018a). Additional support, made known through increased physical and digital visitation, may be achieved if museums more overtly design their missions and collections policies around and for their community beneficiaries.

Museums have become placemakers in their communities due to their service to under-represented populations and partnerships with their regional community and educators. For example, many museums offer programs tailored to veterans and military families. In 2017, more than 2,100 museums participated in the Blue Star Museums initiative, offering free summer admission to all active-duty and reserve personnel and their families. This effort reached more than 900,000 people and does not include the many other discounts and events offered to military constituents throughout the year (as quoted in American Alliance of Museums, 2018a). Museums are also offering many social services, including programs for children on the autism spectrum, English as a Second Language classes, and programs for adults with Alzheimer's or other cognitive impairments (as quoted in American Alliance of Museums, 2018a).

Museums spend more than \$2 billion a year on education activities, meaning the typical museum devotes three-quarters of its education budget to K-12 students (as quoted in American Alliance of Museums, 2018a). Museums receive approximately 55 million visits each year from students in school groups (as quoted in American Alliance of Museums, 2018a) and are considered valuable resources helping teach state and local curriculum by developing bespoke curriculum in math, science, art, technology, literacy, language arts, history, civics and government, economics and financial literacy, geography, and social studies (as quoted in American Alliance of Museums, 2018a). Similar to my own exposure to museums, students who attend a field trip to an art museum experience an increase in critical thinking skills, historical empathy and tolerance. The same study found that students from rural or high-poverty regions, the increase of these skills and characteristics was even more significant (as quoted in American Alliance of Museums, 2018a).

Not only have museums contributed towards the greater good of humans, but they have also contributed to the benefit of preserving and protecting species and our physical environment. According to AAM, "museums are involved with conservation breeding, habitat preservation, public education, field conservation, and supportive research to ensure survival for many of the planet's threatened or endangered species, as well as, conducting or facilitating research to advance the scientific knowledge of the animals in human care and to enhance the conservation of wild populations (as quoted in American Alliance of

Museums, 2018a). In 2016, accredited zoos and aquariums spent \$216 million on field conservation projects in 127 countries (as quoted in American Alliance of Museums, 2018a). Museums are defining and embracing a social purpose to cement their place in their local communities. These present actions lay a foundations for the future by building up the value and quality of life of the communities these cultural institutions serve, ensuring the ‘museum of the future’ has a chance to take hold.

1.6. A perfect storm

Such value has meant that museums have become more than just the curiosity cabinets of wealthy collectors from which they originated, but have become places for people, designed and built by the people they serve. Museums are struggling with accessibility as funding models constantly shift and money ebb and flow to support human resources, collections, and public programming. In 2012, 37% of museums were free at all times or had suggested admission fees only, and nearly all museums offer regular discounts or free admission days (as quoted in American Alliance of Museums, 2018a). AAM reports that since 2014, hundreds of museums have facilitated more than 750,000 museum visits for low-income Americans through the Museums for All program (as quoted in American Alliance of Museums, 2018a). In addition to these efforts, museums are experimenting with ways to reach rural communities, such as pop-up exhibitions and travelling vans or busses bringing portions of the collection to the people, as we will explore in Chapter Four.

Perhaps it is through the efforts outlined here and the countless others taking place all over the Unites States of America, that museums have earned the trust of the communities they serve. According to Reach Advisors, Museums R+D, museums are considered the most trust-worthy source of information in America, rated higher than local newspapers, non-profit researchers, the U.S. government or academic researchers (as quoted in American Alliance of Museums, 2018a). Museums are a place of educational authority and are considered a more reliable source of historical information than books, teachers or personal accounts by relatives (as quoted in American Alliance of Museums, 2018a). Museums drive economic, educational, cultural, and community value at all levels of society. This value combined with the opportunity of expanded reach through emerging technologies, is the perfect storm for cultural institutions to address how to move forward in manageable and actionable steps.

The digital transformation is not linear. In fact, the journey towards digital transformation can be quite complicated – one step forward and two steps back. As reflected in the digital data maturity assessment and follow-up interviews with the staff of the three US museums studied in this thesis, the museums are not systematically tackling all areas of digital data maturity one category and one maturity level at a time. These institutions are simultaneously experimenting with many change levers in many of the categories and maturity levels. In this thesis, digital data collection and use serves as the proxy for digital maturity. By evaluating an institution's digital data collection and use, one may begin to gauge the institution's readiness for the future, as well as, determine how an institution defines and resources "digital" activities.

Whilst my research and analysis has led me to dismiss the idea of a single path to digital transformation, I advocate for museums to expand their digital toolboxes to include private sector, road-tested tools to assist the museum in determining the path or paths that best suit their quest for digital maturity. I will expand on the 4Ps of digital transformation (Figure 1) that I introduced earlier in this section (categories: personalization, platform, panoramic, and paradox), and add 2Ps (categories: pollination and pathways) to make the case that these 6Ps form an essential set of core elements that make up and nurture the museum's terroir. The six categories or 6Ps in total are: personalization, platform, panoramic, paradox (of change), pollination, and pathways (Figure 3).

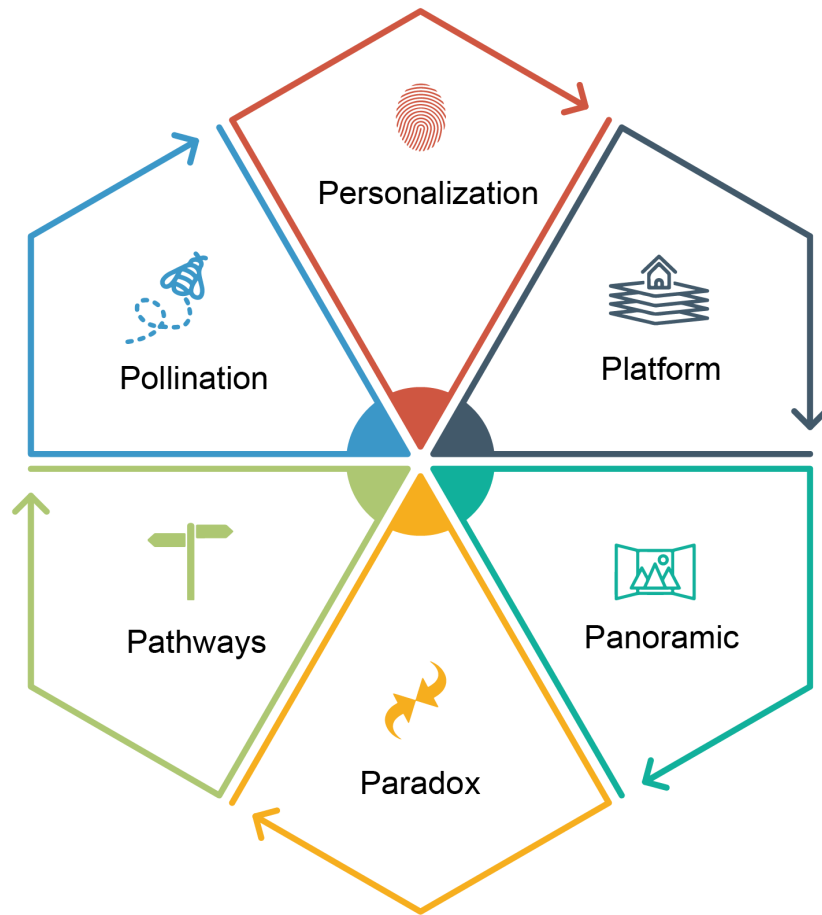


Figure 3: The 6Ps of digital data maturity (Source: Author).

While each museum interviewed for this thesis has taken a different path on the quest towards digital maturity, all museum staff stated they viewed digital confidence as a vital enabler of their digital maturity strategy (Chapter Six). Digital transformation requires a significant investment towards the right set of technologies, but unless leaders also invest in training of how to properly use these tools and platforms, the technologies may not be used to their greatest potential. This finding is also supported in the information ecologies framework introduced in Chapter Three that specifies the need to imbue the ‘keystone species’ required to support the information ecology or digital ecosystem with the right

skills and literacies. An institution that is striving or sustaining a maximized or optimized level of maturity across all digital scaffolding categories is cultivating an environment where information is shared, owned by all, and transformed into knowledge by sharing the good, the bad, and the ugly ideas with their colleagues.

Digital transformation may have acceleration powered by advancing technology, but at its core the foundation required for the scaffolding of any transformation is based on change management principles. Change management has no one prescribed path, rather there are multiple pathways to an evolved and enlightened organisation. As this thesis will evidence, there are many tools museum professionals may use to aid their strategic management navigation, but it is not through the use of these tools alone that the museum derives further understanding of what digital means to them and how digital is applied to its operations and visitors. In all of the literature reviewed for this thesis and corresponding fieldwork, the ever-present goal for museums of all shapes and sizes across the globe make a show of becoming “digital”. The process of becoming something other than what cultural institutions were or presently are, is the very act of transformation. Becoming digital may begin with the digitisation of museum collections or it may begin through the comprehension of the collection and use of its collections, facility, development and visitor data.

1.7. Overview of this thesis

To build this narrative around digital maturity analysis within the museum, and the role of data within, this thesis is structured around seven key chapters. Chapter Two offers a history of technology in museology through the past five decades. This account is written through the lens of change agents embedded in the museums. The true test of a transformation effort is whether the change sparked can be maintained and sustained once the change agent(s) have left the institution. A by-product of this thesis is the need to gauge how digital transformation and readiness is predicated on a singular change agent mind-set or if behaviour changed across specific teams or an organisation sparks the desire for development. The tools discussed later in this thesis are no substitute for the hard work and dedication needed by the institution to understand the capabilities, competencies, and literacies required to support any digital transformation effort. This chapter strives to answer: who drives digital maturity in the museum?

Chapter Three, which positions how museums may begin to explore the impact of digital maturity through data as currency, is the second of three chapters to lay the contextual foundation of data as the identifier of a museum's terroir. Digital data collection and use is a valuable indicator, if not the most crucial indicator, of overall digital maturity. In this chapter, I outline what constitutes digital maturity in the museum through the understanding of how data is absorbed, insights are derived, and how data is being used to inform decision-making. As illustrated in Chapter Two, museums are evolving beyond the digitisation of the collections to the digitisation of each aspect of the visitor experience whether in the physical museum or digital ecosystem. Any size museum may begin to take advantage of the benefits of digital data collection and use by moving from thinking primarily of big data, to the betterment aligned with thinking about smart data or the act of fit-for-purpose data tools and capabilities.

Chapter Four focuses on the role of digital maturity within museums to spur community placemaking improvements and innovation. Whilst Chapter Two sets the historical context of digital maturity and Chapter Three introduces the concept of establishing digital maturity through data collection and use, Chapter Four is the final of three chapters depicting why digital maturity is important to museums by showcasing museums and other organisations embracing and encouraging their soft power or social influence through digital activities within their physical communities. It becomes clear in this chapter that data is the lifeblood of an organisation cultivating a space and place in the physical cultural sector. The cultural institution is faced with the challenge of understanding data flow across the physical and digital ecosystems and determine how these connections bridge the physical ecosystem with that of the digital landscape to enhance the visitor relationship with the organisation and influence an increased depth and breadth of the visitor experience.

Chapter Five introduces how cultural institutions may begin to measure digital maturity through the application of private sector business tools. The research methodologies are introduced after grounding the reader with the context in how museums have responded to technologies, used technology to harvest and use data, and the opportunity to use this data to expand visitor and community relationships. The first tool introduced is the time-tested 'maturity matrix' developed by me based on a time-tested,

private sector business maturity management model. The maturity matrix is a self-assessment of how data is collected and used within the museum across six capability areas: governance, management, community, processes, metrics, and tools. The maturity matrix is a snapshot in time that allows museums the ability to see where they stand today. The goal of the matrix is not to achieve an unrealistic goal of optimized maturity across all six capabilities; rather its primary use is in how the museum may begin to chart the path to prioritize next investment and resource planning steps towards the achievement of higher stages of maturity outcomes towards optimization.

Chapter Six follows three museums in North America as they assess their digital maturity through data collection and use by using the digital data maturity self-assessment. The digital data maturity matrix is an original product created specifically for this thesis to gauge how well optimized is the museum's data governance, management, community engagement, processes, tools, and metrics. In this chapter, one may begin to see how all museums share similar aspirations and goals but take various paths to achieve maturity.

In Chapter Seven, I then introduce the second business tool, that of 'scenario planning'. This private sector business tool may be used in conjunction with the maturity matrix to better understand the cultural institution's possible, plausible, and probable futures and what levers may be pulled for greater impact across the six capability areas of digital maturity. While scenario planning has been used with great success for private sector companies like Royal Dutch/Shell, scenario planning is increasing in popular use as the AAM used this business tool to illustrate the impact of strategic long-term planning to North American cultural institutions in their 2018 Trends Report and Museum magazine articles depicting the possible, plausible, and probable futures of museums in the year 2040. The 'museum of the future' may include the mission of preserving the past and present, as well as, require the need for a dedicated effort to keep an eye on the horizon and plan for what cultural institutes may need through any organisational evolution, such as that of digital transformation.

Chapter Eight weaves together the insights and examples from Chapters Two through Seven to focus on the importance of systems thinking—its challenges as well as ways of embedding this mind-set into the DNA of the museum—as a way to help the museum achieve community impact. I integrate the case study analysis with additional

research into how organisational design challenges continue to exist in digital and to examine how visitor experiences drives prioritization of digital innovations. I dig more deeply into the importance of understanding digital skills to drive digital adoption and how this confidence helps increase the spread of ideas, challenging the organisation and the sector to become greater community connectors and partners.

Chapter Nine concludes the thesis and emphasizes the need to think about digital maturity holistically by reflecting on the how the human, experiential, and organisational contexts of digital maturity may be realized when organisations cease the attempt of finding one way to achieve digital maturity and, instead, explore the many pathways available to them when they understand how information flows through their institution and they use this knowledge to inform all decisions and overcome future challenges and obstacles. When information is flowing freely within the museum's physical and digital ecosystems, the conditions are ripe for ideas and innovations to be cross-pollinated within and between cultural institutions. I conclude with the call-to-action for each museum to use every tool at its disposal—available within both the public and private sectors—to construct the 'museum of the future' at the intersection of people, technology, and the physical environment.

Chapter Two:

Change and Transformation

To understand the story of museum evolution in the age of modern-day computing, we have to start from the beginning of computing. We must pay tribute to those who forged and built the successes from which our cultural institutions benefit. Some of these people are well known as stewards of cultural heritage -- others are less familiar or even anonymous change agents. Each is important. This chapter tells the story of the last five decades of museums in the digital age through the lens of the change agents who encouraged cultural institutions to learn from, but not get stuck in the past, and how to apply this creative thinking in how we capture and classify collections and visitor studies. Understanding this history of museum transformation, with a longer view, enables us (here in this thesis, but more widely in our discussion and practice in this area) to interpret how change frameworks and activities were adopted and adapted with purpose and at scale. Interpreting transformation is about the need to understand the people-- and not just the technology. Moreover, with digital change we notice (by looking back) that it is particular people (the change agents or ‘hackers’) who characterize and influence key moments of maturity and transformation. To study digital transformation means, therefore, to study how change agents detected and brought about innovation through revolution and evolution.

Those who have built or are building the foundation of progress of humankind are referred to as “hackers.” In this thesis, when referring to a “hacker” it does not mean computer criminals, but “in its true and original sense of an enthusiast, an artist, a tinkerer, a problem solver, an expert (Raymond, 2001, p. xii).” These individuals and their underlying culture have changed the way people relate to and reshape their idea of a museum. The concept of continuous idea generation, or the process of creating, developing, and communicating ideas is understood and actively practiced in many museums. In fact, director of the Museum of Modern Art (MoMA) Glen D. Lowry “asserts that the idea of

the museum as a ‘disruptive institution’ is embedded in the museum’s original conception” (2009, p. 9 as quoted in Drotner, et. al., 2019, p. 6).

In the 1960s and 70s, something extraordinary happened. During this era of social change, hackers across all industries were developing the birth of modern day computing and the reasoning of chaos theory, as well as other progressive ideas. Some museums embraced the age of technology as their institutions morphed their identity into more than just a place of collection for the academic audience and expanded to include communities of the television generation (Williams, 2010, p. 16). From this new awareness of external audiences grew a need to share and connect what each institution had to offer with all who entered its walls. As museums began to be viewed as “public trusts with duties and responsibilities to their collections, to their communities, and to future generations,” the need for information management to easily identify, interpret, and display items of interest for more than one audience became of utmost importance (Williams, 2010, p. 16). Computerization was still in its infancy and only available to a select few institutions that had both the money and affiliation to pursue new technologies to assist with the digital information capture and organisation of their collections. To this day, the high cost of technology and lack of resources continues to separate museums that can afford to be on the bleeding edge of technological advances from the majority of institutions that cannot (Williams, 2010, p. 16). The cultural and social changes of this era shaped how modern museums entice prospective visitors to recognize and appreciate the existence of cultural destinations.

For the first time since the 1920s, when experimental psychologists Edward Robinson and Arthur Melton delved into the concept of visitor analytics, museums evolved from academic-only institutions and assessed how to incorporate a human-centric strategy (Bitgood and Shettel, 1996, p. 6). The drive to enhanced information management in the 1960s led to the focus on the visitor and the effect of the visitor on the cultural institution and vice versa. After research (conducted by museum visitor studies researchers, Harris Shettel and Chan Screven in 1969) of school group interactions with museums was published, visitor studies became an active area of study (Bitgood and Shettel, 1996).

The rise of technology enabled hackers to quickly build on ideas at a more rapid clip. Once new or different problems and solutions are identified they continue to build by

removing any unnecessary blocks of thinking. Shettel, Screven and others (1996) were building upon the ideas of great thinkers and explorers just as those before them had. They were part of the hacker movement -- establishing the framework for museums to think creatively about visitor engagement and finding ways to join personalization with the visitor experience. These cultural institutions set a solid foundation and allowed for the growth of well-honed collections that piqued human curiosity. Hackers built on this foundation and introduced blocks of creative thinking – one at a time. This began the process of cultural heritage. It is by understanding how these various building blocks came into existence through technological and social growth, that we could identify any museum's development. Studying its virtual substrate is not unlike how we would study the actual building blocks of its physical structure. Before delving into the milestones of computing over the past five decades, one should understand the similarities of the virtual and physical foundations of these cultural institutions.

Museums of the present and future are structures of ever-changing scale and complexity. They represent diverse characteristics and desires. Just as the hackers railing against the cathedral-style building of technology by a select few architects who develop one brick at a time, shielded from everyday challenges, museological hackers are finding a new generation of hackers to discard cathedral building and embrace the development style of the 'bazaar' model. This model encourages an agile community and is ideal for museums to establish connections with individuals and groups. Rather than erecting ivory towers of academic prowess, the availability of information allows for the design of block-style structures customized for the fluid needs of the cultural institution and visitor experience.

Over the past fifty years, museum hackers of all backgrounds have built a world that scales to the complexity of a larger connected community -- designed or enhanced by an increasing number of architects. Museums are coming to terms with being a public servant instead of serving the public. The mission and relevance debate continues between the museum aesthetics of a collection-based organisation to that of an institution delivering the visitor an experience catered to their needs, challenges and desires. Museum philosopher, Stephen Weil, suggests a new model where the museum is *for somebody*, instead of being *about something*. He writes, "A transformed and redirected institution that can, through its public service orientation, use its very special competencies in dealing with objects to

contribute positively to the quality of individual human lives and to enhance the well-being of human communities (Weil, 2004, p. 170).” The question remains -- does it have to be an either or? Perhaps the question does not need to be so binary.

Almost forty years ago, Adele Z. Silver of the Cleveland Museum of Art observed: “museums are inventions of men [*sic*] not inevitable, eternal, ideal, nor divine. They exist for the things we put in them, and they change as each generation chooses how to see and use those things (Weil, 2004, p. 172).” If the museum is fulfilling its mission, both aesthetics and personalization may be achieved. Weil (2004, p. 183) suggests a litmus test to isolate museums with a collections-first approach from those institutions aspiring to serve the public by applying the 1936 observations of a German curator writing about a homeland museum in Cologne:

The *heimatmuseum* must not be a kingdom of the dead, a cemetery. It is made for the living; it is to the living that it must belong, and they must feel at ease there [...] [T]he museum must help them to see the present in the mirror of the past, and the past in the mirror of the present [...] and, if it fails in that task, it becomes no more than a lifeless collection of objects.

If museums change from an inside-out perspective to an outside-in approach of marketing and decision-making, they have the power to change the relationship between the visitor and the institution and become the instrument of social change Weil professes. This change may be sparked within museums by hiring externally for change agents who can remix and rethink the talents and operations of the current museum and infuse the organisation with a new way of thinking and working that helps the collective organisation see into and through the mirror of the past.

Bigger clusters of hackers are forming to address and resolve the gaps between museums and communities. These hackers have a louder voice than their predecessors. Reality is forcing change as these hackers take on professional museum organisations and lead community change through the powerful connection of the Internet. Fifty years ago, museum hackers paved the way for the development of technology and the focus for visitor studies. And over the past three decades, recognition of the need to go beyond a single

variable and visitor study has occurred. Museum researchers, John H. Falk and Lynn D. Dierking (2013, p. 13), began chronicling the museum journey of embracing the role of an educator and becoming interested in the museum experience through the lens of a visitor in their acclaimed research, *The Museum Experience* published in 1992. The goal: hone in on visitor experience and to build and improve the supporting infrastructure. Falk and Dierking (2013, p. 17) recognized the visitor journey does not begin and end when the visitor(s) walk through the museum door, rather the experience is shaped by the pre- and post-visit actions. Today, the museum industry is taking the work of Falk and Dierking and other museum studies researchers earnestly and questioning how current economic and social changes may be signals impacting the museum experience – one that actively engages the visitor both inside and outside the physical walls of the institution. Put plainly, the ‘hacker’ is a key concept because this person or person(s) are the infamous canary in a coalmine, meaning they can detect critical environmental changes within the museum and signal need for immediate change. As we will see, the role of the ‘hacker’ is not only to detect the need for change, but to use their agency to spark tangible activities to assist making the case for change at scale within the museum.

2.1. Five decades of museology

In order to understand the challenge facing museums in the digital age, it is necessary to understand the major developments in computing and how museums rewired [or failed to] their cultural institutions to adapt and adopt emerging technology. Museums of the 21st century are transforming from the curiosity temples of the 19th and 20th centuries into both individual and group learning environments. Throughout the 19th century, visitor studies were isolated. It was not until the 1960s and 1970s when a series of evaluation studies kicked off a growing curiosity to learn more about the impact(s) of visitor behaviour in cultural institutions (Bitgood and Shettel, 1996, p. 6). A Hooper-Greenhill (1999, p. 7) study found that many non-visitors likened museums to a church or temple. This reference will become important when the parallel rise of the change agent or hacker is later explored.

Significant changes to museum missions were the result of passionate and empathetic museum educators who recognized the importance of those walking through their doors. These museum change agents challenged the status quo by hacking technology

and existing processes. In a series of visitor behaviour studies still relevant today, psychologists Robinson and Melton observed visitors' interactions beginning in 1925 and determined several factors which impact exhibition design and visitor circulation patterns; that Robinson later reported to the 1926 American Association of Museums Annual Conference (Bitgood and Shettel, 1996, p. 6).

External factors -- in addition to the changing and more recognized needs of the visitor -- spurred technological advances across the entire museum industry. The primary focus of technology in the 1960s focused on how to document the collection. Museums had become a destination for the public. And with this spotlight, museums may have felt pressure to compete with sports and other leisure activities, including television. Museum educator, John Falk reveals that research into the motives fuelling leisure activities started in the late 1960s "because it promised to help them [researchers] understand why people engage in leisure behaviour" (2009, p. 46). Such research is critical to museums because leisure in the 21st Century is linked to the creation and enabling of identity-related needs (Falk, 2009, p. 44). Cultural institutions, during the 1960s, were challenged with finding ways to connect with the communities they now served in order to keep the doors open; balanced with maintaining a relevant institution and finding more effective methods to preserve the provenance and health of their collections (Williams, 2013, p. 16). Economic and social changes at this time in America resulted in a more "transient life style," meaning professionals were no longer staying at one organisation or limiting oneself to a single position but seeking relocation (Williams, 2013, p. 16). Museums were no exception and experienced "with these relocating professionals went valuable collection information previously recorded in their memories and relied on to fill the gaps in faulty record-keeping systems (Williams, 2013, p. 16)." The pressure to adapt and adopt to new technologies and social expectations was felt by cultural institutions inside-out and outside-in.

In the early days of computerization, the cost to maintain "mainframes" and the resources to support these systems were exorbitant -- only the larger institutions with massive collections or those affiliated with a university could afford. These systems were considered status symbols by the cultural institutions who could not afford the adaption of new technologies (Williams, 2013, p. 16). The museum professionals pioneering the digital revolution thought technological prowess and outputs would create a utopia of museum

practices (Williams, 2013 and Jones-Garmil, 1997). The impact of innovation at this time across all industries, not limited to museums, may have created an overwhelming belief that anything was possible. The editors of *The Routledge Handbook of Museums, Media and Communication* (2019, p.8) describe this evolution as:

The shifting *disposition* of the cultural role and social function of museums from ‘custodial’ responsibility to facilitating more ‘convivial’ interactions is being revealed in the adaptation of museological modes of operation, their organisation structures and strategies, as well as curatorial and pedagogical practices.

Emerging technologies gave museums the tools to explore and expand their physical collections and geographical constraints. This exploration opened the museum doors to new driving forces that influenced a change of language, mission, and vision.

The Smithsonian Institution was one of the first to enter into the race toward computerization with the creation of the “Self Generating Master” (SELGEM) that “used text data fields that were delimited by numeric tags and special source code” (Jones-Garmil, 1997, p. 36). In addition to the Smithsonian Institution, three other cultural organisations began inputting data into SELGEM beginning in 1965 (Jones-Garmil, 1997, p. 36). SELGEM operated in 1970 using the COBOL programming language, making the platform operable in several institutions external to the Smithsonian Institution. Similar to SELGEM, the program package, “General Retrieval and Information Processor for Humanities Oriented Studies” (GRIPHOS) was first deployed for museum use in 1968 (Williams, 2013, p. 17). This system was created by Jack Heller, a professor of computer science at the State University of New York at Stony Brook, and was intended to automate collections information in museums (Jones-Garmil, 1997, p. 36). GRIPHOS was operated by the Museum Computer Network (MCN) through a subscription fee. MCN oversight locked down the programming package and did not allow users to make any adaptations or extensions to the system (Jones-Garmil, 1997, p. 37). The third player in this new space was “Arizona State Museum’s Interactive REGIStration System” (REGIS), a program launched in 1975 to improve museum registration efficiencies (Williams, 2013, p. 18). All

three programming packages were limited to those institutions with access to large mainframe computers and did not offer customer service support.

Computerization was an expensive gamble. Many institutions were disappointed with the results of their efforts. Like many organisations across a variety of industries, museums were making the mistake of thinking technology would solve more problems than realistically possible at that time (Williams, 2013). Museums tried to replicate substandard analogue processes to an automated system. But digitisation only amplified the analogue problems. These new systems required new thinking and workflow. The 1970s ushered in the era of the minicomputers and the ability for institutions not able to afford the programming packages previously described. This investment required more than just hardware costs. The new system still required specialized skill sets. As David Williams (2013, p. 18) so aptly describes in his essay, “A Brief History of Museum Computerization,” “because of the greater number of projects attempted, and the do-it-yourself approach taken by many, the number of successful computerization projects during this era was low.” At this time, the focus of investment was organisational change and how museums answered the call from the public sector to demonstrate accountability for the care and preservation of their collections. Even throughout the 1980s as computerization grew and became even more affordable through the desktop and laptop, the museum industry struggled to implement a centralized and commercialized product to improve efficiency and effectiveness. GRIPHOS is still in use today yet has lost traction amongst the real-time technological advancements and has no established network of users.

Many of those involved with the initial wave of technology were not specialists. Before emerging technologies introduced a shift in how museum information was created, gallery interpretation was the responsibility, in many cases, of volunteer docents and staff gallery educators (Samis, 2019, p. 53). Museum staff took on the role to innovate as another layer of responsibility. Then-Director of New Technologies at the French National Galleries in 1996, Bernadette Goldstein, reflected that simply investing in a database would not interest the visitor, and suggested, the role of a cultural interpreter: “what we might now call an interpretive media specialist-someone with a leg in both worlds, at home with both the broad public and art world and versed in the capabilities of new media technologies” (Samis, 2019, p. 54). It was not until the 1990s when the role of the specialist increased.

Such appointments had curatorial backgrounds or information specialists transferring their knowledge across industries. Specialized groups, such as MCN and other similar niche technology conferences gained momentum and membership throughout the 1970s, but even as the mainframe evolved into the generation of the minicomputer, robust resources and specialists were required to maintain these systems. Museum computerization proliferated, but this was a period of test-and-learn with very few success stories to justify the cost of computing (Williams, 2013, p. 18). Though the cost of computing was dropping and what followed was an era of rapid innovation that laid the foundation for creative hackers to push the computation to be more affordable and applicable.

There is no doubt museum operations were shaped by the dynamic social, economic, and political landscapes of the late 20th century. As Ross Parry stated in the *Museums in a Digital Age* anthology, institutions could “reflect upon several decades of caution provoked by a set of technologies that for a long time, for most museums, were seen as expensive, high-risk, over-hyped and requiring an unfamiliar up-skilling of the workforce (Parry, 2013, p. 1).” The extraordinary commitment required to explore emerging technologies and the resulting conflict between resourcing this exploration and maintaining museum operations, is an argument that persists across the museum sector today. As Peter Samis (2019, p. 52), associate curator of interpretation at SFMOMA, notes in his chapter, ‘Revisiting the utopian promise of interpretive media,’ this conflict dominated Kent Lydecker’s keynote address at the MDA/ICHIM Conference in Cambridge (1993, p. 291) in which the then-Associate Director for Education at the Metropolitan Museum of Art says, “The advent of interactive multimedia is changing the nature of the physical and conceptual environment encountered by visitors who come to the museum.” The push-and-pull of emerging technology experimentation and accountability reflect the internal fragmentation of museum work culture, as well as, the museum connection with their community beyond its physical walls. Samis (2019) uses the words of Lydecker to strengthen his call to museums to think beyond placing a screen in a gallery, but to use technology to supplement and compliment the learning and entertainment experience.

Emerging technologies influence the back-of-the-house, as well as front-of-the-house museum activities. Just as museums were experimenting with how to blend technology with their collections, museum programming was developing to shape or fit

within the constraints of the technologies. At the same 1993 MDA/ICHIM Conference Samis references in his article, Samis also quotes Scott Sayre, head of the Minneapolis Institute of Art Interactive Media group. Sayre (as quoted in Samis, 2019, p. 53) states:

The ever-expanding capabilities of interactive media make it easy to become overly concerned with its technical aspects. However, the Mia's experiences demonstrate that the development of appropriate, effective content is still the most difficult part of the process.

It was in the 1990s as visitor expectation increased that visitor studies hit its stride to become a sweeping force of change and address the importance of the visitor's voice and needs in the museum information and programming (Falk and Dierking, 2013, p. 4). Museums integrated IT systems and a drive toward developing standards across registration, designation, strategic planning, collections management, and training began in earnest. The use of external networks began at this time. In 1992, museum educators, John Falk and Lynn Dierking, published their revolutionary museum professional primer -- insisting on the importance of the visitor instead of the collection or as the authority of the institution. Their Interactive Experience Model (later renamed the Contextual Model of Learning in 2000) is a cyclical framework of overlapping contexts - the personal, sociocultural and physical - breaking down the complexity of the visitor interaction with the museum.

If the idea that a visitor was influenced by upbringing and previous experiences sounded familiar at the time of the publication of *The Museum Revisited*, it is because of Pierre Bourdieu and Alain Darbel's (2002, p. 3) visitor study in 1969, *The Love of Art*. In this study, the authors assert that art and education realms contribute to social, economic and cultural reproduction. There was never a clearer conviction of elitism handed down. "Thus [...] the social order is progressively inscribed in people's minds. Social divisions become principles of division, organizing the image of the social world. Objective limits become a sense of limits, a practical anticipation of objective limits acquired by experience of objective limits, a 'sense of one's place' which leads one to exclude oneself from the goods, personas, places and so forth from which one is excluded (Bourdieu and Darbel,

2002, p. 41).” Museums had to find a way to overcome inherited ‘cultural capital’ and discover ways to connect with a diverse community -- or risk becoming obsolete with the rise of the middle-class.

Is it any coincidence that in the year Falk and Dierking finished writing the manuscript of *The Museum Experience* (1984) and the year this book first became published (1992), the American Association of Museums (AAM) (1992, p. 8) acknowledged the trend of visitor experience research and released a series of reports stating, “museums can no longer confine themselves simply to preservation, scholarship, and exhibition independent of the social context in which they exist.” As Marsha L. Semmel, former director of the Office of Strategic Partnerships at the Institute of Museum and Library Services, wrote in the forward of *The Museum Experience Revisited* (2013, p. 7), she had not critically investigated the perspective, knowledge, or experiences of the museum visitor or prospective visitor before reading *The Museum Experience*. The topics in the book made an impact on Semmel and other professions resulting in increased attention around the broader learning ecosystem and how these contexts impact visitor studies. Visitor studies became a central pillar to museum growth and the Visitor Studies Association.

Falk and Dierking’s research and growing belief of many museum educators of this time is built on the constructivist learning theory -- or the idea that museums do not dictate the visitor experience. Rather, visitor’s construct their own meanings within the museum. In a speech at the International Committee of Museum Educators conference in 1991, George E. Hein (1998) acknowledged this view of learning was in opposition with traditional museum practices and called on museum professionals to learn from modern educators like John Dewey. It was Dewey (1916, p. 135) who said:

Study is effectual in the degree in which the pupil realizes the place of the numerical truth he is dealing with in carrying to fruition activities in which he is concerned. The connection of an object and a topic with the promotion of an activity having a purpose is the first and last word of a genuine theory of interest in education.

In the mid-1990s, museum educators debated over what model of visitor learning took precedence. Bitgood and Shettel (1996, p. 9) reminded museum professionals to look at the bigger picture and multiple variables: “Focusing on just one variable shows lack of appreciation of the complexity of informal learning.”

The scope of visitor studies includes audience research and development, exhibit design and development, program design and development, general facility design, and visitor services. Historically, exhibit evaluation of design and development has dominated these sometimes-overlapping areas of study, and research depended on basic demographic data for defining visitors. In 1983, Marilyn Hood took on the challenge to understand the motivations behind why some chose to visit museums and why others did not. This study went deeper than sole demographic data -- it opened up the door to the importance of psychographic variables, how Falk (2013, p. 40) describes “psychological and motivational characteristics of individuals” influence the learning process and the value of the experience. It is crucial to understand how museum learning and education have evolved because we will begin to identify the same or similar change levers required to enact digital transformation akin to the visitor experience movement kicked off by Falk, Dierking, and others.

In the absence of acknowledged museum authority through the role of an ‘educator’ or ‘docent’, there is not chaotic visitor behaviour, but patterns that may be observed by measuring key performance indicators. Museum researchers Falk and Dierking (2013, p. 29) discovered time and attention are two additional variables factoring into the visitor experience. Time is the connective tissue and fourth dimension holding together the framework of the Contextual Model of Learning. Like Lego® blocks Falk and Dierking (2013, p. 29) view these variables as the scaffolding upholding this Model and as “A convenient, though admittedly artificial, way to think about this model is to consider experience, of which a key part is learning, as being constructed over time as the individual moves through her sociocultural and physical world; over time meaning is built upon, layer by layer.” In the late 1990s, Beverly Serrell (1998, p. 108-125) researched the relationship between time and visitor behaviour and found more time was spent interacting with exhibits encouraging engagement. In conjunction with other visitor behaviour variables,

researchers like Shettel built upon the usefulness of time as a predictor for assessing educational effectiveness.

The observations of visitor behaviour became more robust at the turn of the 21st century as museums internally reflected on how exhibition design impacted the visitor experience. Joseph Pine and James H. Gilmore (1998, p. 165) describe the experience economy as having visitor participation and “the kind of connection, or environmental relationship, that unites customers with an event or performance.” Many studies focused on the length and type of information conveyed through exhibit labels. And the debate continues today. In the early 1990s, Paulette McManus evaluated visitor interaction with labels and concluded, similarly to Falk, social context impacts how visitors behave with the exhibition and what it’s communicating (Bitgood and Shettel, 1996, p. 9). As the world became familiar with the networked society and rise of the digital age, museums were called upon to offer diverse interpretations and communication of information. The authoritarian voice dominance was fading, and the rise of the individual and community voices were loud and clear – they called for museums to reflect the community’s stories and interests if cultural institutions wanted to stand a chance at competing with other leisure activities.

Rather than a focus on knowledge outcomes, constructivist learning requires a melding of the personal, socio-cultural, and physical contexts -- and how the individual visitor relates to the museum or exhibition at a specific place and time. Traditional learning theories do not account for these influential variables. There is nothing standard museums could create to engage the diverse needs, challenges, and desires of visitors. The future of museums is dependent on the connective tissue between the museum and the visitor, as well as the museum with the broader community. The museum’s knowledge of rare and coveted collections required a shift -- to learn more about the individual visitor and the community the museum serves. Hein (1998, p. 3) asked museum professionals to recognize the power of creating meaningful visitor experiences, “in order to grow and learn from their museum experiences, [museum staff] needs to understand what meanings visitors make of their museum experiences. How can the educative value of experiences be enhanced?”

Several strategic planning frameworks were created to answer Hein’s question and overlay the Contextual Learning Model. Some have been more successful than others, but

none have become widely applied. The Personal Meaning Map (PMM) and the Learner Report (LR) are devices to glean more insights from visitors beyond the typical surveys and personal interviews. The PMM and LR show promise to breaking down the complex behaviours of visitors for museum professionals to better understand and create applicable interactions with the museum (Hein, 1998, p. 15-32). The AAM Task Force developed the Comprehensive Interpretive Plans (CIP) in 2004 as a possible addition to the accreditation process. The CIP (Koke, 2008, p. 248) was defined as:

A written document that outlines the stories and messages the museum wants to convey through a variety of media such as exhibits, programming, and publications. It may include the institution's interpretive philosophy, educational goals, and target audience.

The CIPs were structured to provide a common language and allow for discussion beyond those departments responsible for exhibition design and development. The goal: to determine the right mix of ideas for the visitor experience. Though some institutions benefited from the development and execution of the CIP, like the Art Gallery of Ontario, this strategy-planning framework did not gain traction or approval for overall implementation. Some institutions claimed the extra planning process was additional work for already time-stretched staff and some feared the structure may dampen creative ideas. Despite the numerous research validating the need for focus on visitor studies and the success of the CIP in several institutions, Judy Koke (2008, p. 248) wrote about her experience deploying a CIP framework; she countered the fearful response of the AAM Task Force:

This focus on integrating a visitor-based definition of success required on-going audience research, which in turn stimulated a wide variety of new ideas and approaches to interpretive work.

Current visitor studies may be assimilated into the department identifier of 'audience development.' It may be a matter of semantics, but such wording harkens back the 19th and

20th century line of thinking whereby the museum is the authoritarian voice. One speaks at an audience, not ‘with’ an audience. At the core of the Contextual Learning Model, the individual has an interaction with the objects, with others in the same exhibition area, and with the physical museum itself. Cultural institutions need to reframe their thinking and expression to focus on community development and inclusion. Lois Silverman (1999, p. 161-170) counsels museums of the future will need to meet the expectations of a variety of community groups.

At the turn of the 21st century, computer systems and networks were fully integrated into the majority of cultural institutions. In-house training, support and additional information specialists were growing in strength and numbers. There was pervasive use of content and syntax standards. Technology has developed from being databases, to understanding a richer narrative that is a through line betwixt and between the museum’s physical and digital ecosystems. The words of science technologist, G.S. Rautela (1996, p. 32) capture the changes documented in the previous two decades in museology: “We must also not forget that the information age is really about people communicating with people” (as quoted in Samis, 2019, p. 54). The age of disruptive and interactive media and communications began and museums began to shift from collection-focused institutions to community-focused partners.

2.2. The birth of the change agent or hacker

While this chapter has highlighted the evolution of computing in cultural organisations, museology, overall, has experienced massive growth and practice standardization. A perfect storm of social, economic, and political changes worldwide sparked an innovation movement. Much of the museum industry progress was a result of computerization creation. Just like those museum professionals challenging the status quo to encourage cultural institutions to become visitor-centric and establish standards of accountability to the publics served, the birth of the digital revolution began with seeking ways to communicate to the masses.

In the 1960s, hackers were seen as innovators. These individuals were tinkerers driven by passion to change the status quo. The MIT Artificial Intelligence Library was the first group to adopt the term ‘hacker’ (Raymond, 2001, p. 4). In the early years, hackers were isolated in their own universities or research centres. It was not until ARPAnet was

created that hackers connected and began building networks to communicate and learn from each other. ARPAnet birthed the digital age. Created by the Department of Defense in 1969, ARPAnet was the first trans-continental, high-speed computer network built to “link together hundreds of universities and defence contractors and research laboratories. It enabled researchers everywhere to exchange information with unprecedented speed and flexibility -- giving a huge boost to collaborative work and tremendously increasing both the pace and intensity of technological advance (Raymond, 2001, p. 4).” The hacker culture grew from connected networks and thrived in places such as MIT’s Artificial Intelligence and Laboratory for Computer Science labs, Stanford University’s AI Lab (SAIL), and Carnegie-Mellon University (CMU).

Before the era of the personal computer, hackers depended on shared use of the Digital Equipment Corporation (DEC) Programmed Data Processor (PDP) series of minicomputers owned primarily by universities (Raymond, 2001, p. 5). By the 1980s, three groups of individuals were using their time on these machines to create elements that became universal operating systems, personal computer hardware and software, and first-generation robotics. The groups relying on an aging PDP system railed against the group with the mission of commercializing computerization. In 1983, PDP technology dependent after thirteen years on an older model micro-computer became extinct as a newer model took its place. It should be noted that at this time, Steven Levy wrote *Hackers*, and claimed the movement had met its end. One hacker saw the writing on the wall and was determined to not let the hacker ethic die out. Richard Stallman began the Free Software Foundation (FSF) and in 1982 he created a portable version of the Unix and C programming languages. The software was free and known as GNU (Gnu’s Not Unix) operating system (Raymond, 2001, p. 11). The enthusiasts prevailed, and the hacker culture continued.

The early 1980s was an exciting period of growth with the development of microchips, workstations replacing time-shared units, and the formation of start-ups like Sun Microsystems. Just as in the previous decade, the dividing lines amongst hackers were once again drawn -- this time between the new generation of personal computer tinkerers and connected AT&T Unix users. With the close of the 20th century, computers were affordable, and a new user base was introduced to the hacker culture seeking better tools and Internet growth. Unified by their desires, hackers were not organized by any other

means. The FSF was unable to produce any usable or commercialized software products, and Microsoft was able to obtain market share, despite an inferior product. According to author and hacker historian or ethnographer at this time, Eric S. Raymond (2001, p. 14), this was a depressing period as the first-generation hackers aged and withdrew; and, as many predicted, the entrance to the market of large companies, such as Microsoft, marked the end of the hacker culture.

The failings of FSF may have defeated the optimism of many hackers, but it fuelled the creativity of Linus Torvalds, a Helsinki University student. Torvalds developed a free and successful Unix kernel (or brain for the system) in 1991. “His initial, rapid success attracted many Internet hackers to help him develop Linux -- a full-featured Unix -- with entirely free and redistributable resources (Raymond, 2001, p. 15). Rather than a group of select individuals, Torvalds harnessed the greater network of hackers to create a complex operating model. Linux dispelled the myth that only cathedral-style models could produce such a high-quality product. Volunteers coordinated through the Internet only and banded together to build the system they’d craved for three decades. “Quality was maintained not by rigid standards or autocracy but by the natively simple strategy of releasing every week and getting feedback from hundreds of users within days, creating a rapid Darwinism selection on the mutations introduced by developers (Raymond, 2001, p. 16).” Defying the odds, including the prevailing Brook’s Law predicting that “a project with thousands of contributors ought to be a flaky, unstable mess” Linux became a stable and competitive force to be reckoned with in the commercial-software market and mainstreaming of the Internet (Raymond, 2001, p. 171).

In a very short time, hackers went from fringe innovators to influencers of Fortune 500 companies. Raymond released his essay *A Brief History of Hackerdom* in 1996 documenting the transitions of the hacker culture and sharing the success of Linux using the cathedral and bazaar model metaphor. In what is now known as the modern interpretation of the ‘shot heard round the world,’ Netscape CEO, Jim Barskdale credited Raymond in 1998 as the “fundamental inspiration” for deciding to open the Netscape browser to the Internet (Raymond, 2001, p. 173). Raymond, and others in the Linux community, recognized the success of Netscape might validate their own success and existence. It was time to see if the theory of the success of Linux was lightning in a bottle

or could it be replicated and scaled? In a bit of a meta twist of events, Raymond--the hacker ethnographer--partnered with Netscape to advise the creation of a new company and product developed by the masses.

Hackerdom needed a reboot and rebranding. The sting from FSF failings were too recent, and “free software” had a lot of baggage with the negative association. The Netscape validation gave the momentum for the hacker tribes to band together and capitalize on the moment to secure their future. Over the course of the next year and a half the negative connotations of “free” were replaced with positive associations around the term “open source” and the creation of the Open Source Initiative (OSI) organisation (Raymond, 2001, p. 175). Though the creation of the Netscape vision, the Mozilla product, was not successful, Pandora’s box was opened and the ‘open source’ movement began in earnest.

Supporters of the new strategy did not want to repeat the same mistakes as FSF. Lessons learned from the negative stereotypes and actions of previous hackerdom structure included investing in top-down support. FSF evangelism hinged on the bottom-up support of the hacker community. The Netscape example proved that a senior thought leader and the support of Fortune 500 resources were required to help push support and lend credibility to the ‘open source’ vision (Raymond. 2001, p. 177). To sustain the growth of the strategy, a flash-in-the-pan media effort could not be risked. For true market credibility and to solidify the Fortune 500 support, the eyes, ears, and voice of mainstream media was also needed. For awhile, the OSI pursued the trademark certification of ‘open source,’ but ultimately the court decided this was a term too broad to trademark. The efforts were not in vain because over the course of the court review, the Open Source Definition built up credibility in the media and warded off monopolies from “embracing or extending” the term for their own uses (Raymond, 2001, p. 178).

Most importantly, the hacker revolution recognized the need to educate from within. Hackers were their own worst enemy and greatest weapon. The cathedral model was built on having only a select few voices act as ambassadors on behalf of the greater whole. The bazaar model, and its efficient creation of Linux, proved otherwise and emphasized the need for all voices to have the power to be heard and assist for the common good. All hackers needed to understand the arguments and counter measures to win the war and

become a visible and unified force.

2.3. Embracing the hacker ethic

Just like the kernel that sparked a revolution in computerization, cultural institutions have been shaped by the hackers who have challenged the status quo and paved a future for their services in an increasingly digitized ecosystem. A hacker's mentality, it could be argued, is now needed within all museum professionals. The cathedral model is fading or close to being stripped down and the bazaar model is increasing in strength as museum professionals find their voices and actively listen and engage with the communities they serve. To study digital transformation within museums means, therefore, the need to study how change agents in cultural institutions detected and brought about innovation through revolution and evolution.

Raymond breaks down what is needed to become a hacker in the series of essays comprised in *The Cathedral & The Bazaar*. While he discusses what is required for a software-hacker, Raymond (2001, p. 196) stresses this mind-set can be found in the "highest levels of any science or art." As seen with the efforts of Hein, Faulk, Serell and others throughout the course of the cultural institution evolution, museum professionals have applied the hacker attitude to solve problems and master new skills to better the overall industry. Lois Silverman and Mark O'Neill (2004, p. 194) advocated the museum profession stop pitting theory against practice and recognize "visitor studies provide a perspective that can reveal the blind spots of even the most empathetic staff member." Museum hackers are creating value by working in the space between academic and field practice and then sharing insights and lessons learned back to the communities they serve. Raymond (2001, p. 197) describes this mind-set as:

Hackers solve problems and build things, and they believe in freedom and voluntary mutual help. To be accepted as a hacker, you have to behave as though you have this kind of attitude yourself. And to behave as though you have the attitude, you have to really believe the attitude.

In the *Hacker Ethic*, Pekka Himanen (2001, p. ix), also alludes to the fact a hacker may exist outside of the technology realm by stating, "the expression hacker ethic is used in a sense

that extends beyond computer hackerism, and that for this reason it confronts social forces that are not normally considered in discussions concerned exclusively with computers.” Museum professionals throughout the past five decades have cultivated this attitude by envisioning the future of museums as experiences that may be built, torn down, and rebuilt block by block based on new ideas, challenges, and sharpening of skills. Every block represents a new problem to be solved and a clue to solve the next piece of the puzzle. Hackers live for the next challenge.

In the past, hackers were thought of as lone wolves, just as the museum educators and policy changers before the turn of the century. They acted alone to challenge the status quo. There were limited connections. And a select few made decisions for the majority. The age of the Internet has made it possible for ideas to be easily exchanged. A hacker believes there is no need to reinvent the wheel. “To behave like a hacker, you have to believe that the thinking time of other hackers is precious—so much so that it’s almost a moral duty for you to share information, solve problems and then give the solutions away just so other hackers can solve new problems instead of having to perpetually re-address old ones” (Raymond, 2001, p. 198). The future of museums is not an issue for a single person or museum, but all museums and museum professionals. Together, the museum community can continue to clear away the ruins of cathedral model thinking and build up new communities together with one Lego® block or creative approach at a time.

A hacker is just another “name for a general passionate relationship to work that is developing in our information age” and the “hacker ethic is a challenge to our society and to each of our lives (Himanen, 2001, p. ix).” The beginning of the 21st century is an exciting time for museum professionals to rethink, recycle, and reimagine the impossible and continue to expand the influence of the museum beyond its physical walls. The cathedral model implies a central authority and censorship. With the creation of the bazaar model, hackers embrace freedom of choice and creation. Guardrails for security are accepted so long as there is no infringement on others, and hostility is used to compel for the common good.

Simply having an attitude of bucking authority does not make one a hacker. There are many architects of the future museum industry. These designers, builders, and tinkerers have various backgrounds and education. The hackers of today may start as a specialist but

should take a page from the handbook of the software-hacker and become a generalist and learn and adapt multiple skills. One generation of hackers is not better than the last, only better as a result of previous masters. A hacker is made by experience and forged by successes and failures. A test-and-learn approach is required of systems thinkers as they examine the impact of their experiments on the whole and is a theme of this thesis that will be woven throughout the discussion of digital data collection and use. The future requires museum professionals of all competencies who help museums see the present in the ‘mirror of the past and the past in the mirror of the present’ (Weil, 2004, p. 183).

According to Raymond (2001, p. 204), reputation is vital amongst hackers and is built by “giving away your time, your creativity, and the results of your skill” as part of “what anthropologists call a gift culture.” Museum professionals can build this same type of culture by freely sharing the technology built to increase museum efficiency and effectiveness, and by educating the industry about the inspiration that led to developments of the improvement and advancement of various programs and services. Like the open-source software movement, museums sharing information can get real-time feedback and improvements to what they are proposing to be built or are building. Museums can learn from the successes and failures of these initiatives and systems to determine what will work best in their communities. They can then adapt the knowledge, activate test of these learnings, and then publish their learnings back to the museum industry. This type of information sharing ensures the continuous improvement and increased quality of infrastructure and experiences across all participating museums and education of professionals. Over twenty years ago, Adele Z. Silver (Anderson, 2012, p. 172) made an observation that’s still relevant, “museums are inventions of men [sic], not inevitable, eternal, ideal, nor divine. They exist for the things we put in them, and they change as each generation chooses how to see and use these things.” Just as the hacker culture does not have any identified leaders or tribal elders, the symbiotic relationship created amongst institutions and professionals freely sharing and adapting knowledge propagates the culture itself.

2.4. Increasing the value of visitor studies

An example of a current team of hackers expanding on the monumental visitor studies of Falk and Dierking and others, is the Dallas Museum of Art (DMA). The DMA is

tackling the challenge of working to understand more about its visitors and the clustering of motivated sentiment and behaviours, or why are these individuals are visiting and how are they acting in the museum. DMA hackers took an interest in visitor studies and invested in discovering more about what made the visitor's experience memorable or not. The DMA understood they needed a detailed understanding and sympathy with the various communities served and such research was not a one-time observation but conducted on a continual basis. In 2001 the DMA began to see that the health of its community was suffering, and the board, staff, and membership were clamouring for a change. They understood treating only the symptoms would not induce the paradigm shift required. But it was not just eyeballs the DMA sought; it was looking to find the right audience at the right time to engage with the right objects and organisation programming.

Since the latest economic recession from 2001 to 2007, consumers are spending less money on luxury items, and museums are competing with other entertainment venues for every dollar. Settling for a bigger audience with general or mysterious value will not solve revenue issues for museums; to meet their goals, these organisations need to understand the diverse needs and groups within the community. The DMA listened to its community and used the data to understand needs and desires, produce actionable results, and increase engagement with the institution, and reflected, "By understanding the nature of visitors' experiences with art we wanted to spark their creativity, curiosity, and wonder and inspire others to join them" (Pitman and Hirzy, 2010, p. 4).

From 2001 to 2010 the DMA conducted community analysis and built the Framework for Engaging with Art (FEA). Just as the analysis occurred over a significant time period, the framework and subsequent changes within the institution did not happen overnight and took time to take hold as trusted, collaborative relationships were formed inside and outside of the museum walls. The project began as a hypothesis proposed by former DMA Director Bonnie Pitman. The museum wanted to know more about why its audience was decreasing and proceeded to interview more than 450 people throughout the Dallas community to determine their wants, needs, desires, and satisfaction with the museum (Pitman and Hirzy, 2010, p. 7). Initial analysis led the DMA leadership to discover that their community displayed three distinct levels of engagement with art: Awareness, Appreciation, and Commitment (Pitman and Hirzy, 2010, p. 15). Over the course of three

months in 2007, fondly remembered by Pitman as the “summer of discontent,” museum staff analysed the interview findings and discussed what the museum would do as a result of the data (Pitman, 2012). With executive leadership support, museum staff, Pitman, and former Chair of Learning Initiatives at the DMA Gail Davitt sought out the expertise of Randi Korn & Associates, Inc., to help them dive deeper into the numbers and determine next steps.

From the very beginning, the DMA staff were determined to have internal collaboration result in a consistent mission; strive towards excellence at all times; focus on art, artists, and creativity; understand the audience; incorporate audience research; not be afraid of experimentation; and value the ideas across the institution and community. It was this foundation that allowed the museum to build an internal culture of learning and take risks with smart, strategic experiments. Executive leadership expected the staff to participate (Davitt, 2012). Trust may not have been apparent at the beginning of this paradigm shift but was slowly built as the staff demonstrated the results of their listening and analysis and brought their insights successfully to fruition. Visitor research analysis went beyond demographic splicing and dicing to identifying the value that different subsets of the community received when experiencing art in the museum and determining if they were able to make connections with the art, artists, and institution (Pitman and Hirzy, 2010, p. 21). Six visitor surveys conducted onsite and online between 2003 and 2010 examined the self-expressed connections the community had with art and the museum (Pitman and Hirzy, 2010, p. 34).

The results of those surveyed spurred the museum to change “levels” of visitor engagement to “clusters” because of an implied hierarchy with the word ‘levels’ (Pitman and Hirzy, 2010, p. 37). Instead, the museum and data collectors used a statistical procedure called K-means cluster analysis to naturally identify four clusters of visitors: Observers, Participants, Independents, and Enthusiasts (Pitman and Hirzy, 2010, p. 42). The responses and information from each cluster became the Framework for Engaging with Art (FEA), and the museum staff used these insights to guide the development of programming and outreach to ensure single programs and messages would resonate with multiple groups (Pitman and Hirzy, 2010, p. 88). Hirzy and Pitman (2010, p. 88) noted, “Similarities and differences in the clusters’ ratings of the statements demonstrate the

complexity of human variability and show even in the context of a singular place like an art museum, diversity is enormous and unpredictable.”

Unlike many institutions, the DMA had a hypothesis before jumping into conducting visitor analysis, and leadership that wanted to do more than produce numbers (Pitman, 2012). According to Randi Korn (2012), the DMA has been a step ahead from the very beginning with its collective initiative and thoughtfulness. Korn (2012) observed, “It is rare that a museum comes to a researcher with a hypothesis and is a researcher’s dream.” As the data filtered into the institution, museum staff conducted cross-departmental workshops with the data collectors, Randi Korn & Associates, Inc., to break down the research and glean actionable insights (Davitt, 2012). It was in this setting that the museum staff could freely discuss the impact of the research and develop test modules to experiment, evaluate, and then decide if and how an idea would scale (Pitman, 2012).

The museum could not mandate change, and the desired shift in thinking and public action took time and trust to develop. While there was executive level momentum, there was no pressure to “change the world,” but simply experiment. Departments within the institution needed to see and recognize the value of their contributions and results of these experiments (Pitman, 2012). There was no one department that pushed back because the museum staff was invested in the process with leadership. The core education and analytics team consistently presented findings and discussed next steps with the representatives from each department across the institution (Pitman, 2012). It was the research, interest, and commitment to visitors, not the actual FEA resource, that acted as the catalyst for change (Davitt, 2012). Analysing the data and then executing the FEA for use in real-time programming and communication was a long process that required an evolution of thinking fuelled by a significant monetary investment.

The FEA and key accomplishments resulting from this foundational planning element were compiled into the book *Ignite the Power of Art*, co-written by Ellen Hirzy and Bonnie Pitman and published in 2010. The book unleashed a firestorm of publicity and acknowledgement for the DMA. The DMA has continued to push the envelope, switching up executive leadership by hiring Maxwell Anderson as Director and other key personnel appointments. The change in leadership combined with the FEA is fertile ground for continuous evolution (Davitt, 2012). The FEA was just the beginning of understanding the

museum's community; the surveys were a snapshot in time and did not measure or evaluate visitors' on-going self-expressed connections with the institution, objects, or broader community (Davitt, 2012). With a better understanding of the subsets within its community the museum is now applying these theories to determine relevant institution engagement, identify how it can share these experiences with the community, and facilitate reciprocal community engagement and dialogue.

Through the process of understanding the community, the museum reaffirmed its mission and built a common language to use throughout its messaging to drive audience focus, effectively allocate resources, target communications, and integrate evaluation (Pitman and Hirzy, 2010, p. 126). The institution reset and determined key metrics for brand and internal engagement. In response to the FEA, the museum invested in the Center for Creative Connections, an interactive area, as an innovative learning environment for all clusters (Pitman and Hirzy, 2010, p. 151). This area of the institution is the ideal location for the museum to begin to round out the analysis of visitors and become community-focused instead of audience-focused. The institution is now going beyond superficial visitor analysis to a deeper level of analysis to understand how the community is actually engaging with the museum and others in their personal and professional networks by sharing their stories and experiences.

In addition to the FEA, the DMA has a publicly viewable dashboard spanning art, building, financial, fundraising, and technology metrics (Dallas Museum of Art, 2012). Many of these numbers are superficial and do not begin to address the depth of analysis of visitor clusters originating with the FEA surveys. There is a huge disconnect between the intent behind the FEA foundation and the DMA Dashboard. The dashboard tells a story of an institution pushing the brand into the community but does not demonstrate how the community is actively receiving or engaging in dialogue with the museum around efforts. What this dashboard did well was begin to pave the road for transparency of museum sustainability and make visitor behaviour data visible to the public. The FEA garnered industry recognition because the institution wanted to go beyond check-the-box analysis, took the research seriously, and integrated findings into all areas of the museum (Davitt, 2012). It was this dedication and construction of internal integrated process that revived the DMA and brought in a diverse community and successful partnerships. The evolution of

the DMA continues with the publicly available metrics on the dashboard, but it is now time to bridge the divide with the FEA and examine how these metrics are evaluated across the lifecycle of all visitor clusters and across the pillars of brand engagement, industry engagement, content creation, and internal engagement to accurately assess the holistic health of the community.

Since the book *Ignite the Power of Art* and subsequent FEA publications, other institutions have requested access to the secret sauce and instrument for advancing visitor engagement in museums. While the methodology the DMA used to create the FEA can be replicated, Korn, Pitman, and Davitt agree that each institution needs to clearly understand goals and objectives and form a hypothesis before delving into visitor research. All DMA staff interviewed also agree that other museums need to take time to understand how to select and use the right set of tools and then be able to reflect on the data and identify ways to apply the analysis (Korn, 2012). Organisations need to understand the diverse needs and groups within their communities and how each subset engages with the institution during their life cycle. The DMA listened to its community and used what it heard to better understand needs and desires and produce actionable results to increase engagement with the institution; now it is time to understand the holistic health of the community and the results of their engagement with the museum.

Since the survey analysis to cluster visitor motivations into distinct categories, the DMA continues the work to discover more about the visitor and the museum experience to build a predictive visitor experience model. In January 2013, the DMA launched an initiative to capture visitor data in real-time. This initiative, DMA Friends, is a free program designed to enhance museum visitor participation. Visitors sign up for the program on-site at one of the museum iPad kiosks and then track their museum experiences using activity codes found in galleries, programs, or randomly distributed by staff. Visitors earn credit by entering these activity codes through personal mobile devices or various kiosks throughout the museum and converting credits into rewards, such as free tickets to exhibitions, lectures, and behind-the-scenes tours. For those visitors who want to experience the museum in new ways, there are badges or pre-determined collections of activities that when completed, also unlock special programs and access (Dallas Museum of Art, 2012b).

DMA Deputy Director Rob Stein (2012) says the DMA Friends initiative enhances treasure-seeking behaviour and is designed to understand where the customer is coming from, what they are doing in the museum, and encouraging repeat visits. DMA Friends data is not currently tied to driving any business decisions but has the potential of being combined with general visitor attendance and other on-site and online activities (Stein, 2012). During the first year, the initiative was designed to deepen museum engagement and diversify participation that the Membership program was not accomplishing (Stein, 2012). At the time of this thesis research, the initiative has 50,000 Friends participants and received a \$450,000 National Leadership grant from the Institute of Museum and Library Sciences (IMLS) to spread the Museum's Friends Membership Program to the Denver Art Museum, the Los Angeles County Museum of Art, and the Minneapolis Institute of Arts (Tozzi, 2014). The DMA is cultivating a culture where the visitor comes first at a cost...valuable information.

The DMA is counting on free membership to lure visitors into the institution multiple times. The increased number of visitors and visits will build a bank of information the DMA may use to better understand the museum's offerings and value of the visitor engagement. The data captured by the DMA goes beyond demographics or superficial observation of the earliest visitor studies and delves into the psychographics and motivations of why a visitor is attracted to the museum and exhibits. It should come as no surprise the DMA is hunting for such information because hacker and current DMA Director Maxwell Anderson (2004, p. 9) proposed the importance and pursuance of the quality of visitor experience metric almost a decade ago in his essay, 'The Metrics of Success in Art Museums.'

Since Anderson's initial interest in visitor studies, he and Stein are after the ultimate museum visitor experience. They want to use the information to tailor personalized visitors' experiences and transform the relationship between the visitor and the object and/or collection. In a paper, Stein and co-author Bryce Wyman (2013) write:

As visitors engage, new patterns quickly emerge showing how visitors use the museum and what sorts of programs are most valued. Ultimately, this pattern of data collection will allow more spontaneous types of programming, almost akin to a

game of pick-up basketball: for example, a spur-of-the-moment docent tour around a critical mass of self-identified enthusiasts appearing in the same place at the same time.

It is the hope that such data can change the efficiency and effectiveness of the institution as Weil encouraged. He spoke of “the ‘success’ or ‘failure’ of museums in terms of mission advancement, not just survivability. He stressed that museums need to distinguish their ‘outputs’ from their ‘outcomes,’ defined retrospectively as productivity versus externally valuable productivity” (Weil, 2004, p. 204). For the first time, advances in technology are allowing museums to capture and sift through large amounts of visitor information to determine how and why a visitor changes over a lifetime relationship with the institution. Hackers are being called to the challenges created by these advancements.

2.5. In summary

Theodore Low defined museums as a “dynamic force in the cultural life of a community” (Anderson, 2012, p. 35). Such representation requires constant input into the community and understanding of constituents. Those institutions driven by fear are not a force but a dwindling light. A number of anxieties have plagued the museum industry over the past several decades. Fear of technology investment, fear of technology becoming obsolete before there is a return on investment, fear of automated systems replacing the museum professional, and countless other reasons that have prevented museums from experimenting with new methodologies and systems. To continue relevancy, or the examination of relevancy, hackers or change agents may be a keystone species within our information ecology (concept to be introduced in Chapter Three) needed for museums to test-and-learn new approaches to challenge their place in the community.

For optimal growth a museum’s knowledge base is not static and is a continuously restructured for increased storage and application. The case for museums is never-ending. At the start of the museum professional’s career, one learns museums “play an important role in developing a sense of identity and community cohesion for the areas in which they are located” (Ambrose and Paine, 2012, p. 13). The world’s political and social contexts are continuously changing and impacting the life and times of the cultural institution. Knowledge structures are being built like those made from Lego® blocks. New thoughts

are exchanged for others like the Lego® blocks being removed from the structure to be repurposed or placed within another structure. Other supporting ideas and systems like the blocks of the tower have to adapt to the rebalancing of weight. The structure will not always remain upright. Some movements or experiments will not be successful. Hackers learn from these failures and use that knowledge to rebuild better towards a successful outcome.

Such change agents or hackers build the ‘museum of the future’. Like the constructivist museum, hackers are the learners constructing “knowledge as they learn; they don’t simply add new facts to what is known, but constantly reorganize and create both understanding and the ability to learn as they interact with the world” (Hein, 1998, p. 126). How might we instil the conditions and contexts to embed change agent principles into all museum roles and responsibilities? This ability to question and quickly adapt, is needed in organizations aspiring to increase their overall digital maturity. In the following chapters, we will explore how we can harness the power of museum people as a whole and with purpose, rather than relying on a select group of individuals with limited agency or ability to scale impact. It is through this collective effort, we may begin to wield new assessment tools and build fit-for-purpose solutions.

Chapter Three:

Environment and Context

It is through data that museums may discern visitor behaviour and form a connection with the visitor resulting in an enjoyable and repeatable museum experience. This chapter considers how cultural institutions may begin to think about ‘big data’ in the context of the experiences, best practices, and scholarship developed outside of the cultural sector. In the previous chapter, the past five decades of museology in the age of computing was explored through the lens of ‘hackers,’ the creative and innovative thinkers who shook up their cultural institutions to make way for the digital era. Now, this discussion will go a level deeper and consider some of the ways museums are responding to the necessities and opportunities of big data to mine for information about their visitors through new forms of media and take the time and resources to understand the wants, needs, and challenges of the communities they serve. It is this understanding of, and sensitivity to, this era of mass data, that provides the grounding to consider the outcomes of these technologies and allow us to consider how these technologies and data may inform overall museum operations and visitor relationships. According to Internet giant, Google, five exabytes of information was created between the birth of civilization and 2003; after 2003 that total amount of information is generated every two days (Hal Varian, chief economist with Google, quoted in Kitchin, 2014 and originally cited in Smolan and Erwit, 2012). With the knowledge of the power of ‘big data’ and its rapid growth, museums can adapt or adopt communications personalized for unique cultural experiences. Another purpose of this chapter is affirming how museums can learn from the historical study of informatics and from each other to look towards a future where cultural institutions may manage their own growth curve through introspective study and predictive data modelling.

In the previous chapter, it was shown how computer hardware has transformed institutions from cathedrals of space and power available only to a select few to those with

collections now available for viewing through affordable technology carried in clothing pockets. The building blocks of this communications bazaar are amassed or toppled by the amount of information the museum can glean from every visitor interaction -- at all possible touch points. Similar to physical bazaars, the digital version of the bazaar represents a diverse group of creators and communities. Bazaars may be alike, but no two are exactly the same. There are pathways, areas, characters, and flavours unique to each. The distinctions between bazaar structures may be subtle and only detected when compared. The culmination of the foundation, scaffolding, and community are the 'terroir' of the bazaar, and as such, require a natural energy and human endeavour in tandem to sustain and thrive.

Drawing from the maturing scholarship of 'information ecologies' (Nardi and O'Day, 1999) amongst other researchers and business pioneers who are transforming data-informed analytics, the approach here is to present how organisations have been, and are still, challenged with the technology and conceptual frameworks and language circulating around 'big data'. More specifically, the aim here is to discuss how visitor collection data and museum media might be seen as, in essence, the 'terroir' of the museum (See Figure 2). Here, 'terroir' is the contextual characteristics unique to a certain place that influence and shape its character. In agriculture and ecological terms, a 'terroir' is the soil, the topography, and the climate, that collectively give produce grown there a particular characteristic. For cultural institutions, 'terroir' might, therefore, be attributed to the type and size of the museum, its visitor demographics, its physical location, and all forms of media. Collectively this information produced within the museum may potentially be a big data set and is influenced by external variables that may or may not be within the museum's control.

The thought process of a 'hacker' or change agent has broken some museums from the bonds of a cathedral-like entity and opened up a space for the community to actively participate. Layers of innovative thinking, identity, member and collections data, talented staff, and active communities make up the structure of the museum bazaar. The blocks may be arranged strategically or tactically rearranged in multiple ways. Perhaps if the design and configuration of blocks were based on data-informed decisions, the museum could create a bazaar-like atmosphere highly frequented by the communities it serves, rather than pristine

and cold cathedral-like environments. In this chapter, we will explore how visitor and collection data are, in essence, the ‘terroir’ of the museum and consists of site-specific characteristics interrelated to the environment wherein the cultural institution’s community is cultivated, and how this data--big or small--may become a dominant force in the museum’s ecosystem.

The volume, velocity, and variety of data today are influencing change across ‘informational ecologies,’ originally defined by Thomas Davenport (1997) and the definition expanded by other knowledge management researchers as “the system of people, practices, values, and technologies in a particular local environment (Nardi and O’Day, 1999, p. 49).” Successful data integration and knowledge sharing requires an original lexicon for use and understanding of the information, and the financial, technical, and human resources to connect and extract insights from the data to become information relevant to the needs, goals, and objectives of an organisation. There are cultural institutions finding new ways to define what ‘big data’ means to their institutions and confront the traditional twentieth-century museum view of digital engagement and data gathering, a view in which museums explored digitisation focused on collections management. Our discussion here works from the assumption that, currently, there is no single solution or platform for obtaining, storing and analysing the combined museum physical space, object, and personal or sociocultural data. Institutions may begin to bring together the disparate data and databases only if and when data integration points (across operational, experiential, and visitor data sets) are identified.

3.1. Before big data

The cultural institutions mentioned throughout this chapter are only a few of many tackling big data for various outcomes. Before ‘big data’ became part of the business jargon to discuss large volumes of information, museums were grappling with how to make their way into the digital era by digitizing collections. Examples of museums digitizing collections for better knowledge and interpretations of their collections by researchers and community include the release of the Cooper-Hewitt’s collection metadata as a downloadable file, the Rijksmuseum’s 100,000 high-resolution collection available through Rijkstudio, the 70,000 artworks in the Tate, and the UK Natural History Museum’s plan to digitize 80 million specimens (Chan, 2012 and Freeman, et. al., 2016). The examples of

digitisation and data development are only a snapshot of what has been done or what is possible. The nature of this research topic is ever changing. Digitisation of collections has spurred advancements of technology, training, and conversations of intellectual property. The mass movement towards collection digitisation is expensive, and the outcomes are still grey. The Netherlands spent seven years and \$202 million to digitize archives, and due to storage and intellectual property limitations, only 2.3% of the digitized archive is available online (Amirtha, 2015). Research is on-going to unlock or predict the outcomes of the digitisation decisions cultural institutions are implementing.

There are also museums using advanced technology to enhance the visitor experience, and from these efforts swaths of data will be collected. For example, the National Museum of Natural History recently launched the Augmented Reality (AR)-enabled “Walk Among the Dinosaurs” exhibit and will learn more about their visitors using motion-tracking (Rielad, 2012). The Solomon R. Guggenheim Museum in New York is allowing visitors to post messages on the exhibits using smartphones and tiny electronic transmitters dispersed throughout the museum (Gamerman, 2014b).

Visitor behaviour and patterns now extend beyond controlled observations to include tracking methods using beacon technology. The Louvre is using Bluetooth sensors, and the Boston Athenaeum, MIT’s List Visual Arts Center, and New York’s Neue Galerie are among the first institutions to use beacons to map how visitors explore their spaces (Freeman et. al., 2016, pp. 13, 18-19). It is not just the path visitors take through the museum being analysed, but also the way visitors interact with the collection. The Museum of Old and New Art in Australia and the Nelson-Atkins Museum of Art are experimenting with data collection to learn how visitors play a part in the interaction of the Internet of Things and their institution (Freeman et. al., 2016, p. 19).

Museums are not acting on their own. Several cultural institutions are partnering with third parties to leverage resources and share insights. The UK Arts Council of England and the Arts and Humanities Research Council formed the Digital R&D Fund for the Arts funded four big data projects: ArtsAPI, Arts Data Impact, Culture Counts and The Usual Suspects (Arts Council, 2015 and Arvanitis et.al., 2016). Each project explores how the industry can better understand visitor behaviour and scale participation. The Google Cultural Institute has joined over 150 museums and to explore the impact and opportunity

of online access to these institutions. With over 500 partners in over 60 countries, the Google Cultural Institute is responsible for more than 19 million unique visits and 200 million page views of participating museums in just one year (Freeman et. al., 2016, p. 20). Organisations are going a step further to document the physical museum information, such as The Institute of Museum and Library Services (IMLS) compiling a list of 35,000 museums and related organisation information and the European Commission-funded ENUMERATE documenting the digitisation and digital preservation initiatives (Freeman et. al., 2016, p. 18). Linked Open Data in Libraries Archives and Museums (LODLAM) and the Open Knowledge Foundation OpenGLAM are bridging the worlds of libraries, archives and museums to share resources, access, and foster collaboration (Open Knowledge International, 2016 and Freeman et. al., 2016, pp. 15-16).

Museums are not just collecting and splicing and dicing data but are also featuring artists who are using data to power their art. Laurie Frick tracked her time, sleep, and movements each day for a year and visualized the patterns and showcased as a work of art (Freeman et. al., 2016, p. 13). The Museum of Fine Arts, Boston recently opened an exhibit, “Pending,” consisting of connected glass cameos representing every ignored Facebook friend request of artist, Charlotte Potter (Subbaraman, 2015). Storytelling through data is not limited to exhibitions. The Northern Ballet is using operations data of itself and other dance organisations to visualize the organisation’s community contributions and the V&A Digital Map launched in September 2013 visualizing visitor behaviour data with event and facilities information (Adhikari, 2014).

Museums are also using predictive analytics to increase the bottom line with gift shop sales similar to the Norman Rockwell Museum. The History of Colorado Center, Indianapolis Museum of Art, and Cleveland Museum of Art are using point-of-sale software information to indicate next visit purchases (Freeman et. al., 2016, pp. 13 and 19). Then there is the crowdsourcing opportunity where museums invite the community to participate in the selection or interaction of the collection. The Brooklyn Museum has several examples of crowd sourced exhibitions and interplay they are using to influence what they display and how the institution participates with and in the community (Gamerman, 2014a). Cultural institutions of all shapes and sizes are exploring ways to open and access data and determine the impact of culture in numbers.

3.2. Defining big data

The essence of big data is the ability to economically capture and collect very large amounts of data of various formats and consume this raw material in real-time, making data viewable at the granular level. Much of the study around big data has been limited to the discussion about the growing volume and the defined amount of data being explored, outside of any agreed academic or industry definition of these data's characteristics (Kitchin and Lauriault, 2015 and Boyd and Crawford, 2011). Due to past technological constraints of data storage, only what was deemed important information was sampled and later analysed. The paradigm shift of how big data is collected and analysed may be described as the ability to see the forest and the trees, rather than just the forest. With big data, organisations can see the big picture view; unlike with 'small data' where very specific data sets produced using sampling techniques tend to limit the volume, velocity, variety, and veracity of information captured (Miller, 2010 as quoted in Kitchin and Lauriault, 2015). In other words, 'small data' is the study of the tree instead of the forest.

For context, about how big 'big data' may be or become within the museum sector, consider the extent in which the Internet has transformed the communication data landscape. In 2016 every second, approximately 7,000 tweets were tweeted, almost 800 Instagram photos uploaded, 136,000 YouTube videos viewed, 39,000 GB of Internet traffic, over 57,000 Google queries searched, and two million emails are sent (Internet Live Stats, 2016). University of California communications professor Martin Hilbert, citing Papas (2016), has commented, "[t]he Internet stores information, the Internet communicates information and the Internet computes information. The communication capacity of the Internet can be measured by how much information it can transfer, or how much information it does transfer at any given time." Therefore, it is important for museums to be able to define and distinguish the various data being captured and collected, so the institution can better make sense and use of the information in the context of its and its community's goals and expectations. New forms of media and communication enabled by the Internet are producing data museums may extract and analyse alongside traditional structured data kept in customer relationship management (CRM) systems to spawn improved visitor experiences.

In their seminal study of the scale and depth of this digital transformation, *Big Data: A Revolution That Will Transform How We Live, Work, and Think*, authors Viktor Mayer-Schonberger and Kenneth Cukier (2013) define big data as “the ability of society to harness information in novel ways to produce useful insights or goods and services of significant value.” The revolution is not how or what data is being collected, rather it is how or why full data sets are conjoined and interpreted versus sampled data sets. Technology researchers Danah Boyd and Kate Crawford (2011, p. 3) state the importance of big data is the ‘relationality with other data’ and that this is what is changing the definition of knowledge in ways similar to the innovations of Henry Ford developing mass production and the Industrial Age. The information age is giving way to a knowledge age (Martin Hilbert, quoted in Pappas, 2016) where the sum of an institution’s information is available for investigation along with behavioural and use data from external sources.

Authors boyd and Crawford (2011, p. 7) not only espouse big data benefits, but also caution the industry that the effects of “big data and whole data are not the same.” Big data possibilities may have spurred data-driven thinking, but small data may prove to be more attainable and effective to push for deeper data-informed thinking and data-based decision-making. The challenge, therefore, for institutions such as museums, is to bridge big data with small data, resulting in a valuable business objective. The value to be achieved is recognizing an element within a large dataset that requires deeper understanding and using smaller datasets that then produces best-next actions for the organisation to implement. Some critics of using big data exclusively such as, Rob Kitchin and Tracey P. Lauriault (2014), note the merits of small data as the conjoining and scaling of disparate datasets to be used with big data analysis. Whilst both big and small data have their weaknesses, the fusion of their strengths may result in a more holistic outlook of the museum’s visitor, operational, and transactional data.

Big data infrastructure and value is still difficult to obtain at scale and requires long-term strategy and planning. Depending on the goals and objectives of the cultural institution or department, small data thinking may pave the way for big data successes. Trends like those captured in a *NMC Horizon Report*, predict that museum education and interpretation are increasing the focus on personalizing experiences in museums and focusing on the power of data analytics to inform museum operations (Freeman et. al.,

2016, p. 1) and the purview of small data. Museums may want to consider how to define a strategy that embraces big and small data. The framework needs to be designed to support big data (infrastructure, integrated systems, and networked data sets) which will make small data opportunities (like visitor personalization and omni-channel experiences) more consistent and attainable. The museum would then have immediate access to interpretation and use of this new media and communication data.

Until the advent of pervasive media and communications, data organisation, management, and consumption was limited to collections management. Since the birth of modern computing, museums have been in the process of digitizing their collections with the aim of documenting better knowledge and interpretation of their collections by their users. Consider the comprehensive overview of museum technology advancements moving into the 21st Century shared within *The Wired Museum*, where Katherine Jones-Garmil (1997) outlines the steps taken by museums to move from collections to content management system development, and the opportunity for required planning and resources to support these investments. An additional future opportunity and benefit of big data is the more recent ability to analyse user activities across interactive media to question and study the global cultural universe. Media theorist, Lev Manovich (2015, p. 1), coined the phrase ‘cultural analytics’ in 2005 meaning “the analysis of massive cultural data sets and flows using computational and visualization techniques. Third party data about what people post to social networks and how they interact with content and each other is now accessible, and the technology to process and visualize such data is available. Manovich (2015, p. 13) has advocated the study of large datasets with multiple variables, referred to as ‘wide data’ and seek out “new similarities, affinities, and clusters in the universe of cultural artefacts, but first of all, help us question our common sense view of things, where certain dimensions are taken for granted.” The challenge cultural institutions face is centred on the new skills required to weave data-informed critical analysis into every aspect of the museum’s culture and terroir. It is up to the museum to choose to work to scale small data, or attempt to capitalize and learn from big data.

As a first attempt to frame a way of thinking about and working with new forms of information, museums might consider the following processes as a useful framework to understand their own digital data collection and use. If we were to begin to set out the array

of questions and new operations that big data brings to the museum, they could be disassembled as follows to inform and support a data-informed foundation. The activities described in each step of the framework (See Figure 4) may be executed in sequential or parallel order. As we set these steps out, we are only now exposing the new complexity (and opportunity) of big data management, within the museum and the methods with which data may be understood, associated, and explained. This is the museum data beyond the era of collections data and visitor metrics. The culmination of these steps is the establishment or enhancement of a data-rich terroir and information ecology present in all museums, yet having a unique interpretation and application within each museum.



Figure 4: The data ecosystem (Source: author).

3.3. Step 1: Developing a ‘single source of truth’

First, any museum developing its new big data operation needs to start by understanding its information systems design and identifying a single source of truth (SSOT). This SSOT is essential in the creation of data models so that every data element is stored only once. Every physical and digital transaction within the museum is documented and, in some cases, tracked and analysed. The breadcrumb trail of data left as organisations and people conduct business online, both behind and outside of the firewall, is referred to

as ‘data exhaust’ by O’Reilly Media Company Research Director, Roger Magoulas (Lorica, 2010). Such vast amounts of data may lead to incorrectly linked duplicate data or de-normalized data elements if a SSOT architecture is not advocated for and maintained. There is a broader question as to if the data should be stored or if organisations can use analysed and synthesized data findings as the SSOT? Cultural institutions may be feeling pressure to package and interpret data to build dynamic structures and experiences for the everyday visitor and risk using incorrect, out-dated information if not pursuing a SSOT model. A museum can collect and act on the ‘data exhaust’ of visitor and development data to build a more in-depth view of visitors; provide a standardized, central personal and sociocultural context database across the institution; and perhaps, increase customer service in the hopes of increasing membership and donations.

Data in and of itself does not provide a narrative. It lacks context and empathy, as well as, the ability to understand the sentiment of the individuals making up the collected information. It is simply raw data, both structured (data stored in traditional format like that of a CRM) and unstructured (data that is not easily stored or indexed in traditional format like email and social media conversations). Many organisations have this data being collected and stored in multiple locations, rather than a SSOT structure promoting interconnected information. Museums have the opportunity to combine visitor information with artefact information to create a rich base of knowledge that could positively inform exhibit design, marketing efforts, and interactive visitor experiences that span multiple touch points in and outside of the physical museum space. One of the ways to take advantage of this opportunity is to change visitor information collection processes and database design by allowing employees across the museum access to this data, thereby freeing or democratising the information. By identifying integration points and altering the collection of visitor information, the data sets of museum objects and people can be analysed and accessed alongside each other to determine actionable insights to improve the visitor’s museum experience. Yet, it is not the technical limitations that are an obstacle for most organisations, but the strategic and organisational challenges of such a connected environment (Malik, 2013). In the next example, we will explore how museums might interact with the many communities it serves and how these interactions and feedback loops are collected and accessed to build more contextually relevant visitor experiences.

There are models of this new behaviour and operational approach outside of the museum sector. For instance, the leisure industry can offer some strong examples of expanding the collection and use of data. The most vivid illustration is the way in which data is managed at the Walt Disney Company. Since it opened in 1971, Disney World has been a family destination. From Mickey ears to Princess dress-up studios to meticulously painted details on park sets, Disney created an experience people enjoy more than once. Disney keeps upping the price of the experience. Disney World has a return visitor rate of 70 percent and for every 1 percent increase of customer retention, profits soar 7 percent (Connellan, 1997, p. 6). Disney has woven together science and animation. For the effortless experience of scheduling breakfast with Cinderella, Disney trades a frictionless vacation for personal information. The second a park visitor steps off the airplane, a scan of their Disney MagicBand places them and their family or friends at the centre of the action. No hassle required. The MagicBand is an experiment of human engineering.

Context-aware technology is the result of decades of engineering. The MagicBand was a \$1 billion dollar bet on 'big data' value. A seemingly simple plastic wrist band with RFID chip tracks your every move and anticipates your needs as you move from the airport, to the resort, to any one of the parks. Disney has cultivated the Magic Kingdom experience for decades from the TV screen to the physical park experience to the online expansion. No detail is too small. The magic is a contained physical and digital environment, and it is because of this clear separation from reality, Disney is able to obtain visitor information that in any other environment may appear intrusive (Kuang, 2015). Once children are snug in their beds and parents are fast asleep after a long day at the park, the magic behind the curtain is revealed. Chipped paint is refreshed; sidewalks are cleaned, and the parks return to their sparkling appearance. Through an intricate set of underground tunnels and trained staff, guests never see the mess behind the experiences and creation of memories. This attention to detail and storytelling craft is the result of Disney needing to get better and faster at knowing where, when, and what visitors were consuming in the park.

The less time visitors wasted in line at the park or other friction points in transition between the parks and hotels, the more time they could spend at the park and increase Disney business. The gains in technology were targeted to improve customer service

efficiency and park effectiveness ultimately impacting Disney's financial performance (Pedicini, 2016). In exchange for a convenience, clear information policy, and Cinderella addressing the visitor by name, visitors give their credit card information and Disney receives a detailed view of how visitors spend their time and money.

While the MagicBand initiative gained considerable media attention since the formal launch in 2013, the project to develop a streamlined data collection for the improvement of visitor satisfaction started as experiential operation. The team crafting the networked experience started with five people. Challenged with identifying all the barriers for a faster attraction visit, the Fab Five team, as dubbed by fellow Imagineers, drew inspiration for their recommendations from wearable technologies (Kuang, 2015). They envisioned a park with kiosks instead of turnstiles that synced with the wristband and ended with a flash of green and a 'pleasing tone' granting entry or cash register transaction (Kuang, 2015). A matrixed network of sensors has paradoxically allowed for more ease and spontaneity by offering pre-planning and advanced personalization. The redesigned Disney experience thrives on making people happier by giving them more choices instead of limiting their number of options. The information does not start and stop within the parks either. While commenting on the intricacies of cross-channel experiences, Thomas O. Staggs (2016), Special Advisor to CEO, Walt Disney Company, said:

Also, I believe if you look forward as we increasingly establish those direct-to-consumer relationships, that expertise in customer engagement will be a skill set that's transferable around our business, even if you're not handing off an ESPN consumer to other Disney businesses.

The MagicBand is collecting reams of data to analyse visitor behaviour to conceive and design many more features going beyond what is currently possible. The information is not only making the Disney park experience more accessible, but is also developing a new workforce profile to serve visitor needs regardless of media, communication, or physical space.

The end experience may appear seamless for the Disney visitor, but not so simple in the creation of infrastructure or the protection of the data elicited with every swipe of the

MagicBand. There are numerous privacy concerns and challenges that accompany any data project. To extract value from data, museums should be clear with visitors about what data is being collected and how this data will be used. What the Disney example shows so overtly to museums is the powerful connection that can exist between the collecting of data and the generation of a frictionless visitor experience. In their own SSOT structure, museums may take inspiration from this example and organize around visitor behaviour, scale relevant knowledge across the institution, and set the stage for a seamless approach to user experience.

3.4. Step 2: Establishing ever-connected and augmented experiences

Once technology is integrated into daily life and each platform, device, and media are used to interact, the groundwork for a seamless user experience is then set. As new technology opportunities enter into the communications and media mix, museums are challenged with how to incorporate the activity into an already rich and complicated interconnected information structure. Visitor behaviour and patterns now extend beyond controlled observations to include tracking methods using indoor way-finding technology. Museums are discovering their role in the Internet of Things movement and how they can expand the relationships between visitor and collections to bring innate objects to life. For example, the Royal Ontario Museum in Toronto launched the augmented reality (AR)-enabled “Ultimate Dinosaurs” exhibit in 2012 to learn more about their visitors’ behaviour using motion-tracking data and are among many museums experimenting with the technology to the visitor experience (Rielad, 2012). Similarly, the Solomon R. Guggenheim Museum in New York allowed visitors to post messages on exhibits using smartphones and electronic transmitters dispersed throughout the museum (Gamerman, 2014b). In examples such as these, the museum sector is beginning to address the gap between the front-end visitor experience and the way in which this set of experiences are powered and connected with back-end systems.

Whether it is AR, social media, or traditional visitor engagement studies, such interconnected data infrastructures are amassing information the museums have the opportunity to analyse in order to understand challenges, gaps, and potentials for all digital and physical interactions. This raises the question of what a museum might learn from the presence of these data sets? How can all communication channels work together to provide

a ‘360-degree view’ of visitor behaviour, so museums can offer a harmonious experience across digital and physical visits to their institutions? It is not the tools that make a successful data-informed culture and seamless cross-channel experiences; rather, it is the challenge of the status quo to rethink the institution’s data collection and use policies and processes (Patil and Mason, 2015). Data collection, big or small, requires a guide to use and extract every relevant detail. This guide or direction is influenced by the museum’s terroir. When reviewing the current state technologies and processes, Patil and Mason (2015) suggest this is the time to invite all areas of the institution to ask questions to better understand the data flow, unearth flaws or opportunities to evolve the data collection and use, and build a common language to discuss how the data is derived and interpreted. The direction of the museum depends on knowing what data is available, how this data may be used, and recognizing which outcomes impact the organisation and why. It is with this analysis; the third step in the process is critical to achieving democratisation of information.

3.5. Step 3: Creating trustworthy dashboards and scorecards

With potentially vast amounts of data being generated from these new forms of media and communication, museums will also need robust and trustworthy mechanisms to visualize and monitor this data. In addition to an open discussion about data flow, a data-informed culture is fuelled by transparency of data performance and interpretation. Dashboards are a living breathing extension of data infrastructure strategy and planning and a useful business tool to help jump-start conversation and establish a common language for data collection and use (Patil and Mason, 2015). Building and sharing collective knowledge across an institution is an integral part of any digital transformation process and is not a new process for the cultural institution. It is important to note, dashboards capture a visual moment in time and are only as powerful as their data and insights design. Dashboards are a source of information, and action on this information is the goal or intended outcome of having a trusted dashboard.

For over five decades as museums have sought out new ways to explore digital heritage, museums have examined the multiple ways information has been collected and examined. While this examination has almost exclusively focused on collections data, the probing of what cultural institutions have collected and why, and its place in the digital future began to take shape with the exploration of these digital heritage pioneers in the

1970s. From their initial efforts, we can delve deeper to understand the depth and breadth of information the museum now owns or has access to explore. To prepare for the future, it is essential to understand the questions and learning that has preoccupied researchers in the past.

If a museum is to make productive and profitable use of information, it needs not only to define what information means for it, but also to understand itself as a community of users of information, to recognize the ‘stakeholders’ in information, and to provide them with the means of negotiating over information (Orna and Petit, 2010, p. 28).

The difference between those first discussions in the museum sector about data, and the debates about present data sets is the presence of user information. Yes, the volume and veracity of the information has increased over time, but the information has moved from innate objects to animated visitors experiencing collections and employee interactions within the physical and digital museum ecosystem.

Rather than trying to capture all of this data and risk having tool manage the institution and not the institution manage the tool, the dashboards and scorecards should include only critical information about the people, places, things, methods, and events aligned with the cultural institution’s purpose and feature the corresponding narratives and alarms to trigger review and action (Patil and Mason, 2015). If there is too much information, the tool may become intimidating and ignored, and if the dashboard or scorecard includes only those data inputs that give a sense of the outcome the institution wants to address, the tool may assist in identifying opportunities and refining processes. The flexibility is not in the tool chosen to visualize the data, but the test-and-learn approach required to identify, collect, and take action with the data, and the skills required to help prepare and make sense of the information.

While writing about the information revolution within the National Museum of Australia (NMA), Darren Peacock also explored the metaphor of information ecology and ecosystem, and through a series of internal workshops and experimentation, settled on the concept of ‘commonwealth of information’ to epitomize the content- versus collections

management system direction in preparation of a networked information society (Peacock, 2008, p. 67). When Peacock shared this snapshot of strategic planning and thinking with the museum sector, the networked information society had yet to explode with the types of social media and ease of mobile or responsive communication. The scholarship surrounding the movement of collections to content management systems or importance of best-of breed capabilities of both systems has led to this critical juncture where technology is beginning to offer museums ways to meaningfully connect the information stored and analysed in both alongside information from a broader set of media and communications resources.

Approximately twenty years ago, Howard Besser (1997) challenged cultural institutions to understand the changing form of text and images into digital form and explore how museums could bridge and bond the still distinct ‘camps’ of information practice centred on collections data and content management. In addition to Besser, David Bearman (2008) foresaw how collections data and interpretation would take on “a life of their own” and museums would need to reconcile museum knowledge. The questions big data bring into cultural institutions are an extension of those historical insights examined with newer technology processing and analytics capabilities.

Whilst there is a case to be made for museums to share data between each other, there is urgency for cultural institutions to look to themselves. By looking to their own past, considering the questions they asked, and reviewing how their own data is organized, they can prevent siloes of information-capture and analysis, and understand what data they have (how it is stored, the problems considered, and the people who can manage and interpret the data collected), and how insights are turned into actions. Then common links can be defined and shared with other institutions or community partners. Perhaps it is Jennifer Trant (2008, p. 218) who more accurately challenged museums to expand their role in the ecosystem by reimagining their role with information ecology:

But to play this role they need to be connected, organized, available, engaged and of relevance: connected to each other and to many communities that they serve; organized, so that the content in their care remains connected to related content in other institutions; available to a wide range of users in many different contexts;

engaged with the active interpretation and documentation of their collections; and relevant because they are responsive to user needs and interests.

Information challenges and needs have been expressed by the museum sector for decades and it is now that the sector has the ability to begin to tackle these requirements in earnest as technology has matured. Using history as the guide, institutions can share these data sets and foster information ecology ripe for testing and learning.

When operating with big data, we see the importance of the museum incorporating data collection and use as a strategic objective. If you recall, in Step 1 ‘Developing a ‘Single Source of Truth,’ museums are identifying their one, trusted source of information. Then in Step 2, ‘Establishing Ever-Connected and Augmented Experiences,’ museums are bridging these new media elements to form experiences. Once the museum has a basic understanding of their data landscape, they then begin to visualize the strengths and weaknesses of the data quality and connections in Step 3, ‘Creating Trustworthy Dashboards and Scorecards.’ It is after this understanding that museums may identify and strategically choose the narratives the museum uses to describe how and why this data is valuable. The data then begins the transformation from its raw state to be packaged into information and knowledge to improve the visitor experience.

3.6. Step 4: Providing a platform for experimentation

As Nardi and O’Day (1999, p. 53) remark on the characteristics of a healthy ecology, “balance is found in motion, not stillness.” Big data does not equate to big thinking or action. As Disney displayed, the ‘think big, act small’ approach is based on focused data challenges, hypothesis and actions. The Norman Rockwell Museum in Stockbridge, Massachusetts (US) is an example of a small museum embracing a test-and-learn environment to consistently learn from and evolve as a result of the data being collected and interpreted. The museum knew they had a group of profitable visitors returning each year, but as this visitor group aged, their return to the museum became annual instead of multiple times a year. The museum started gathering data and listening to their visitors. Using transactional data, the museum parsed out patterns of visitor behaviour and began to test data rules and product recommendations through email communications. In the span of a 90-day test in 2013, the museum increased second-time purchasers of art by

150 percent, delivered \$20,634 incremental revenue (a 49 percent increase) versus 2012, and delivered an overall 77 percent increase of annual revenue during campaign weeks (Olavsrud, 2014). This type of experimentation may begin with smaller projects and data sets and then mature into an always-on concept baked into the testing of new ideas and larger data sets.

Museums are also tapping into crowdsourcing, as a test-and-learn method, by inviting the community to participate in the selection or interaction of the collection. The Brooklyn Museum has several examples of crowd sourced exhibitions and interplay they are using to influence what they display and how the institution participates with and in the community (Gamerman, 2014a). The goal of such projects is to explore how the industry can better understand visitor behaviour and scale participation. Cultural institutions of all shapes and sizes are exploring ways to open and access data that have significant impact and influence on developing and promoting culture. The culmination of this data, gathered indirectly or directly across these four steps, results in an information ecology with a rich history and future growth potential due to interconnecting people, tools, and processes (Nardi and O'Day, 1999).

3.7. Step 5: Forming an organisational memory

An accumulated body of data, information, and knowledge created in the course of existence is referred to as organisational memory. The direct link between new forms of media and communication, the data produced, and the structure to connect such information, is evident with the final industry example in this chapter. Beginning in 2002, the Cleveland Museum of Art (CMA) embarked on a \$350 million capital campaign to physically revamp and expand the permanent collection. The museum made a resolute effort to rethink its collection and how it would be displayed, and to forge new relationships between the objects and the local community as new additions and changes were being made to CMA galleries. The CMA had a desire to build on the visitor behaviour theories and direction of museum communication specialist, John Falk, with a digital strategy lens and mission to transform the Museum for the 21st century (Alexander et al., 2013). In 2009, the CMA partnered with a research firm to study the visitor behaviour in the then newly renovated European and American Art Galleries. The research targeted answers to two questions: how can we hook visitors as they browse, and how can we

provide the kind of interpretation that will open up our expectations and honour visitors' browsing behaviour (Alexander et al., 2013)?

The research findings led to the CMA launching the Gallery One project in December 2012 to test a transformative digital strategy, objectives, and collaboration mindset. The analysis revealed people felt intimidated by art museums and found those types of institutions to be elite, old, and boring (Alexander et al., 2013). The CMA wanted to seize an opportunity to give people the toolsets to engage with art on their own. Gallery One is a 40-foot multi-touch MicroTile screen in the United States displaying over 3,800 objects from the CMA Collection. Visitors may interact with the MicroTile Collection Wall and other interactive spaces, using indoor way finding technology and an accompanying Art Lens iPad application, to filter the art they want to see and create personalized tours of the museum (Alexander et al., 2013).

The entire information technology infrastructure was re-imagined to support the Gallery One screen and interactive spaces. In the midst of renovation challenges that kept parts of the CMA collection off view or in temporary storage, the Museum discovered visitors had a desire to see in one location all objects by theme and immediately know if the object was available to be viewed in the open physical space (Alexander et al., 2013). A 'cascading collection management system (CMS)' approach governs the CMA dynamic data management with weekly refresh of object-related metadata to the main digital asset management (DAM) system and then information is passed onwards to the Collections Online DAM and Gallery One CMS (Alexander et al., 2013). The final design of Gallery One is the product of an internal collaborative vision brought together by the technology, education and interpretation, design, curatorial, and collections management departments (Alexander et al., 2013).

The applications team then committed to meeting routinely to discuss all on-going and future projects, as well as, how the technology will interact in the backend and how these projects will fundamentally impact all areas of the museum. The Gallery One infrastructure was created to address the challenges of universal access and limit unnecessary social media and digital platform sign-ins. The CMA addressed a gap and need for supporting technology platforms to connect across the institution and is collecting valuable data about how its visitors are interacting with the physical objects. The design of

the data flow indicates the CMA was intent on creating a museum prepared for the future by thinking about a digital strategy that would enable sustainability, modularity, scalability, and support evolving hardware and software needs (Alexander et al., 2013).

Today, museums have the opportunity and challenge to link the participatory experience with the museum's customer relationship and visitor behaviour information. Legacy platforms have given way to newer technology solutions for small data study, and while big data is still managed by large platform vendors, new and affordable solutions are being created so organisations can operationalize big data one data set at a time. Cultural institutions may approach data collection and analysis incrementally to build trust with visitors and take the necessary time to build an information ecology based on researched patterns in data to understand visitor interaction across an interconnected system of media and communication.

3.8. Developing keystone species

This chapter has outlined the elements comprising a data ecosystem. One of the essential ingredients for this ecosystem to function is the keystone species. As part of the information ecology metaphor developed by Nardi and O'Day (1999, p. 79), they define this role:

The wedge-shaped stone at the pinnacle of an arch—the keystone—stabilizes the arch and holds it together. Like the keystone, certain species in an ecosystem are crucial to the shape and stability of the system.

The roles of a data engineer and analyst are vital to the storage and interpretation of information. Researcher and journalist Vikram Choudhury observes: “The predictive power of big data, when applied to human behaviour is set to revolutionize how business operates, [but] vast resources of information are meaningless without intelligent interpretation (Dearborn, 2015, p. 93).” The museum requires people who know how to ask the right questions and assess the health of all inputs and outputs of the ecosystem. Whilst the museum needs this expertise, the organisation is in dire demand of the buy-in from senior leadership to hire and cultivate this talent.

The keystone species of the museological data ecosystem is not limited to those with the ability to splice and dice numbers. Nardi and O'Day (1999, p. 80) expand their definition of the keystone species as one who may “literally sculpt the environment so that a variety of organisms can be hosted. With this expansion, the role of a museum’s leadership in the development and expansion of the data ecosystem cannot be overlooked. While members of the museum staff or change agent(s) can champion digital evolution, leadership may be the “better approach to encourage mutual adaptation, fostering new relationships between the technologies and the practices...of people who are trying to find information” (Nardi and O'Day. 1999, p. 82). The job of the data whisperer extends to the leadership understanding of how to filter the noise from valuable signals that may lead to changes in the way the museum operates and delivers staff- and visitor experiences.

In this cultivation of the keystone species, cultural institutions are not fundamentally different than for-profit organisations. Former chairman and CEO of General Electric, Jack Welch says, “If the rate of change on the outside exceeds the rate of change on the inside, the end is near” (Allison, 2014). Being able to understand and interpret data in near real-time is becoming the standard for all levels of any organisation. As we saw in the rate of technology change demonstrated in Chapter Two, such change may be introduced by a single person, but does not gain traction without a collective, organisational effort. Digital data collection and use is a critical component of overall digital transformation. Business technologists and strategists, Michael Gale and Chris Aarons (2017, p. 114) claim there are two aspects of the executive function to secure digital transformation readiness:

1. Executives need to expand their sensitivity to information and identify the most important elements in order to orchestrate the transformation in the right way. This expansion of information goes far beyond the key performance indicators most look at and requires a different set of leadership traits to shine; and
2. Executives need to be increasingly capable of focusing on the potentially small and different elements that drive effective digital transformation. In digital, many times the size of an activity does not define the magnitude of

its significance or capacity to make the results far greater than the sum of the parts.

Senior leadership should have knowledge of the bigger picture and be able to see or begin to piece together how the data may be turned into information and then shared knowledge to help all levels of the organisation make the right data-informed decision at the right time. Whether the museum chooses to explore big or small data, the keystone species (analyst and leader alike) need to look beyond surface level or easy-to-glean data.

In his book, *The Power of Noticing*, author Max H. Bazerman (2013, p. 115) says, “The best leaders are ‘first-class noticers.’ This means they pay attention to what is happening around them. They see things that others miss.” This means the keystone species require the space to not only extract data, but also be able to sift through information seeking out trends and patterns of use to examine new paths of discovery and action. Surface-level data may be the most readily available data, but does not always equate to relevant information. Business author, Daniel Kahneman (2013, p. 116) reflects on “What you see is all there is” phenomenon: “The idea that the future is unpredictable is undermined every day by the ease with which the past is explained. Thus, we can be blind to the obvious, and we are also blind to our blindness.” This keystone species may partake in a test-and-learn mentality offering the museum greater room to manoeuvre and grow with a faster innovation and learning cycle. Also, if the leadership supports this group with legality and governance, rather than obstacles that cannot be overcome, the digital confidence gained in lessons learned may act as guideposts on the museum’s journey for internal and external reflection and analysis. If museums cultivate a keystone species consisting of a diverse set of digital data and information management literacies and skills, then there may be an overall increase of data awareness and benefit, as well as, build a redundancy of thinking to look beyond or challenge status quo and data biases.

3.9. Thinking big, acting small

Whereas the previous discussion (in Chapter Two) surfaced the concept of the change agent or ‘hacker’ as a key human agent, in this chapter it is the concept of the ‘terroir’ that provides an important way of understanding the data context of the museum’s digital maturity. As we saw highlighted in the Disney example, data collection and use

requires a well-nourished ecosystem of interconnected people, processes and technologies. The aim of this chapter has been to understand the institutional context for being digital and working with data. To understand data in the museum is, today, to understand the new scale and new connectivity of big and smart data. Big data is not limited to big museums. Any size cultural institution may benefit from the understanding of its current data landscape. Once the museum has taken the first step to clarify the ‘single source of truth’ of data collection and how the museum uses this data, the museum may move to the second step of the process and craft smarter experiences.

To better understand visitors and act on this data, museums are encouraged to visualize what the information is and find ways to communicate the impact of this data to internal and external stakeholders. Once a structure and data collection and use routines are established, the museum staff is then freed up to experiment the possibilities of what they can learn from this data and explore innovative and relevant exhibitions and communications initiatives. No one individual or department can take on the burden of solving for all steps by themselves. Instead, as new methods are explored, information policies revised, and technology evolves, knowledge must be documented and continuously updated. It is this last step that is the most vital to the success of the museum. By sharing the research context, successes, and failures, museums can expand and enhance their data skills and capability, allowing museum staff transition into new roles, and new staff – without any such background – can step into the museum and be able to learn from the organisational memory.

The five steps may be acted upon in sequence or in parallel to build a data-informed culture, test-and-learn different engagement approaches, and share valuable visitor behaviour across the organisation. Having access to and investing in the analysis of all types of data moves museums into taking actions based on what people want to see and do in their spaces.

For the future of communication and media use in the museum, big data represents a new way museums can learn from each other. However, like information ecologies, the terroir of the museum results in many and unique data types and sets, requiring time, patience, and constant cultivation. New forms of media and communication are generating new forms of data, and it is data, which can be leveraged and harnessed to give insights into

visitors. Data yields a number of interpretations or stories, and it is up to a museum to take the time and resources to understand the specific wants, needs, and challenges of the communities they serve. Knowing and understanding visitor behaviour and analysing in real time, yields insights that can be promptly used. In order to take advantage of this opportunity of big data, museums are confronted with acknowledging and understanding these new or newly combined datasets are part of wider information ecology. With the advent of big data opportunities, museums have the opportunity to challenge scholarship, reach into the past, and build on the questions (originally posed by Besser, Orna & Pettitt, Trant, and others) to look and think forward about how data is structured and shared amongst museum professionals. Museums now have the power to determine how visits to their institutions can become magical and repeatable experiences.

As we shall see in the next chapter, the role of the hacker and the significance of the museum terroir together pave the way for museums to explore the organisational context for digital maturity by understanding and embracing the influence of ‘soft power’.

Chapter Four:

Experience and Provision

Following our consideration of the key contexts of organisational transformation and change (people, provision, and place), this chapter examines the ways in which the cultural institution's identity and relationship, particularly in its locality, is constituted – specifically with respect to digital capability and data collection and use. What emerges here is the value of approaching this third and final context through the lens of 'soft power' and social inclusion as a means of discerning why digital maturity is important to museums. To put it another way, how might museums consider the disruption and power of these technologies within their own walls, but also the impact on their community relationships?

Using the research and debate of the Guggenheim Bilbao, we will examine the re-emergence of social inclusion with the popular term, 'soft power', and clear away the distraction the term entails to study what digital data maturity ultimately enables. We will explore if institutions have a firm meaning or purpose within the physical city they are located and if they have created safe spaces in their physical and virtual walls to intrigue and empower the communities they serve. In this chapter, the human and experiential contexts come together as we examine what scholarship within the physical community can teach us about how we cultivate community and maturity in museum digital ecosystems.

4.1. Soft power disguised as social inclusion

Soft power is a term coined by Harvard political sociologist, Joseph Nye, approximately a quarter century ago to mean, "the ability to influence behaviour using persuasion, attraction or agenda setting" (Dextor Lord and Blankenberg, 2015, p. 9). Museum professionals and authors of the book, *Cities, Museums and Soft Power*, Gail Dexter Lord and Ngaire Blankenberg, assert that soft power (2015, p. 10) with the rise of cities and civic power are moving museums from the margins to the centre of civil society transformation. Soft power, like the term *big data*, is a phrase that has surged in popularity.

The museum's regional influence and community partnerships was a dominating discussion topic in the 2015 American Alliance of Museums (AAM) conference in Atlanta, Georgia, but this discussion is not new. Soft power became a significant museum theme in 1986 when the International Council of Museums (ICOM) defined museums as “for the public benefit” (International Council of Museums, 2018). American institutions followed suit in 1992 and declared museums as educational centres for the entire public in the pivotal publication, *Excellence and Equality: Education and the Public Dimension of Museums* (American Alliance of Museums, 1992).

Unlike with hard power, soft power is not the centralization of power or used as propaganda. Soft power is the diffusion of such power within and amongst the community. The role of national governments is transitioning to the growing urbanization of the world. According to Khalid Koser, executive director of the Global Community Engagement and Resilience Fund, cities are where soft power is being cultivated:

You can find the entire spectrum of views within a few blocks in most cities. Cities have the venues and the community organizers. And whatever their perspectives on migration and migrants, city dwellers are open to debate and exchange. While states are building walls, cities are building bridges. While states are launching patrol boats, cities are launching ideas. While states are unilateral, cities are transitional (Lord and Blankenberg, 2015, p. 14).

Just as cities are breaking free from their well-intentioned planning and zoning restrictions of the 20th Century, cultural institutions are discovering their role as cultural accelerators and power converters, “transforming creativity and knowledge into influence, encouraging us to see new perspectives and even to change our behaviour” (Lord and Blankenberg, 2015, p. 23). Cities and their cultural institutions have an opportunity to bond and build bridges within the physical and virtual ecosystems where they serve and exist.

While the topic of soft power may be popular, senior lecturer in arts and cultural management in King's College London, Dr. Melissa Nisbett (2016), argues the concept is absent of critical rigor and says Nye's 2004 book on the subject, “lacks a coherent theoretical framework overall and is seemingly divorced from social and political theory.”

Nisbett (2016) contends that soft power can be bought and is a tool employed by western nations as a “simple way of renewing, refreshing and replicating existing power structures.” Rather than continuously debating the term, Nisbett (2016) recommends discerning the practice of soft power at a regional level in the digital age:

However, due to globalization and the accompanying stronghold that neoliberalism has across the globe, with the rise of Western corporate power, the growth of the Internet and shifting patterns of cultural production and consumption, soft power has transcended mere influence to become a significant factor in a state’s ability to generate income and boost its wealth. Any notions of intercultural understanding and cooperation have been at best, forgotten, and at worst, abandoned.

Perhaps, then, in a post-Internet world, museums can better comprehend the connections between the institution, visitor experiences, and community impact by collecting and examining data shared with and obtained by the museum.

Whilst the practice of soft power needs in-depth scholarly analysis, it is important for museums to look to their visitors’ needs and desires to figure out how the museum can be relevant and fulfil its mission. Museum educator, Mike Murawski (2013, p. 43), emphasized the urgency for a revolution of empathy and social impact in museums, stating:

Yes, museums are institutions that hold collections. But they can serve a powerful role with our communities as active spaces for connection and coming together, for conversation and dialogue, for listening and sharing. Museums can be spaces for individual stories and community voices. They can be a space for growth, struggle, love, and hope.

The (UK) Museum Association designed the campaign, *Museums Change Lives* (2013, p. 4), in 2012 to address the changing role of the museum in its community. The campaign includes a set of principles to guide the museum in establishing deeper relationships with its visitors:

- Every museum is different, but all can find ways of maximizing their social impact.
- Everyone has the right to meaningful participation in the life and work of museums.
- Audiences are creators as well as consumers of knowledge; their insights and expertise enrich and transform the museum experience for others.
- Active public participation changes museums for the better.
- Museums foster questioning, debate, and critical thinking.
- Good museums offer excellent experiences that meet public needs.
- Effective museums engage with contemporary issues.
- Social justice is at the heart of the impact of museums.
- Museums are not neutral places.
- Museums are rooted in places and contribute to local distinctiveness.

This thesis is not to advocate that these principles should be applied across every institution, rather to examine the opportunity for data that may be translated into information and insights museums require making decisions. Unknowingly, museums may be further marginalizing voices of those it strives to include simply because there was no strategy or mechanism to move beyond assumptions. Sociologist, Manuel Castells has explored how the Information Age has given the marginalized a voice and provided connections with other like minds and networks to harness knowledge and share lessons learned. Castells (2013) lays out how communication power has shifted from one-way communication to interactive communication that is created and consumed by the individual. Soft power may be a rallying cry for museums to invest in their own information ecologies (Chapter Two), perceive their data terroir, and craft relevant messages and programming that influence positive and consistent interactions. The museum's impact on their community via soft power delivered across digital channels or enabled by digital technology is a key element to include in the museum's evaluation of their digital maturity. It is this intention that has been a driving factor for city planners to transform their communities into inclusive and intelligent spaces.

4.2. Learning from smart cities

The networked communication of the 21st Century has exposed fatal flaws in the designs of the middle ages and those of the 20th Century visionaries and has given rise to the connected and smart city of the future. In his pivotal book, *Edge Cities*, author Joel Garreau (1991, p. 10) quotes social historian, Dennis Romano, when discussing how Venice developed into the landmark city of the present. Romano states, “People forget that Venice was built by hook or by crook ... Those who now romanticize Venice collapse a thousand years of history. Venice is a monument to dynamic process, not to great urban planning.” Wired journalist, Adam Rogers, exposes eight cities working with various partners in the physical and digital space poised to make Tomorrowland a reality in the Wired 2015 Cities by Design issue. Though Rogers (2015, p. 95) is talking about the concrete building and structure, the following statement invokes a Lego-like building structure hypothesizing the creative destruction with the building of bazaar-like spaces and states for Wired, “The cities of tomorrow might still self-assemble haltingly, but done right, the process won’t be accidental. A city shouldn’t just happen anymore. Every block, every brick represents innumerable decisions. Decide well, and cities are magic.” How might museums apply this intention when constructing their own digital transformations bridging their physical spaces with their digital properties and conversations?

In the 1950’s, American urban visionary, Frank Lloyd Wright was asked to predict the features of the future city. Wright answered, “After all is said and done, he--the citizen--is really the city. The city is going where he goes. He is learning to go where he enjoys all the city ever gave him, plus freedom, security, and beauty of his birth right, the good ground (Garreau, 1991, p. 11).” Wright was beginning to describe what Garreau, journalist, would later coin as the, edge city, and was accurate in his prediction with city growth aligning to increased importance of civil society and connected governance. Rather than predict the future, Castells prefers to predict the past and claims the changing shape of communication has powered and mobilized society. Castells (2013, p. xxii) says:

The communication realm is the social sphere where values and interests of conflicting actors are engaged in struggle and debate to reproduce the social order, to subvert it, or to accommodate new forms resulting from the interaction between

the old and the new, the past of crystallized domination and the future of alternative projects of human existence put forward by those who aspire to change the world and are ready to fight for it.

The growth of urbanization has transferred the power of nations to cities. Cultural institutions are not the answer to all of the city's growth challenges, but as museum planner, Javier Jimenez, claims the museum may play an active role in the liveability, economic development and global influence of the city (Lord and Blankenberg, 2015, p. 31). According to The Institute of Museum and Library Services (IMLS), there are over 35,000 museums identified in the United States and an AAM study states that museums contribute \$21 billion to the US economy each year and support 400,000 jobs (Institute of Museum and Library Services, 2008). Many museums encourage a mix of talent, tolerance, technology, and tourism with their collections, and their identified location in the urban ecosystem may influence other cultural and economic dynamics in close proximity. These supporting elements of a museum in the community are also the characteristics of a city supporting the "third sector" or creative economy as outlined by urban planning author and visionary, Richard Florida (Lord and Blankenberg, 2015, p. 15).

Museums may have grander visions of the visitor beyond tourism goals when evolving their institutions for "the public benefit." However, tourism has an impact on and is a major building block of the local economy. The type of tourist a museum attracts is of even greater importance because this tourist typically spends more than other tourists and stays longer in the city (Lord and Blankenberg, 2015, p. 37). Castells (2002, p. 371) emphasizes museums as part of the overall cultural industry -- creating value-generating activities for the city -- and these industries are often supported through "the territorially concentrated milieu of innovation, with a multiplicity of interactions, and face-to-face exchanges at the core of the innovation process, to be complemented, not contradicted, by online interaction." As the city expands, areas of civil society become stronger and others weaker.

As the city space is "built by the linkage of many different spaces in one network of quasi-simultaneous interaction that brings together processes, people, buildings, and bits and pieces of local areas, in a global space of interaction" trans territorial cities emerge

(Castells, 2002, p. 372). Concentrations of power are not just becoming denser, but spreading tentacles outward creating an “Edge City” as defined by Garreau (1991, p. xxii) as being more of a state of mind than a physical place. Edge Cities -- at the edge of or cultivating cutting edge technology -- are literally at the edge of city borders, and being built to intentionally put people on edge. It is actually Charles Dickens describing London in 1948 who best sums up the definition of an Edge City: “There were a hundred thousand shapes and substances of incompleteness, wildly mingled out of their places, upside down, burrowing in the earth, aspiring in the earth, mouldering in the water, and unintelligible as in any dream” (Garreau, 1991, p. 9). Dickens describes the unique terroir of London and what could be of any city. Edge Cities in particular are a balance of the betwixt and between that give a city its essence. These sprawling cities are seen by Garreau (1991, p. xx) as being the most significant change in how Americans are building cities that are the “cornerstones” of our civilization.

The city may expand and not lose major centrality, but new nodes of power concentration emerge in these Edge Cities and power is dispersed. Residence is not the only indicator of the growing networks and nodes. New forms of sociability, like social media, are bridging the cultural physical and virtual divides. Just as the lines are blurring between city and countryside, the lines between the physical and the Internet are becoming difficult to ascertain. Castells (2002, p. 378) summarizes this change, “Growing urban diversity requires the building of cultural and institutional bridges, if metropolitan regions are to be cities rather than mere habitats populated by self-defined networks of individualized interaction.” Cities are not becoming smart only because they employ technology to connect various clusters of nodes and networks together. Through this connection, cities learn about its citizens and strengthen the social contract between the government and the participating individual.

Museums may offer a place and space for difficult conversations to occur. The urban expansion is causing fragmentation with the emergence of new nodes of communication and can be overcome if the components connecting the nodes within the networks are preserved and enhanced. Museums may also offer a common public space for reflection to transcend once-held perspectives. Cultural institutions have the potential to be the capstone Garreau refers to with the creation of Edge Cities and are a potential solution

to the fragmentation inferred by Castells (2002, p. 382): “If people’s experience is fragmented in culturally specific places, and the functions of power, production, wealth, innovation, and communication escape into a different code formed around the virtuality of the space of flows, there are no longer symbolic transmitters in the urban experience.” Museums are this transmitter and the incubator as described by Dexter Lord and Blankenberg. Museums embody a functional and symbolic place of centrality. These spaces serve as a place to bridge the majority with the individual. Cultural institutions may offer symbolic meaning and restore understanding and perspective to messages. Museums are a physical location that when bridged with electronic hypertext may offer greater understanding and context.

Museum and regional community partnerships take time and patience to develop and their effects are not realized immediately. Essayist and general manager of Alhóndiga Bilbao, Lourdes Fernandez, uses similar language of other museum professionals and urban planners when describing the potential bonds between cultural and city efforts: “Thinking of the city as a platform for creative possibilities is more than just a need; it is a *cornerstone* of a better life (Lord and Blankenberg, 2015, p. 176).” The transformation of Bilbao has taken decades to achieve. Similar to the collapse of Venice history, the effects of Bilbao have become distilled down to a fairy tale about the hiring of a famous architect to construct a unique museum building and then, the host city will become magically transformed into an innovative destination.

The Guggenheim Bilbao is the result of one of many of its city planner and artist collaborations over twenty-five years to transform Bilbao from an unsafe, struggling city, into a cultural mecca. The museum, designed by Frank Gehry, may be an iconic focal piece, but architecture was not the reason for the city’s successful rebranding and revitalization. The city transformed inside-out, block-by-block, as a result of the strategic vision and partnership of artists, designers, city planners, universities, and tourism working towards a single, collective vision (Lord and Blankenberg, 2015, p. 182). A cultural infrastructure was created by neighbourhood hubs formed around public spaces and public/private partnerships. Art fuelled the connection between the hubs and formed the Alhóndiga Bilbao, one of Bilbao’s three most important cultural infrastructures and city

think tank transcending political objectives and linking culture with community (Lord and Blankenberg, 2015, p. 183).

The strategic partnerships between the Bilbao cultural institutions and urban planners is a single example of soft power reach and influence over time. Researchers are still examining the effects, if any, of the Guggenheim Bilbao in transforming the image and quality of city life. In fact, some researchers caution against using the term “urban flagship” to characterize a regeneration like the one undertaken in Bilbao because efforts can’t be reduced to a single thing as people are looking for easy answers to complicated challenges (Gomez and Gonzalez, 2001). Additional research is required to determine if the Bilbao effect may be replicated in other places with various ecosystems or if the outcome is a unique by-product of a large museum franchise.

Community influence is earned and not given based on the sole reason that an institution is a landmark. Trust and relevance are bestowed on the museum by the community it serves because the institution has demonstrated it is a safe space for many groups and experiences. In a Gallup poll seeking thoughts about the “Soul of the Community,” urban planner Richard Florida, identified three characteristics of a strong place within the community: “social offerings such as entertainment venues and places to meet; openness (how welcoming a place is); and the area’s aesthetics (its physical beauty and green spaces) (Lord and Blankenberg, 2015, p. 2).” Cultural institutions are a critical piece of the city and community’s DNA because these places have the potential to cultivate citizenship and the ‘soul of the community’ through interaction with the collection and other visitors and the draw of the physical location.

Bridges formed by trust and relationships are not immediately realized. Organisations that ask for the thoughts and opinions of their community, and take action on behalf of their community, will enjoy the benefits of the community’s citizenship power. Blankenberg (2015, p. 112) recognizes active listening as a major bridge builder and says, “A key aspect for museums exercising soft power among the cities of today and tomorrow is their ability to transcend past history and in some cases lasting racism, to be relevant, meaningful and attractive to everyone.” These institutions are not shying away from uncomfortable conversations, but rather are opening up a dialogue and asking visitors and

community members to actively participate in the decisions that are being made in their backyard.

For example, three national museum initiatives in Cairo are moving beyond their predecessors—created by a colonial system—to become a better reflection of the community that protected its city's treasures during the 2011 Revolution. Museum professionals are structuring the programming to influence rather than coerce, educate school children in the local area, and act as the bridge between their cultural past contextualized in the themes of everyday life. Cairo is not just building new physical structures, but also a framework to address social problems and establish a dialogue with its citizens. The Grand Egyptian Museum (GEM), one of the three new institutions being built for this initiative, is part of significant urban planning investment and future for greater-Cairo. The GEM -- in partnership with the other two cultural institutions as part of the initiative -- are answering the call to become part of the new building blocks of a renewed and sustainable community:

It is their community, not ours. We can advise, we can assist and can choose not to assist, but the decision about development priorities and policies must be reached by that society at large, not us...Let us start with that basic truth...too often in the past, we in the development business have acquired a stake in a project we designed and our procedures make it difficult to modify. Sustainable development means that local recipients have the only stake that counts (Lord and Blankenberg, 2015, p. 170).

Such partnership is of incredible value to the citizens of Cairo, but it has an additional impact to the stability of the Egyptian nation and the world. The museums are acting as the bridging and bonding facilitators to heal and rebuild a community rich in history with a voice toward the future.

There is a symbiotic relationship between a city and museum. Neither the city nor the cultural institute has the magic solution for the sustainability of the other. To fully realize the advantages of this soft power embrace, the construct of the city, the rise of urbanization, and communication power in the physical and virtual environments is an area

to explore. Perhaps it is only when the museum can begin to understand the spaces within the smart city where the cultural institution can rise to meet the challenges posed by the communities, will new dialogues and experiences manifest. How can museums transition from a landmark to become a place- or space-maker for the communities they serve? With a greater understanding of urban planning renewal methodology and community impact, museums are positioned to lead the conversation with city officials to explore how they may begin building or rebuilding foundations of their 21st Century institutions to reflect the needs and desires of the physical and virtual visitors. Much of the research to determine museum value to a city has been focused on high-level visitor rates and how many jobs the cultural institution has offered citizens. Museums have tried to replicate the positive effects of city change similar to the Guggenheim Bilbao, but such comparisons can't be made because the *terroir*—identity, structure, and meaning—is unique to each museum. Museum researchers Jane Bryan, Max Munday, and Richard Bevins (2012) recognized this discretion and built a preliminary framework to assess to the socioeconomic impacts of museums and continue to expand the concept of value.

The framework was created to go beyond standard economic data and delve into the socioeconomic value a museum could bring to the city. The categories analysed for this framework range from community involvement, governance, and perception to knowledge and creativity. The mapping exercise was limited to 136 museum stakeholders and data within the economies of Wales and north-east England, but research was meant to be used to assist and scale beyond this geography so other institutions could determine the value a museum could have on its immediate community and success of such efforts (Bryan et. al., 2012).

While it has yet to be determined if cultural institutions are necessary for the city survival, the framework developed by Bryan et al starts to evaluate a museum's contribution of value within the city. Soft power may be a term used in higher frequency beginning in 2013, but the context of this phrase may have morphed into a catchall phrase to really embrace or open the floor to discuss the importance of inclusion in cultural institutions. If we stripped away the cases explored in the book by Lord et al, what is left is a topic of discussion and debate pre-dating Nye's coined term, soft power, a quarter of a century ago. Inclusion has taken on many robes and is a relatively young research topic.

The focus of research over the past decade may be attributed to a reawakened expectation for museums “to orient their work towards what can be described as social policy objectives (Tilli ,2007, p.269). Rather than labelling the practice of inclusion, museum professionals learn from the example set by city planners and in the spirit of one of the most effective urban planners of the 20th Century, Jane Jacobs, and focus on the people because, “Cities like anything else, succeed only by making the most of their assets” (1961, p.140). Bilbao is perceived by humans to be an emblem and not a movement. In the next section, we will go beyond the landmark discussion to show how two small- to mid-size museums are using their institutions to become place-makers and creating safe spaces for their local community and how museums may be able to relate these practices in their digital ecosystems to further their own digital maturity.

4.3. Constructing safe spaces in the physical and virtual ecosystems

Moving from Spain to the United States, we will explore how two museums, one on the west coast and the other on the east coast, are cultivating the people in their community to become a requested and relevant space in their cities. To begin, the Santa Cruz Museum of Art and History is shedding its baggage of the past and surpassing all odds of survival and just keeping the lights on by throwing open the doors and inviting all walks of life and voices to interact with the institution. The participation has saved the museum and is a critical factor for breathing new life into Abbott Square, a Santa Cruz social commons area. Author of *The Participatory Museum*, Nina Simon, applied her research and theories about actively engaging visitors in a museum to her role as the executive director of the Santa Cruz Museum of Art and History (MAH). In four years, she has pulled the museum out of financial straits and into the black for three consecutive years after five years in the red, increased membership by 50%, and collaborated with more than 4,000 artists and community groups through exhibitions and cultural events (Isenberg, 2015).

Simon was recognized as a (2015) Silicon Valley 40 Under 40 Winner for her work at MAH developing community partnerships and solidifying a new future for the museum (Isenberg, 2015). Several cultural institutions involve the community in their initiatives, so what made the work at MAH so unique to earn international recognition? Simon and her team sought inclusion of activists. The MAH team established a relevant and safe space in the community by including people already passionate and hungry for change. These

people and groups were just as hungry (sometimes literally as in the case of the Homeless Services Center partners) and fighting to keep afloat as the museum itself. Inclusion became a business strategy for MAH and through empowering and connecting members of the community with each other, the MAH became a community home and reflection of everyone instead of a lifeless targeted demographic space (Simon, 2015b).

During the first MuseumNext conference in the United States in 2015, Simon shared the story of how MAH transformed its space from a renovated prison into a participatory home for the arts. The MAH was riddled with problems when Simon took the helm, so she strategically thought big and acted small by selecting a goal, articulating it clearly and then finding easy ways to begin fighting for action and inclusion (Simon, 2015c). The MAH team began by asking people to contribute. Whether it was making cardboard boxes for a co-created family opera or asking for discarded toilet paper rolls, anyone and everyone could contribute, and no one was excluded from a call-to-action impacting the community commons space and its museum. Everyone could participate and make a contribution because everyone was included.

Next, the MAH team armed themselves for the battle of relevance. They began by carefully crafting a mission statement representing their goals and reflecting the community needs. Simon (2015c) advised other museum professionals at MuseumNext by saying, “If you can use the sentence: ‘We can accomplish XX part of our mission by doing YY,’ people listen to you. They may not agree with you, but if you couch your goals in the context of agreed-upon strategic language, you can use that language as a shield as you pursue action.” Though the battle was tiresome, the war for relevance is never over, and the MAH team is hyper aware they cannot go it alone. They need the strength of the community, each other, and other museum professionals looking to them for inspiration, to guide them through the tough times and bolster a fighting spirit.

Simon recognizes there is a battle for relevance within the community the institution serves and another that may be within its own walls. The museum may be its own worst enemy and defeat inclusion before it has a chance by hiding behind what feels safe or become the status quo. Simon cautions museum professionals to begin change where it needs to happen first and ensure the immediate team is behind the strategy before deploying it to the broader community (Simon, 2015c). One of the ways MAH began to

cultivate the warm and fuzzy feelings of success were by establishing safe spaces within its own walls. Simon (2015c) warned, “When you think about creating your army, think about whether your actions are inviting people in or keeping people out. It can be so easy in this work for us to hunker down and focus on ‘doing the thing’ ourselves. It’s ironic and self-defeating that we can sometimes be exclusive in pursuing inclusion.”

The MAH team partnered with museum strategist, Beck Tench, during the summer to hold a museum camp for museum professionals and other activists of cultural efforts, so the team could share their methodology for space-making. Over the course of three days, over 100 museum camp participants thought about the theme of space and how they could make space for themselves and others within the institutions and communities they served. The MAH team (2015c) and other Santa Cruz leaders bonded together to share their lessons learned, pay it forward, and think about the meaning of space:

At Museum Camp this year, we will explore space: time-space, head-space, physical-space, blank-canvas space. We will practice creativity, contemplation, reflection, risk-taking, and noticing the world around us. We will check our devices and our culture-driven need to consume, produce, and perform at the door.

Museum Camp will be a safe space to practice new things, try on new habits, share moments of fear and courage with others, remember that you matter, and renew dedication to your passions and our field.

Make friends, find clarity, and develop space-making, contemplative, and creative practices for your own life and work.

Museum campers did exactly that and together co-created 56 space-making cards to share with their teams and other museum professionals all over the world. Each card in the Space Deck is a prompt to make space in one’s own life or vocation. Museum Camp creators (2015c) say, “These cards are intended to assist the creative, the museum professional, the librarian, the artist, the activists, the burnt-out, in making space for self and for others with intention and awareness.” The Space Deck was made available to print on-demand and

consists of cards to create spaces for stillness, creativity, courage, activist, relational, movement, ritual, and environmental.

Campers were inspired to create these cards after watching the MAH team in action host a First Friday event in the museum and adjoining community space, Abbott Square. First Fridays are the brainchild of Simon. On the first Friday of each month, Simon and the MAH team host a community forum where they share what will be happening at the museum in the future and invite the community to ask questions and share their own ideas about how to make the exhibitions better and reflect their own voices and desires. MAH opens up the entire museum and creates space stations throughout the museum for different group activities. Live music and artists entertain visitors with food and drinks in Abbott Square (Santa Cruz Museum of Art and History 2015a). The MAH team divides up to facilitate these simultaneous events throughout the evening.

First Fridays are the first step in revitalizing Abbott Square. The outdoor plaza adjacent to MAH is considered to be the “front porch for the Museum’s dynamic exhibitions and programs (Santa Cruz Museum of Art and History 2015b).” Simon is partnering with community leaders from the County and the City to revitalize the common area into a welcoming plaza for individuals and families to showcase the arts and cultural events of Santa Cruz (Santa Cruz Museum of Art and History 2015a). The MAH team is actively exercising its soft power to extend influence beyond its physical doors and into community spaces. Simon is encouraging her team and other museum professionals through the Space Deck to find new ways for the museum to act as a bridge for and bond all aspects and groups within the community.

This type of social capital building through bridging and bonding being applied by MAH are two behaviours identified by sociologist Robert Putnam in his book, *Bowling Alone*, to assist people in solving problems together. Putnam identifies ‘bonding’ as bringing together people in a homogenous group to support one another (Lord and Blankenberg, 2015, p. 222). The act of ‘bridging’ refers to sharing and exchanging information among socially heterogeneous groups (Lord and Blankenberg, 2015, p. 222). Dexter Lord and Blankenberg (2015, p. 222) consider bonding and bridging as important components of soft power because the activities encourage strong communication, empowerment, and reinforce positive behaviour change. Simon added another plank to the

bridge between the MAH and its regional community when founding the Of/By/For All Project in 2018. Through this effort, Simon is sharing the MAH model and connecting other museums and museum professionals with the intention to build partnerships between civic and cultural organisations by advocating museum collections and experiences created OF, BY, and FOR ALL people (OF/BY/FOR/ALL, 2018).

Moving from the MAH on the west coast to the Brooklyn Museum located on the east coast, similar strategies to MAH are being implemented at the Brooklyn Museum by technologist, Shelley Bernstein. At the 2015 North American MuseumNext conference, Bernstein shared how the Brooklyn Museum was moving from larger engagement requests to smaller, locally focused activity. In 2008, the Brooklyn Museum developed the *Click!* exhibition, a photography exhibition beginning with an open call for artist participation, followed by an online evaluation forum, completed with a crowd-curated physical exhibition of all pieces ranked in order of the forum (Brooklyn Museum, 2008). Bernstein discovered with this exhibition that the harder their team made the requested activity, the more engaged the community became. While examining the data, Bernstein also discovered the closer a person lived to the Museum, the more this person was actively engaged in the content. Activity of the average participant went from half a minute to 15 hours online each month for those locally engaged (Bernstein, 2015).

The focus on local participation was the instigation for the creation of the next exhibition, *GO* in December 2012, extending through February 2013. This exhibition, like *Click!*, had both a physical and a digital component and invited people to travel across the city to explore the works of 1,708 artists (Bernstein, 2015). People were invited to think like curators as they explored Brooklyn. Digital engagement was not requested until twenty-four hours after the physical visit, when the visitor could curate and vote on the best of the collections seen during the physical visit. Bernstein and her colleagues were experimenting with the concept discovered in the *Click!* data about making an activity more difficult resulting in increased and better-quality participation. A simple shift in viewing the visitor analytics revolutionized the engagement crafted as a part of this exhibition. The cooling-off period between the physical and digital visits and activity resulted in 18,000 people making 147,000 artist's studio visits (Brooklyn Museum, 2014).

The Brooklyn Museum shuttered the *Click!* and *GO* exhibitions and went back to the drawing board and began an intense institution evaluation. Together, Bernstein and her colleagues analysed the data and sought outside inspiration from companies like Apple. The Museum understood the value of its community and wanted to capture the familiarity a front-lines staff could offer visitors, like the blue-shirt Genius employees in the Apple stores. The Brooklyn Museum experimented with pilot activities before they finally landed on the most recent exhibition, *Ask*, which became available in October 2014 (Brooklyn Museum, 2014).

Customers enter the Apple store with questions and seeking information about the products and services displayed. The *Ask* application was inspired by this customer engagement and is a platform for a visitor to ask and get an answer in real-time about the Brooklyn Museum collection (Bernstein, 2015). One may download the *Ask* application from any location, but its use is only available within the walls of the museum. The museum asks visitors to not only come to the museum with questions or actively participate with the collection but also to become intrigued enough to answer a question. At present, the Brooklyn Museum has a team of self-identified experts paired with the curators to answer visitor question in real-time from behind the scenes, but Bernstein announced they are exploring ways to bring the staff out into the open similar to the Apple store experience that inspired the *Ask* application (Bernstein, 2015).

Ask is more than a technology application or add-on to the museum collection. This exhibition was born from visitor behaviour data and an agile building approach to research how a visitor could or would interact with a piece of art (Bernstein, 2015). The Brooklyn Museum team did not want to build a piece of technology or brochure to regurgitate information accessible within provenance or label information and the team knew it needed a hook to get people to want to actively participate with the staff.

The Brooklyn Museum used a combination of technology and big data to smartly determine the opportunity to expand and enhance the visitor experience. Bernstein and her colleagues thought big and acted small to embrace local citizen influence and engagement. In this next section, I will bridge how cultural institutions can infuse their planning with this same data-informed approach and align with the evolution of the smart city for a new museum experience expanding the physical into the creation of a fresh digital ecosystem.

4.4. Expanding museum walls in partnership with a data-informed smart city

As explored in the previous chapter, museums are flourishing with data now available through new technologies to assist the institutions in becoming more valuable and effective as face-to-face gathering places. Any size museum can take a more data-informed approach and implement smarter strategies and tactics as a result of the insights gleaned from the data paired with observation of its communities' needs, challenges, and desires. The combination of collaboration and open access to culture across physical location and digital resources is referred to as an "open museum" in the 2015 paper describing this paradigm (Dupuy *et. al.*, 2015, p. 1). The authors of this paper allude to the many innovations achieved when museums embrace the paradigm shift towards the 'open museum' through the "integration of real and virtual data" and challenging the "symbolic power of institutions, authorship, and intermediation" (Dupuy *et. al.*, 2015, p. 3). Museums are not challenged by the once-held belief of the role of the museum and the ecosystem itself within which it operates. Museums are in need of an evolution demanding the creative destruction of a command-and-control ecosystem to an open, permeable, mobile, and inclusive space.

Cities are undergoing a similar evolution to become smart cities by repairing previous century designs and preparing for a new ecosystem coexisting in the physical and virtual planes. Just like MAH and the Brooklyn Museum are focusing their efforts close to their physical location, technology innovation is beginning at the local level too. According to urban planning advisor, Andrew Townsend (2013, p.10), "Local is the perfect scale for smart-technology innovation for the same reasons it's been good for policy innovation-it's much easier to engage citizens and identify problems, and the impact of new solutions can be seen immediately."

The city DNA is made up of many communities all equipped with their own infrastructure, data, and behaviour. In this section, I invoke urban planning methodology museum planners may mimic or add to. These planners can help define smart cities as places where architecture, cultural objects, environment, economy, ourselves and everyday issues and things are wired together, speaking to each other, and giving our society data which can be analysed to promote better placemaking and community engagement.

‘Community’ has become an overused term to define any congregation of people. Perhaps the frequency of the tag ‘community’ and extremely high (and many times missed) expectations is because communities are not being nurtured or managed. Community is aspirational. Simply labelling an event or planning an exhibition for a specific group does not immediately make the group a community or even the organisation a participant of the community. Such labelling may be fostering a false sense of connection. According to Castells (2013, p. xii):

Horizontal, multimodal networks, both on the Internet and in the urban space, create togetherness; this is important because it is through togetherness that people overcome fear and discover hope. Togetherness is not the same as community because community implies a set of common values, which is a work in progress within the movement, since most participants arrive with their own motivations and goals and then set out to discover potential commonality in the practice of the movement. Thus community is a goal to be achieved, but togetherness is a starting point of and the source of empowerment: *Juntas podemos* (Together we can).

Building a community takes time and focus. It also requires several partnerships and alliances as MAH has created with the County and City to transform Abbott Square. Another example of a cultural institution embracing local influence is the Amsterdam Museum (AM). This museum is a city institution and the majority of its visitors are tourists. During the MuseumNext 2015 conference in Indianapolis, AM Head Curator and Head of Public and Education announced they wanted to raise the level of local visitors to become the majority. During the conference, Head of Public and Education, Annemarie van Eekeren (2015), outlined the mission of the AM is ‘We make history’ and told the story of its collection and four locations in partnership with the city.

Van Eekeren recalled a 2013 exhibition about the Golden Age that did not have the type of success or reaction from a specific local community as they assumed. Two months after said exhibition opened and was preparing to close, the Museum asked the Caribbean community for their reaction to the exhibition profiling this moment in their history. The community responded by saying the exhibition was not a reflection of their version of

history, rather it was that of the planning curator and AM (van Eekeren, 2015). This insight prompted the museum to re-evaluate this exhibition and invite this community to plan the next evolution of the exhibition from the permanent collection and capture the story and visitor engagement with their unique perspective. This type of institution and community collaboration gave birth to two recent exhibitions. The first exhibition created in 2013, *Meet the Collection*, brought together local collectors and artists to curate a special collection and author accompanying resource materials (van Eekeren, 2015). The success of this exhibition inspired a physical-digital exhibition hybrid, *Memory of East Amsterdam*, in 2014 and continues at present in the digital form of personal narratives, photos, and objects intermingled with the AM collection and voice of curators (van Eekeren, 2015). This exhibition was specific to a geographic location and subset of communities and was chosen as a launch pad for AM to become more involved in local issues. Similar to the Brooklyn Museum, this exhibition prompted a specialized team of museum storytellers and self-defined experts to coordinate and collaborate with many communities across Amsterdam (van Eekeren, 2015). The AM views these types of exhibitions as the future of the museum and the narratives shared are being integrated into the community and city DNA of Amsterdam (van Eekeren, 2015).

Like the AM identified the East Amsterdam community, cultural institutions need to identify and be where their consumers and visitors congregate naturally. Through continuous interaction in the natural environment, museums can participate in the community conversations and become trusted and relevant partners. Relevance requires constant proof and cannot be obtained in a single blockbuster exhibition or event. Substance matters. Perhaps if cultural institutions used ‘togetherness’ as a lens to create content and space, museums will discover increased visitor engagement and longevity of relationships in the form of visit length, repeat visits and interactions, and memberships.

Community now extends beyond the physical environment into the virtual, as Castells alludes to with multimodal networks. Websites, social media networks, mobile solutions, and other digital assets are being created by organisations to serve one or several communities online and offline. Museologist, Elaine Heumann Gurian, delves into this bridging of the physical and digital ecosystems in her 2007 article, *Introducing the Blue Ocean Museum: an imagined museum of the nearly immediate future*. Heumann Gurian

(2007, p. 2) warns that in an age of distributed communications, museums have lost “command of information” and must explore new ways to interact and remain relevant. She poses the question: “Will museums be willing to respond to the new Internet reality in order to remain important civic spaces, or will their inherently conservative natures prevail rendering them marginal or even extraneous in the future?” Heumann Gurian (2007, p.3) concludes that, “Museums will remain relevant only if they invest in the strategies that mirror the way people have come to use the web to investigate and learn. In other words, museums will have to change their internal cultural position from instructor to facilitator.” This question and conclusion remain relevant. Similar to cities learning and adapting in digital maturity, museums need to invest in data collection and use to understand and deliver meaningful experiences. A digital ecosystem is forming powered by online connectivity and engagement as organisations are creating viable pathways between nodes or neighbourhoods, while other organisations are facing urban sprawl challenges as they create unrelated mobile apps and microsites.

Cultural institutions may apply the same urban planning principles they are exploring to increase their soft power in the offline, physical landscape to the online environment. It is important to first identify and organize all of the customer or visitor touch points and understand how the individual and identified communities interact with the organisation online and offline. It is common for look at this by internal function instead of customer or visitor journey, as evidence of the Gartner Digital Marketing Transit Map (Gartner, 2017a). Next, the organisation should understand the internal and external technology required to make these connections and communicate. They should ask if the data being generated from any interactions is being viewed holistically or if any insights are being derived for business decisions.

According to the Gartner Digital Marketing Transit Map (2017a), the organisation is meant to “show the relationships among business functions, application services, and solution providers.” There are multiple hooks, people, and departments involved in every touch point and technology. It is difficult to display such relationships in parallel transit lines with overlapping stations. Gartner is trying to apply urban planning and design principles with this map design and the map reference to neighbourhoods, yet neighbourhoods in the offline definition that are vibrant are also diversified and dense. This

map design looks like it is the product of an organisation and not for the use and navigation by humans. The Gartner Digital Marketing Transit Map is referenced as inspiration for cultural institutions and to caution against designing around function and not a community-first design.

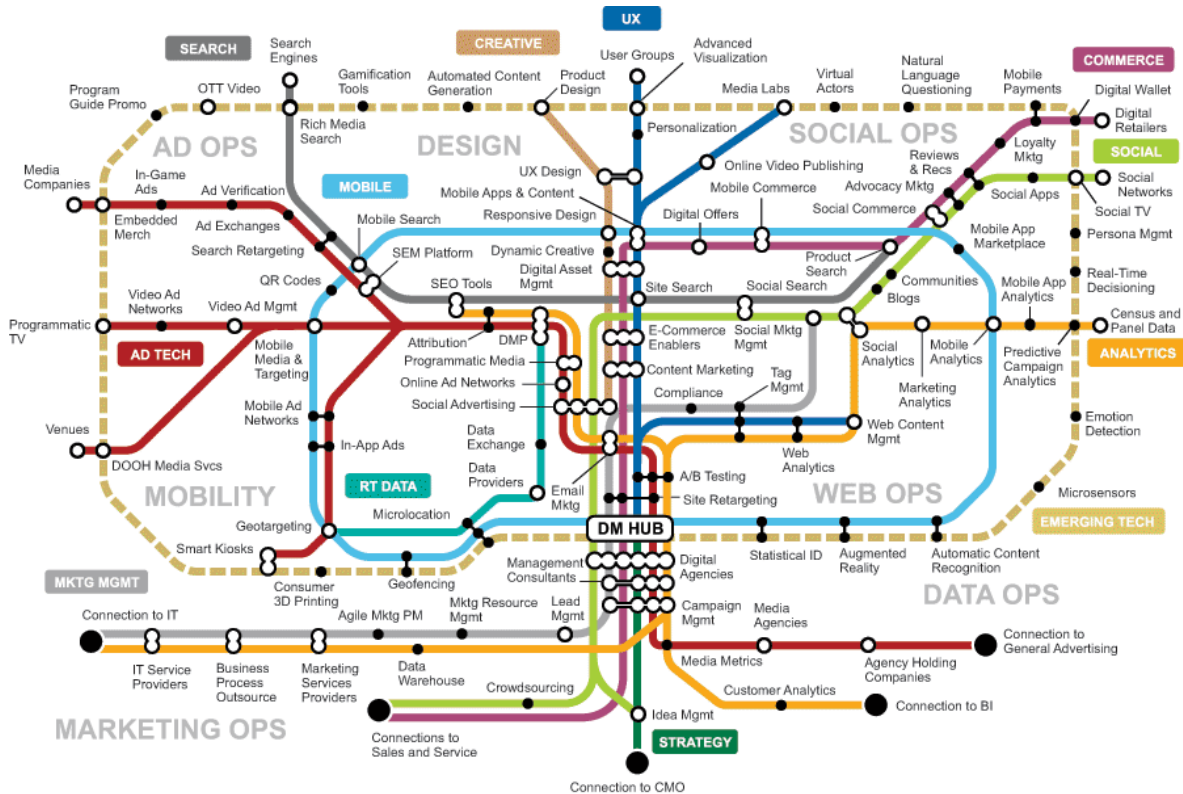


Figure 5: Digital Marketing Transit Map (Gartner, 2017a).

Founder and executive director of the non-profit, Architecture for Humanity, Cameron Sinclair advises urban planners to think about human interaction first instead of architecture or planning for cars. Sinclair (Rao, 2013) says, “We’re building destination cities. We need human, living cities.” Just like cities on a map, cultural institutions are building destinations online. Those building these destinations are designing for the organisation and greater search engine optimization rather than human space and community living. The Gartner Digital Marketing Transit Map is a good start to apply urban planning methodology to digital ecosystem strategy building to better understand gaps, opportunities, responsibilities, and the integrated role of an online community.

An online community should be easy to navigate just like a walkable city. In the book, *Walkable City: How Downtown Can Save America, One Step at a Time*, Jeff Speck

(2012, p. 11) defines the General Theory of Walkability as the walk satisfying these four main conditions: it must be useful, safe, comfortable, and interesting. I contend that an online ecosystem a cultural institution builds may benefit from having the same conditions as the physical space. Any Internet presence of a cultural institution is an invitation to explore more about the collection online or in the physical space, a potential dialogue with the visitor, and connection between the museum and the individual or the individual to other like minds or new perspectives. The online nuclear ecosystem of the institution may be a robust website or a website in partnership with various social network channels and/or online communities. The broader digital ecosystem is then represented by the online networks and nodes of the communities within the physical City.

The nuclear ecosystem is proven to be useful and provide information about how the cultural institution can serve the immediate needs and context of the visitor. Within the broader digital ecosystem, the institution may prove its relevance and soft power to the many nodes or communities within the network. The ecosystems should be well-developed to allow ease of use for the visitor and provide a safe environment to engage in potentially sensitive conversations triggered by physical or virtual events and interaction with the collection. The design of the ecosystems should be comfortable to navigate and offer spaces clear and conspicuous for thinking and engaging one-to-one and one-with-many. And similar to the intrigue of an eye-catching architectural design of the physical space, the visual navigation and content of the digital ecosystems should be interesting, open and inviting, and managed by online community managers to proactively engage with members of the community and reinforce positive behaviour.

Urban planner, Jan Gehl transformed Copenhagen and Battery Park in New York by observing the life between buildings and cultivating the community experience in these public spaces. What if museums thought of the social networks and online communities not created- or managed by the institution as the alley ways and common green spaces and parks? What if cultural institutions learned from the physical human behaviours observed by Gehl and applied this methodology in the online ecosystem to the connections between the museum and communities? If museums were able to successfully cultivate trust and relevance through online interactions, perhaps these communities would help the museum

increase its soft power and impact a greater growth and engagement rate within the online and offline space.

For example, Gehl (2011, p. 17) discovered that if activity between buildings is missing, low-intensity contact forms offered in public spaces disappears. Using a combination of web and social analytics aligned with visitor and member information, could a museum begin to see if activity to the institution's online presence suffers when connections are not cultivated between the institution's main online presence with other online communities or nodes that influence? Smart data and system design may be studied alongside urban planning methodology to organize digital ecosystems that complement the cultural institution's physical presence and influence within the community, city, and region.

Overall, the online space is going through a design evolution that mimics the physical urban planning and design evolution. The online environment began like early city development. Construction was organic and the new layered on top of the old. In the 1930's, design started to be influenced by functionalism and supplementary to aesthetics (Gehl, 2011, p. 43). Entering the second decade of the 21st Century, access to the Internet has become more mainstream and an online presence is expected. Aesthetics has trumped ease-of-navigation or -use, and design is structured for artificial intelligence, not humans. Instead of layering new upon old, online construction has extended outward into a proliferation of social media channels and microsites and is more akin to physical urban sprawl. The changing conditions with increased urbanization have compelled physical sites to rethink and redesign street design patterns and public spaces to accommodate evolving social and recreational city life (Gehl, 2011, p. 50). Increased access to the Internet and massive online content consumption habits are beginning to force similar changes to digital ecosystem design.

The digital ecosystem is ripe for change. Cultural institutions house a wealth of information in the physical space that is of incredible value to a connected world. Museums can be seen as influencers within the physical communities and break out of functional silos constructed in the online ecosystem if the museum considered sharing historical authority in a user-generated world. In the words of Ed Rodley (2014), associate director of integrated media at the Peabody Essex Museum, "Not being visible online is the equivalent

of not existing.” The museum presence online is much more than the digitized collection. Rodley (2014) calls for museum professionals to become more “promiscuous” with the spread of digital assets and engagement. With 34% of humanity now accessible online and a reach of 2.4 billion people, cultural institutions are at a critical point in their development to become powerful collaborators with the local community and by default of the Internet, may increase their soft power on a global stage (Sanderhoff, 2014)). Cultural institutions should not only be concerned about how walkable their nuclear ecosystem is, but how easy it is for visitors to navigate from a space in their ecosystem to a complimentary space within the broader digital ecosystem of the community or City.

For example, just as London has built a physical space known as the Knowledge Quarter around the British Museum, University College of London, the Guardian, and other public and private institutions within a one-mile radius of King’s Cross, St. Pancras International, and Euston Train Stations, the online ecosystem could organize itself into similar hubs, cross-promote interests, and bridge one online community with another (Lord and Blankenberg, 2015, p. 60). The organisation could occur through digital ad placement on other sites, combine email lists or e-newsletter topics, guest blog posts, and embedded redirects to other communities placed in the right place at the right time of visitor interest or other trigger online behaviour. The opportunities for the organisation of online hubs or neighbourhoods is endless. Ultimately, cultural institutions should make it easy for a visitor to get from point A interest to point Z interest without having to navigate through 24 other spaces within the organisation or hub.

The organisation of online hubs or neighbourhoods within the nuclear ecosystem and broader digital ecosystem is not only a visitor navigation solution, but as in the physical Knowledge Quarter of London, the space may be an opportunity for a cultural institute to initiate a strategic branding deployment, placemaking and space-making initiatives, community-building federation, and accelerate urban development (Lord and Blankenberg, 2015, p. 61). Inclusion may be grown in the physical environment just as the online landscape. The Knowledge Quarter in London was created to bridge gaps to define new conceptual and geographic territories (Lord and Blankenberg, 2015, p. 61). A similar conglomerate may be formed in the digital ecosystem to explore new zones or community offerings and expand soft power reach to these areas. The connection explored amongst this

potential online grouping of cultural institutions with private and public organisations must be more dynamic and robust than a simple hyperlink to bridge the areas. The draw of London's Knowledge Quarter is not just the institutions within its partnership, but the ease with which a visitor may walk or get from one space to another in the most direct and relevant context possible (Lord and Blankenberg, 2015, p. 61).

Spatial cohesion is necessary for any bridge between cultural institutions and other public or private organisations within its defined digital ecosystem. To assist ease of navigation or "walkability," institutions may be able to package experiences based on smart data of visitor behaviour. Using this information, the online version of the Knowledge Quarter could promote each other's organisations, missions, content, and value propositions by leaving a digital breadcrumb trail on each other's web properties and shared online spaces similar to the "knowledge trail" created by the London Knowledge Quarter to welcome travellers at each destination (Lord and Blankenberg, 2015, p. 61). The British Museum and British Library leverage their collections and missions in the Knowledge Quarter to position them as "a neutral space in urban development at the heart of civil society" because they are uniquely placed in the community to knit connections among several types of visitors and member institutions (Lord and Blankenberg, 2015, p. 62). Imagine if cultural institutions could wield this type of power and reach in an environment with no geographical barriers. This placement and connection are possible if cultural institutions position themselves in the digital ecosystem and strategically partner and organize themselves with other institutions with missions and values that complement their own. In this way, community influence will grow beyond the simple act of "togetherness" because similar values have the potential to be nurtured and fostered with repeated visits and knowledge growth. By "framing the agenda" to meet desired outcomes, institutions may exhibit a core form of soft power (Lord and Blankenberg, 2015, p. 62).

Finally, cultural institutions need to listen for and identify the online public spaces where they could learn information about their visitors and community and eventually become a trusted participant within conversation. These public spaces are similar to the parks populating, separating, and bridging one physical space from or with another. In the current digital ecosystem, social networks like Tumblr, Twitter, Instagram, and Facebook are most similar to the physical public spaces. Just as in the physical common space,

conversations develop immediately when acquaintances meet or consume content on the spot on which they meet. When studying public life in cities, Gehl (2011, p. 149) found that popular locations for people to congregate are found along the edges of a space or in the transitional zone between one space and the next, where it is possible to view both spaces at the same time. There are different levels of engagement and participation in the digital ecosystem just as there are in the physical space. Many people are considered lurkers in the online space. They consume content at a distance. They do not engage or comment with other members of the communities they are entering, but simply observe.

In the physical space, Gehl (2011, p. 150) noticed people lingered the longest on doorsteps or at the perimeter of plazas and other common spaces. If museums use the same logic Gehl applied to the physical landscape, institutions may be able to operate and survey communities at the edge of the space, listen for challenges, needs and desires, and then find a way to solve for or engage with those communities to further inclusive opportunities. In his book, *A Pattern Language*, urban planner Christopher Alexander (1978, p. 150) summarizes the experiences regarding the edge effect and edge zones in public spaces, saying, “If the edge fails, then the space never becomes lively.” If cultural institutions collaborate and organize into hubs with like-minded public and private organisations like the Knowledge Quarter, but operated in the digital ecosystem, the same attention to activity on the edges or development of edge cities or hubs will be vital for the success of the common space engagement and partnership.

Just as museums are paying more attention to cultivating a front office staff knowledgeable and inviting for visitors to their physical spaces, cultural institutions need to prepare community management staff and promote digital skills for the development and growth of an online ecosystem. Community managers will be necessary for facilitating constructive dialogs, spotting opportunities for inclusion, and identifying possible connections between the observer and institution knowledge or online collection. Similar to Gehl’s detailed study of Copenhagen, museums will need to become intimately familiar with the needs, challenges, and behaviours of the communities they serve and listen to the general ambience for the well-being of the visitors in the digital ecosystem. Learning will not be limited to common spaces; rather, the construction of how the collection and other institution knowledge is displayed to encourage interactions is critical.

Urban planning theorist and president of the Royal Institute of British Architects from 1993 to 1995, Frank Duffy (Brand, 2014, p. 13), said, “Our basic argument is that there is not such a thing as a building. A building properly conceived is several layers of longevity built components.” I contend that a website or online community is not successful only because of a pleasant user interface design or flashy content, but also the layering of robust elements strategically created and placed in the most relevant location within the nuclear ecosystem and contextually relevant within the broader digital ecosystem. Duffy (Brand, 2014, p. 13) identified four layers of a building’s components that Stewart Brand, creator of The Whole Earth Catalog, then revised into the “six S’s” to account for the structure through time: site, structure, skin, services, space plan, and stuff. Brand (2014, p. 14) called this structure the ‘Shearing Layers of Change’ because of the “different rates of change of its components, a building is always tearing itself apart.” In the digital ecosystem, a website and/or hub is constantly in a state of evolution to keep up with technological advances, access to information, and behaviours of those who interact with the structure and content.

Site or location of the cultural institution is crucial in determining boundaries and the context between the edges of other communities or hubs. Just as the physical location of a cultural institution contributes to the terroir of the museum, the site location in the digital space is unique and fed by community components and other external factors. The structure itself may be as eye-popping as a star architect design with a slick user interface design but must also be in a state of continuous evolution as new navigation pathways and user behavior changes are identified. The skin of the online structure must be inviting and easy to navigate or a visitor will be turned off and may miss where the cultural institution buried the knowledge and collections information. The design of the space must be sustainable and efficient, so that it does not become ignored because it is too costly to change.

The working structure of a physical building like communications wiring, electrical wiring, plumbing, and sprinkler systems are mirrored in the online structures in the form of search, online chat, on-demand video, high resolution imagery, community management, and more services required to ensure the functional condition of the online structure. Each area of the online structure requires detailed thought about who is going to access the site and information and why. Just as MAH and the Brooklyn Museum are creating spaces to

become more local, inclusive, and working with museum professions to be more aware of space-making through the Space Deck, a key component of navigation and engagement is making spaces for every type of one-to-one and one-with-many interactions. Cultural institutions could leverage the ease of access and design flexibility to offer more spaces and community inclusion in the online structure than the physical space could support and at possibly a lower cost point than physical changes to walls, ceilings, or floors. Last, but certainly not least, the structure is built to hold content. In the physical structure, museums are the home to a collection valuable to researchers and visitors of all interests and contexts. The value of the content should be just as focused and valuable in the online structure. Simply digitizing a collection is no longer a significant value draw as more cultural institutions make their collections available online. Museums may want to consider how they can layer value upon what exists. This may take the form of user generated content or open museum concepts like those explored by the Brooklyn Museum.

A connected world is an opportunity to extend a museum's influence into a space not constrained by geographical boundaries, but the limits of one's own imagination. New York's Metropolitan Museum is hyper aware of its tourist attraction in the virtual world and how this part of the museum's community may never experience the physical space. Through a combination of traveling exhibits and strategic community engagement and content strategy, The Met is greeting people and captivating audiences at the virtual doors of its museums. The museum has 6 million onsite visitors annually and has a reach of 92 million people through its Facebook page (Lord and Blankenberg, 2015, p. 106). The Internet is the ultimate centre of innovation. Cultural institutions can now influence behaviour using persuasion, attraction, and agenda-setting in a parallel setting in the online space and cultivate new social offerings, openness, and attract tourists with strategically organized online hub collaborations.

Being digitally mature is more than just having the most up-to-date digital tools and infrastructure, just as a physical ecosystem is more than just streets and traffic lights. Shared values, design, and agreed-upon social behaviours, processes, and outcomes guide how an ecosystem functions, whether it is physical or digital. As we can see from the published evidence gathered in these first three chapters, museums and museum scholarship continues to try to understand how digital transformation happens in the

museum. In the first chapter, we grounded ourselves in how, when, and why museums were adapting technologies. In the second chapter, we saw how information was flowing in, through, and out of the museum, and how museums might codify this data to transfer the bits and bytes into information and knowledge that may inform the museum's operations and visitor relationships. In this chapter, what appears to be evident is that there is more we can do to acknowledge the agency and role that key change agents have in making this change happen, as well as, enabling the conditions to collect and interpret information to aid the museum in data-informed decision making. The following two chapters outline a proposed approach for how museums may begin to gauge their digital maturity by establishing how they currently enable change agents, structure their information ecologies, and cultivate a museum experience encompassing the physical and digital visit.

Chapter Five:

Research Methodologies

Ultimately, this thesis aims to address the larger question of whether there is one path to digital maturity. It does this by taking the specific example of digital data - and how and why all museum data operates within (and is integrated into) the physical and digital ecosystems. In the previous three chapters, we have examined the people context (and the potential that change agents might have on a museum's digital transformation), we understand our information context (and the complexity of the museum data terroir museums), and we have identified the local and physical context of digital change (and the ecosystem mind-set that we will benefit from activating when planning and measuring for digital change). But now, with these contexts in place, what we need to explore in more depth in this chapter, is the sorts of practical models and tools cultural institutions could use to develop overall digital and data maturity. Digital maturity struggles to be simplified into a simple formula; rather the human, experiential, and organisational contexts that scholarship has evidenced throughout this thesis must be taken into account, and reinforces the complex nature of digital maturity. This chapter outlines the methodology designed to conduct the research for this dissertation and explores the ways in which museum professionals may use for-profit business language and tools, in easy actionable steps, to assess their digital maturity and develop a strategy to assist the cultural institution master the increasingly complex data-driven landscape. We will begin by exploring the potential application of the first of two business tools, the digital maturity model and self-assessment.

5.1. Assessing the maturity of an organisation's business processes

Business / Process / Capability Maturity Models (BPMM or PMM or CMM) have evolved since the 1995 debut of the maturity model commissioned by the US Department of Defense and Software Engineering Institute (SEI) at Carnegie Mellon University

(Harmon, 2009). The maturity model was created from the need of the Department of Defense (DoD) to instil project management guidelines for the vendor selection and software integration and operation. As a means of quality control, the model brings consistency to an industry constantly evolving and adapting processes and complimentary hardware. The five-step model created by SEI assesses the levels of an organisation's maturity of processes, measurement, management, and performance and has been adapted by many groups who have added their own interpretation (and acronym soup) of the levels and language used within the model (Harmon, 2009).

Academia and consultant groups, such as Forrester and Gartner, have created some of these adapted Business Process Maturity (BPM) models. The majority of such models are proprietary and only accessible if the organisation is a subscriber of consultant services, whereas researchers at Queensland University of Technology have published their research about holistic BPM model application. Leading BPM researchers at Queensland University of Technology, Michael Rosemann and Tonia de Bruin (2005, p. 2), refer to BPM as:

A holistic organisation management practice, which requires top management understanding and involvement, process-aware information systems, well-defined accountability and a culture receptive to business process. It is based on a process architecture, which captures the interrelationships between the key business processes and the enabling support processes and their alignment with the strategies, goals and policies of an organisation.

The model is not meant to be a checklist or a one-time exercise or application, but acts as a systematic tool to analyse continuously, improving processes, envision the future, and set benchmarks to achieve milestones towards greater maturity, scale and consistent adoption.

Since there are several variations of maturity models, it is important to select the model that best fits purpose of use and is properly administered. There are models that could be used to assess the digital maturity of a cultural institution, but such a model would not be completely applicable because no such model has been created specifically for a museum, and there may be elements of a business for which that model was developed that while aspirational, may be completely unattainable for a museum. The model is also a

framework or guide for the discussion and development of governance, risk, and control and therefore the tool used to assess and path the maturity of the organisation should relate directly to the unique qualities and challenges of a cultural institution. Such a model does not currently exist for a museum, therefore, over the following two chapters, I will advocate the construction of such a model and its proposed business deployment through strategic scenario planning.

There are three main components of a maturity model. First, as just alluded to, a model and its components have a purpose. Some models assess business process or cultural maturity for specific industries or project specifications. Second, models require a scale. Many of the maturity models consist of five to six levels of maturity on a scale of 0-5 describing the process or operation elements being reviewed (The Institute of Internal Auditors, 2013). Maturity is evaluated on a Likert scale with Level 0 is associated with non-existent processes, capabilities, or elements and Level 5 as achieving the highest maturity with sustainable and optimized business processes (Rosemann and De Bruin, 2015, p. 2). Third, each level consists of pass/fail criteria and set expectations that upon completion leads to a higher level of maturity and drives aspirational performance.

A maturity model may be self-administered or completed under the guidance of a third party. To ensure there is a level of commitment to the outcomes of a maturity model and the model is not viewed as a one-time analysis, targets should be agreed to and set for each component at every level. Maturity is established by component, so it is essential to analyse and determine completion and understanding of skill required for each component at every level before moving up the maturity scale to the next component. Revisiting the model regularly with self-assessment or guidance of a third party may help an organisation consider what has been missed with previous thinking and analysis. Conclusions of analysis and conversation at each review of the maturity model should be well documented for organisational memory, so the model and the organisation may continue to adapt, evolve, and construct an on-going roadmap.

The most important part of the construction of a maturity model is the components driving the objectives associated with each level of maturity (The Institute of Internal Auditors, 2013). The architecture of the model addresses what management or organisation stakeholders want to assess, the business processes involved, and how various models or

improvements with each component may lead to greater understanding and governance. For clarity of application, the model should include the research and data gathered to determine what is most relevant and necessary to meet and the level of scale achievable at the organisation and within the industry being assessed. Just like the dynamics of a video game, components should not be made so difficult to attain completion and move to the next level. Clear and plain language expectations are associated with each level. It is at the organisation's discretion whether to complete the level in its entirety before moving to the next level of maturity or determining in advance what components are required as a best practice and other components not given same priority based on the organisation's goals and risk tolerance.

The maturity model is comprised of opportunities for the organisation to evaluate and improve processes over time. There is no guaranteed outcome of success associated with the maturity model. A model cannot account for all circumstances and risk that may be associated with different business and organisation operations. The maturity model is a jump-start to thinking about and understanding how and why things are operating and what can be done or improved upon to achieve different outcomes and new competition potential. Whether it is the organisation or the third party researcher or auditor assisting in the evaluation, areas of development and creative ideas should be considered outside of the model, then such knowledge influences any changes made to the model. The maturity model is a dynamic and living resource requiring constant nourishment and attention.

5.2. The growing influence of industry analysts

Due to constrained resources, museums may hire consultants or third-party agencies to identify the current state of digital maturity and benchmark their state against other museums or competing leisure activities, rather than setting aside the time, space, and skills for the museum to conduct their own audit. There are thousands of technology vendors a user may select from depending on organisation need and maturity. The selection is vast, but the understanding of how, what, and when to select a technology is murky at best. Users may have looked to their personal and professional networks for assistance in choosing the right technology at the right time, but the evolution of technology and its complexity is too great. To fill this need, the global market is now being shaped by IT research firms like Gartner Group and its competitor, Forrester Research. While there is not

a lot of historical information about these firms and their expertise, there is no denying the influence these companies have and how they define criteria for how technology vendors are assessed (Pollock and Williams, 2009).



Figure 6: The Magic Quadrant (Gartner, 2018b).

Two scholars, Neil Pollock and Robin Williams began exploring how the information technology (IT) marketplace was being influenced and shaped by specialist industry analysts offering a commoditized form of knowledge, advice, and the creation of a market analysis tool like the ‘Magic Quadrant’ designed by the Gartner Group (2018b). The ‘Magic Quadrant’ is a visual representation of vendor performance in various market segments. This is a snapshot of vendor performance as evaluated by Garner analysts. The ranking is visualized on X- and Y-axes by ‘completeness of vision’ and ‘ability to execute’ indicators (Pollock and Williams, 2009, p. 131). Other analyst firms like Gartner have similar ranking tools. These rankings are released publicly and then additional insight and knowledge evaluating the vendors is available with subscription to analyst firm services.

Despite the allegations levelled at these groups for not always being independent of the technology vendors they are assessing, the devices these industry analyst firms create remain influential (Pollock and Williams, 2015). A new group with specialized expertise emerged as an answer to the complex terrain of the IT market. Pollock and Williams (2015) witnessed and documented this movement through extended ethnographic study of Garner, Inc, other industry analysts and organisations, and interviews with the technology vendors and clients. Three decades of extreme IT growth and complexity gave rise to industry analysts, although not part of a formal association, they draw upon many types of within-industry and across-industry expertise in their role. Gartner industry analysts defend their position in the IT market emphasizing, “their independence and their production of ‘defensible knowledge’, demonstrated through their adoption of formalized methodologies” (Pollock and Williams, 2015).

Gartner and other analyst operations through their commodified knowledge and advice, and proprietary analysis and ranking tools like the ‘Magic Quadrant’ (positioning niche players, challengers, leaders, and visionary companies in major technology markets), have the power to influence the current and future performance of vendors. Pollock and Williams (2009, p. 132) reference another source claiming the ranking devices “enjoy extensive diffusion and are widely acknowledged as one of the most referenced tools in the IT sector”. Gartner and other analyst firms have filled a void of in-depth analysis of the IT market and evolution of vendor capabilities. Academics, such as Pollock and Williams (2009 and 2015) have studied these market analysis tools and have attempted to establish the industry and tools as ‘impartial’ and ‘legitimate’ arbiters of vendor performance over a period of six years. Pollock and Williams state in their concluding statements of their 2009 (p, 148) Information and Organisation article that they:

Have identified the important role played by these new kinds of intermediary in establishing performance and standing of vendors; and how by enabling systematic, commodified access to community knowledge, industry analysts and IT research firms have provided the grounds for more formalized and systematized assessments of vendors and their offerings.

However, there has been little overall academic attention given to how or what types of community knowledge is being packaged and the impact of commodification of networked reputation accessible through subscription services by Gartner and other analysis firms.

While Pollock and Williams may have considered the scope of work and determined the credible standing of major consultant groups, the study may not have factored in the incredible growth of individuals and agencies claiming to provide consulting in the wake of the exploding technology market. Indeed, studies supported with academic rigor such as that conducted by Pollock and Williams, on a consistent basis may lend credibility to consulting practices. In other words, not all maturity models are created equal or are designed objectively, as to not lead to an outcome solvable only by the consulting individual or agency.

Unfortunately, this gap, while it is an opportunity for an academic research study to test similar maturity models, the structure and evaluation definitions are not made public and such models cannot be used for cultural institutions that are not a subscriber of analyst services. It is then the burden of the organisation to identify an internal or external resource to act as a researcher or auditor and select or build the most appropriate assessment model and work with the organisation to map maturity level and potential opportunities and outcomes.

5.3. Applying a business process maturity model to cultural institutions

Maturity models may help inform an organisation of its gaps and potential areas for strategic and monetary investment. An outcome of the literature review and fieldwork is to provide cultural institutions a proposed model to assess a panoramic view of their current digital BPM strengths and weaknesses, define and overcome the paradox of the current digital maturity state, and establish pathways of actionable steps to achieve the desired level of digital maturity.

When considering the many variables of digital maturity, the framework chosen for this thesis fieldwork is based on the maturity models established to assess business management processes. To benefit from this approach, I propose the blending of the expertise of industry analysts with academic rigor to unlock new ways museum professionals may manage digital transformation. Rather than taking a best guess at what tools and processes would be most effective, there is an opportunity for museum

professionals to take a more dynamic approach by leveraging real-time streams of data to identify and increase visitor interactions with their museum's collection, staff, or greater visitor community, now that we have level-set on the people, place, and provision contexts of digital maturity.

Overall the proposed maturity model, interview questions and answers are meant for any organisation, researcher or consultant to use to assess the maturity of the organisation, develop a needs analysis, and identify the initial elements of a digital and visitor engagement transformation plan. An outcome of this research may be repeatable steps or perspectives taking the tangible form of a playbook. The playbook contains the beginning of a roadmap the museum may use to fuel the momentum of continuous discovery and evaluation to build better-integrated processes and outcomes and become an adaptable organisation continuously thinking about improvement and evolution. These business tools may prove to be useful for other museums to take when ready to embark upon further digital data maturity development, thereby contributing to the museum's overall digital maturity readiness.

For this research, three museums across the United States were used as case study sites to identify how visitor and collection data are preserved and if any trends, patterns, and connections are recognized in the technology used to collect and use data, business insights and volume of repeatable experiences derived from data, and how or if the data is connected to or impacts the museum's physical and virtual environments.

An explanatory sequential mixed methods design was used for all three museums, and it involved collecting quantitative data first and then explaining the quantitative results with in-depth qualitative data. In the first, quantitative phase of the study the proposed maturity model was administered to assess the current technology, data collection and maturity assessment. The self-assessment of digital data maturity survey was collected from designated participant(s) at the three case study museums to assess whether a change-agent mind-set, in combination with, if and how data is collected and analysed, relates to how museums are designing their institution's digital maturity strategy and visitor service and experience infrastructures.

The proposed maturity model has multiple applications and may be used to gauge the overall digital transformation readiness of the organisation. This readiness is evaluated

in the answers to the questions about governance and management, digital tools and platforms, associated business processes, metrics, and institution culture and community. Applying this sort of model in this ways allows for the connecting the dots of scattered process competencies to the organisation's comprehensive strategy and mission. The next area analysed is the answers given to the maturity assessment questions and if the organisation has a well-understood or recognized brand identity, both internally (amongst its own employees), and externally (to prospective visitors and members). Another area that may be investigated in additional depth is how focused is the organisation in digital business processes, visitor and member touch point integrations, and overall comfort and understanding of the organisation's digital footprint and strategy. Traditionally, the readiness scores may be benchmarked against what the researcher or third-party has collected from other organisations. Queensland University researchers validate the gap of existing maturity models not including domain-specific complexities and industry-specific testing (Rosemann and De Bruin, 2005). In this research project, such benchmarks may be good information to note as areas to further explore museum digital maturity when this model is socialized to a broader and diverse number of cultural institutions and enough data is collected to establish industry specific benchmarks for all museums.

Industry analysts separate maturity into linear segments for additional research or to assist the researcher in providing better realized individual consulting. Using the proposed maturity model, there are six maturity levels for an organisation to complete and aspire to become a fully optimized operation. The proposed maturity model maturity stages were constructed using a top-down approach where definitions are written first and then metrics are established (Rosemann and De Bruin, 2005). The definitions for the maturity stages are listed in Table 1.

Maturity Stages	Definitions
Nonexistent	Knowledge sharing is discouraged. There is general unwillingness to share knowledge. People do not seem to value knowledge.
Initial	Knowledge sharing is not discouraged. There is a general willingness to share.

	People who understand the value of sharing do it. Meaning of knowledge assets is understood.
Infrastructure	Culture encourages sharing of knowledge assets. Value of knowledge assets is recognized. Knowledge assets are stored and tracked in some fashion.
Integrated	Sharing of knowledge assets is practiced. Systems and tools to enable business processes and activities exist. Rewards and incentives promote knowledge sharing.
Managed	Employees expect to locate knowledge. Training is available. Business management processes and activities are part of workflow. Systems and tools for supporting business process activities are easy to use. Business process capabilities and benefits are assessed. Leadership exhibits commitment to business processes and provides a comprehensive strategy.
Optimized	Business processes are reviewed and improved. Business management processes systems and tools are widely accepted, monitored, and updated. Business management processes generates realistic improvement.

Table 1: Maturity stage definitions.

Maturity models go beyond the reporting of outcomes to measure individual process performance. The model serves as a beacon to keep the organisation on the right path to achieve its goals and objectives. The six maturity stages of the proposed maturity model are

made up of factors evaluating five areas of the cultural institution: governance and management, digital tools and platforms, associated business processes, metrics, and institution culture and community. The factor is defined as “a specific, measurable and independent element, which reflects a fundamental and distinct characteristic of BPM (Rosemann and de Bruin, 2005).” According to the same Queensland University researchers, their in-depth study of all other BPM models found five common critical success factors or pain points for successful BPM deployment: information technology and systems (IT/IS), culture, accountability, methodology, and performance. In the proposed maturity model for cultural institutions, I have chosen similar areas of study to assess the digital maturity of a museum. The differences between the proposed model and existing models will be the inclusion of domain-specific criteria for components evaluating the drivers, uncertainties, cycles, trends and choices unique to museum ecosystem. Each component is a measurable entity within the model. The components of the six maturity stages and the five areas of assessment build the grid that is the proposed maturity model. The proposed maturity model is a fusion of publicly available components outlined by Hammer (2007) in ‘The Process Audit’ and Ross *et. al.* (2009) in ‘The Five Stages of Managing Technology’ matrix.

The second, qualitative phase was conducted as a follow-up to the quantitative results of the proposed, originally constructed maturity model self-assessment. In this exploratory follow-up, individuals driving digital change in the museum were identified, and interviewed about why or why not data is informing the museum’s strategic development. The questions in Table 2 represent the structured questions and sub-questions asked to validate the digital maturity of each organisation and to establish benchmarks that will inform the museum of its gaps and biggest opportunities for investment of resources.

Informational Interview Objective	Interview Question
01.1 To understand if transformation through digital data collection and analysis readiness is predicated on a single hacker mindset or if behavior is encouraged across specific teams or entire environment	<p>Are those people with a change-agent or hacker mind-set self identified or chosen by the museum for the role of change-agent?</p> <ul style="list-style-type: none"> • What characteristics do those with the (self-acclaimed or identified) hacker mind-set express in the museum environment? • Are characteristics of the hacker mind-set expressed more in the individual role or in team setting? • Does the hacker mind-set influence the visitor service or experience through tool or platform adoption or influence processes of how data is collected and analyzed?
01.2 To focus on how museums can improve placemaking and community management	<p>Are museum professionals mimicking city planners or community organizers in how the museum engages with city or local community groups?</p> <ul style="list-style-type: none"> • How are community voices defined? • How are community efforts with the museum prioritized? • How are such events considered successful or repeatable?
01.3 To explore the impact of data as currency for all visitor touch points in the museum and understanding how data is absorbed, insights derived, and smart business decisions as a result of data infrastructure	<p>What data and how is data being collected today across the service and experience visitor journey?</p> <ul style="list-style-type: none"> • How is this data being stored? • Are data collections procedures documented? • How is this data being analyzed? • Are data collections analysis procedures documented? • When is data not gathered about the visitor at any touch point? Why not? • Is all visitor data gathered from primary sources?

- Is data shared with city or community partners? If yes, what level of access to data is shared? If not, why not?

Table 2: Informational interview objectives and questions.

An active maturity model self-assessment may be the first step in an institution's larger opportunity identification process. The model focuses on the most relevant discussions and questions. The proposed maturity model informs the assets contained in a potential Playbook. The Playbook may be designed to assist the organisation through a data-informed improvement cycle used in Six Sigma planning and applied in either a self-directed path or guided by analyst knowledge. The primary organisation categories for the Playbook include: define, measure, analyse, improve, and control (DMAIC) (Rosemann and de Bruin, 2005). As a result of an ever-changing environment, the organisation and those responsible for making technology decisions are in a sense, designing, building, and flying the plane all at once. Cultural institutions may choose to take a page out of the strategic planning playbook, *The Art of the Long View*, by former Royal/ Dutch Shell futurist planner, Peter Schwartz (1991), and use scenario planning to unlock environmental factors and articulating pathways for plausible futures, as discussed in the following chapter. Recognition of this frantic pace of change and decision-making does not have to result in chaos. Instead, the proposed maturity model may be the first step in defining the gaps and opportunities of the cultural institution, and the lessons learned or next-step maturity actions within the model that may be realized through structured process and accountability. The potential Playbook may be organized into these five DMAIC sections one can follow in order or parallel path the processes and change management with the evolution and adaptation of the cultural institution to its environment. A Playbook begins with assessing the state of the organisation, internalizing trends, and understanding the organisation's capabilities required for the business objective and then proceed by planning the people, governance, processes, and technology to bring the strategy to life. Similar to the maturity model, a Playbook is not a one-time operation of creation and activation; rather it is a living, breathing resource document to be updated frequently as new initiatives and opportunities arise in the industry.

This research encompassed only the construction of the readiness requirements for potential Playbooks. Not all cultural institutions will be prepared to put all of the enablers in place to move from one maturity stage or component level to another. It will be the decision of each museum if they want to take the results of the maturity model to build a strategic plan and roadmap to begin integrating their data to better understand and communicate with the museum visitor in more varied ways. As the structure of the Playbook alludes to, the change required post-maturity model assessment is more than just layering new processes on already established functions within an organisation. Processes evolve to become high-performance processes meaning they have senior executive buy-in and support and extend across functional boundaries (Hammer, 2007). A transformation is possible with the establishment and growth of enterprise-wide enablers and capabilities. The museum may be able to transcend history of its past strategic business decisions if the present is a supported environment ready to give birth to and be a trusted participant in this newly imagined ecosystem.

Define	Measure	Analyze	Improve	Control
Vision: Through the lens of digital maturity assessment, unlock the customer context and focus of integrated data collection	Assessment: Define the processes, funding model, and governance required for each stage of maturity and scenario	Organisation of Tools and Platforms	Performance Management	Optimize
Landscape: Establish the technology blueprint and determine any gaps and opportunities	Strategic Plan / Road Map & Business Case: Determine the requirements for proposed data collection and technology investments	Processes	Benchmarks	Continuous Improvement

Table 3: Digital maturity playbook.

The Playbook elements begin by taking the proposed maturity model assessment and analyzing the results against other museums in the study using mutually understood language. In this stage, the researcher or any other designated museum staff member(s) identifies how connected the cultural organisation is to its environment and visitor engagement or experience management and insights organisation. The researcher can then place the organisation into the correct contextual phase of maturity and development, as well as, pair the needs analysis derived from the maturity assessment and the digital landscape knowledge to begin gathering requirements for structure development and business use cases to test, learn, and develop greater maturity and connection of the physical and digital visitor experience. This is the time to imagine scenarios of why, how, and what the cultural institution could do to improve enablers and digital maturity. In the next chapter, we will unpack how these business tools may be used in combination with scenario planning. The proposed Playbook is a practical guide to start addressing an organisation- and industry-specific problem of becoming a 21st Century organisation ripe for inclusion and participation.

Blending the lessons learned from the previous three context chapters with the methods derived from industry analysis and expertise packaged in reports and interactive models may result in a new way to view and organize how and why all museum data is collected and analysed together to inform how the museum operates and integrates into the physical and digital ecosystems. The findings from the proposed maturity model and Playbook design are the building blocks needed to foster strategic conversations. Envisioning different futures, the researcher can give thought and action plan recommendations for various plausible futures. As with the academic study of industry analysts and their resources structured to solve client problems, I am adapting existing BPM models and analysis I use in my daily work to flesh out technology uses, gaps, and opportunities.

To support the use of the proposed business tools, I am using a pragmatic philosophy with a mixed methods research approach for greater flexibility and ability to use the best of both quantitative and qualitative data collection and analysis. A pragmatic foundation is ideal for mixed methods research because the proposed approach will incorporate multiple methods of data collection and analysis and worldviews from

participating case study sites. The quantitative study is an essential element of the research because it informs the analysis of the technical infrastructure, whether the formation was created by piecemeal or methodically pieced together with linked data and experiences. The qualitative research builds on the quantitative research and informs how and why decisions were made to employ the current infrastructure, give explanation to the future of the infrastructure and readiness to integrate with any other internal or external methods and solutions. The open-ended questions with team members of each case study location also give clues about how and why certain members either rise above with a hacker mind-set or work with the team to increase and infuse new skills and learning to rise together as a team with hacker mind-set abilities.

5.4. Research background

This research initiative is a result of the literature review and questions surfaced in the first three chapter of the thesis. By having the characteristics, and using the methods outlined in this chapter, the proposed maturity model consequently allows us to understand, at a detailed level, how change is activated and accepted across the organisation for management to all staff – this is a human element we established in Chapter Two that we consider key to this digital maturity context. Likewise by building the model to include analysis of governance, processes, and tools, and ensuring it gathers information around how data is collected and used to further the mission of the museum, the model is sensitive to the key context and concept we identified in Chapter Three (around institutional needs). Through a series of interviews and survey data, I assess the availability of visitor information and if the cultural institution is open to innovating thinking and solutions to address the fluid needs of the visitor experience.

Finally, by delving into the capabilities around community, we are able to determine the gaps and opportunities of how the museum may leverage the power of data to help secure a stronger place of relevance and activity in their immediate physical and digital ecosystems as discussed in Chapter Four as a key context of digital maturity. Advances in technology are allowing museums to capture and sift through large amounts of visitor information to determine how and why a visitor changes over a lifetime relationship with the institution. Through the study of a cultural institution's identity, structure, and perceived meaning, I assess how a select group of museums compare their data, big or

small, smartly with the data of surrounding city and community to improve the museum's awareness, visitor experience, and become a better neighbourhood partner.

5.5. Research procedures

The proposed maturity model was tested with one of the museum case study sites (Santa Cruz Museum of Art and History). The model content was evaluated to ensure domain specifics are accurate, reliable, and component outcomes are repeatable. This model has the potential for additional systematic enhancements and extensions if it is socialized beyond the three museums in this study.

The research follows three small-to-midsize art museums across the United States to identify how visitor and collection data are preserved and if any trends, patterns, and connections are recognized in the technology used, business insights and volume of repeatable experiences derived from data, and how or if the data is connected to or impacts the museum's physical and virtual environments. Research was collected over a period of three months and included museum staff interviews about data familiarity and use, existing technology mapping exercise, and assessment of community impact through socioeconomic and visitor engagement criteria.

The museums were chosen because they each represent various funding and organisational structures in three distinct areas of the United States of America. And as a set, this group represents cultural institutions with well-known change agents leading digital initiatives that align with their museum's physical community-focused strategic objectives. The museums chosen are as follows:

- Santa Cruz Museum of Art and History (Santa Cruz, California)
- Peabody Essex Museum (Boston, Massachusetts)
- Minneapolis Institute of Art (Minneapolis, Minnesota)

Location	Santa Cruz Museum of Art and History	Peabody Essex Museum	Minneapolis Institute of Art
	Santa Cruz (West Coast)	Salem (East Coast)	Minneapolis (Mid-West)
Hacker/Champion	Nina Simon, Executive Director	Ed Rodley, Associate Director of Integrated Media	Douglas Hegley, Chief Digital Officer
Integration	Robust hyper-	Well-documented	Explore the digital

(Systems / Data) w/in Physical / Online Ecosystem	local community activity / partnerships – low online activity	digital innovation projects paired	narrative and data systems planning of a mature strategic plan
Data Use	No known structured data – Explore if structured / unstructured data collection and use are on the strategic roadmap	Explore continued use of data collection for insights planning and/or communication	Explore continued use of data collection for insights planning and/or communication

Table 4: Fieldwork locations.

To begin the evaluation process, a primary contact was established to help facilitate interview times and assessment and survey completion. Individuals and/or teams were selected for an introductory interview to determine the challenges, desires and needs of each museum. The introduction included or was followed up by the completion of a data collection and digital maturity assessment and a digital ecosystem needs assessment. From the information provided by verbal and needs assessment, I, as the researcher, identified the gaps and opportunities of each museum using a framework to visualize the visitor experience powered by data and supporting digital infrastructure. Follow-up conversations took place to review this framework with participating museums. Then I began the task of identifying trends or patterns within the data connected and among the participating museums and staff to discover what other museums can learn to build and enhance a new visitor experience lexicon and integrated physical-digital ecosystem.

Since the proposed tools needed to be adapted to assess the museum environment, I did an initial test with the MAH because I was in the company of Simon for a conference. This test included an expedited completion of the maturity assessment and technical survey. In addition to the questions already outlined in this proposal, the researcher asked the director and any team members completing the assessment tools, follow-up questions about how why they selected the maturity levels within each category of the digital data assessment.

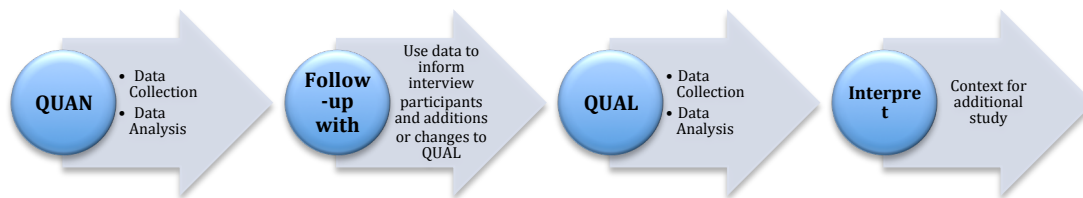


Figure 7: Explanatory sequential mixed methods model.

- Quantitative data collection / analysis
- Qualitative data collection / analysis
- Mixed methods data analysis procedures
- Validity approaches

Researcher's resources and skills to conduct mixed methods research

I bring to this study over a decade of experience of evaluating data collection and analysis platforms. In other organisations, I have conducted similar technical maturity and readiness evaluations, analysed for patterns, and scoped out gaps and opportunities for business units to immediately apply infrastructure adjustment and smart data insights. I am biased towards tools and platforms primarily designed for the marketing function, though every effort was made to ensure objectivity though these biases may shape the way I structured data collection and analyses and interpreted my experiences. As the researcher, I am familiar with identifying needs and opportunities for sales and service design to create an infrastructure and accompanying mind-set for holistic museum health through data informed, not data driven decision-making.

Potential ethical issues

When generating any type of data, it is critical all research is conducted fairly and ethically. As a student of the University of Leicester, I recognize my obligation to the participants of the case study sites and the framework of research ethics as stated in the Research Data Management Principles (RDMP) (http://www2.le.ac.uk/services/research-data/documents/uol_rdmprinciples). As the researcher, I took into account the requested

needs of the informants of the case study sites and abided by the following to protect the participating institutions and the informant's rights:

- This framework extends beyond the University of Leicester and includes on-site procedures for each of the four case study participants;
- Clearly communicate the purpose, and needs of the research to the participants;
- Ensure that informed consent is obtained from all participants, and they were not pressured or coerced to take part in this research;
- Inform the participants they could withdraw from the research process if they changed their mind about involvement;
- Participant's decision about anonymity is made by the participant and declared in written statement with consent;
- Receive written consent from participants before conducting any data collection;
- Understand and anticipate the needs of participants and anticipate any issues with the research methods or content of the questions so any concerns are addressed promptly and appropriately;
- Inform participants of all data collection devices and activities;
- Ensure all participants receive the same treatment;
- Make available all verbatim transcripts, interpretations, and reports (specifically about participating institution);
- Clearly state who owns the data from the study; and
- Ensure the integrity of the data and appropriately store and manage data (active, shared, curated or stored) in accordance with information governance and University requirements, adherence with legal requirements.

Prior to conducting the data collection, I identified and consulted with identified gatekeepers and University to ensure the elements of study and the researcher are prepared, informed, and align with RMDP. Once the study was underway, I scheduled an informal conversation with participants about any needs or questions they have about the data collection and analysis process. It was essential I build trust with participants and provided an environment where they could speak freely and knew I would not include any data into final study that may be harmful to the participant.

As the researcher, I was clear about the purpose of the study and further explained any questions throughout the data collection while being mindful of and adhering to interview protocol. Each participant had the same opportunity and was treated like all other participants in a fair and equal manner. I did not express own opinions and take sides; I reported both multiple perspectives and contrary findings, vowed to report honestly and fairly, identified participants as agreed to in initial consent, and provided copies of the findings to participants.

5.6. In summary

This research was conducted to identify gaps within the data collection process and solve for an integrated model to collect and analyse data for greater insights into visitor behaviour within the museum walls and the digital ecosystem. Information was collected over a period of three months and includes museum staff interviews about data familiarity and use, existing technology mapping exercise, and assessment of community impact through socioeconomic and visitor engagement criteria. Exactly one year following the initial maturity self-assessment and interviews, I followed-up with all the museums about the status of their digital data goals and introduced the scenario planning framework as a means to deconstruct and project the progress of the maturity assessment. Digital maturity, specifically as it relates to data collection and use, is not a stable study object because of the ever-changing nature of technology and the immediacy of digital information. Analysis of the completed digital maturity model and interviews is explored in Chapter Seven.

This chapter has attempted to show the value of using digital maturity analysis as a means to understand the human, experiential, and institutional levers that need to be activated to achieve greater optimization in digital across the areas of governance, management, processes, tools, metrics, and community engagement. This business tool enables us to take a snapshot in time and evaluate, at a deep level, the supporting capabilities across all six areas. However, to complement this analysis we will explore how to apply scenario planning (Chapter Seven) to assist the museum in prioritizing any change management efforts to maximize and optimize the maturity of capabilities across all six areas of digital maturity. Our next discussion will explore in detail how three US museums have applied the digital data maturity self-assessment as a means to understand or gauge their overall digital maturity.

Chapter Six:

Case Studies

In its attempt to understand pathways to digital maturity, and the value of ‘data maturity’ as a proxy for this, this research has used established business tools from corporate world (refined for use in the museum sector) to analyse three small- to mid-sized art museums from across the United States to identify the conditions and capabilities of data use and collection. The research was collected over a period of two years and includes museum staff interviews about data familiarity and use, existing technology mapping exercise, and assessment of community impact through socioeconomic and visitor engagement criteria. Exactly one year following the initial maturity self-assessment and interviews, a follow-up intervention took place with all the museums about the status of their digital data goals and introduced the scenario-planning framework as a means to deconstruct and project the progress of the maturity assessment.

Prior to verbal interviews and electronic status updates, each museum completed a data collection and use maturity analysis across six categories: governance; tools; community; management; metrics; and processes. Each category consists of capabilities scored on a maturity scale of 0-5 (0 being non-existent solutions or capabilities and 5 being optimized solutions or capabilities). Each capability was then given a second maturity score with a red, yellow, or green indicator (red meaning the capability maturity statement was not true; yellow meaning the capability statement is somewhat true; and green meaning the capability statement is accurate). The total points possible within the maturity data collection and use matrix is 155. Not every area of the digital data maturity matrix is scored equally. For example, the category of ‘Governance’ outweighs ‘Processes’ and ‘Management’ categories because a sound foundation of policies and standards guides the

creation of policies and mature management practices. Digital maturity, specifically as it relates to data collection and use, is not a stable study object because of the ever-changing nature of technology and the immediacy of digital information. Therefore, the following four case studies represent a snapshot in time.



Figure 8: Digital data maturity categories (Source: Author).

The three museums were chosen because each museum employed an innovative personality or group of talent, and is a good representation of size and funding models of art and history institutions across the United States of America. These three museums (in order of interview schedule) include the Santa Cruz Museum of Art and History, the Peabody Essex Museum (PEM), and the Minneapolis Institute of Art (Mia). The objective was not to compare the three museums to each other; rather, to document the differences in staff, budgets, technologies, and strategic goals to assess the possible, multiple pathways to

digital maturity. Each of their particular approaches to digital data collection and use uncover insights about how a common framework to manage the challenges of digital data may be applied to museums of all sizes and types. Mature data practices, processes, and a digitally confident workforce are the connective glue holding together any digital transformation. Rather than testing or analysing the ever-shifting trends of the digital evolution, this thesis and the accompanying case studies test the self-assessment digital data maturity and scenario planning frameworks.

As stated in the previous chapter, it is common for consultants to use frameworks to assist in the innovative strategic planning process and to chart a course towards success, or what is known as a North Star. While a strategic plan is prescribed, a strategic framework is the scaffolding or blueprint an organisation employs to keep an eye on the ambition – the inspiring and perhaps unprecedented objective derived from the museum’s mission – and orients the organisation’s purpose, promises, guiding beliefs and values, and initiatives. The North Star aligns the organisation in the direction of the single largest driver of sustainable long-term growth aligning the organisation’s mission and value being offered to the museum’s patrons.

To better identify trends or patterns in the analysis of the completed digital data maturity matrix and personal interview, I developed four categories to group museum analysis. The category definitions were pre-determined before the analysis based on concepts gleaned during literature review and the drafting of concept and research methodology chapters; however, the analysis determined how the museums in this thesis were categorized. The four categories are: personalization, platform, panoramic, and paradox (of change). The first category is that of *personalization*, meaning the museum is focusing on micro and hyper-local relevancy that may or may not be scalable (as we saw in Chapter Two). The second category is *platform*, meaning the museum is honing and expanding digital skills and literacies through connected systems and services (as we saw in Chapter Three). The third category is *panoramic*, meaning the museum is taking an integrated-first technology and services approach to build a holistic ecosystem of people, collections, and events (as we saw in Chapter Four). The fourth category is *paradox*, meaning persistent paradoxes of change are accepted, and viable options are explored and

baked-into the museums digital data strategy, allowing the museum to evolve with or within multiple scenarios (as we saw in Chapter Six).

For each of the museums interviewed for this thesis, I selected a core and secondary ‘P’ categorization to illustrate the depth and breadth of the work required to achieve any single level of digital data maturity (Figure 1). The following case studies are evidence of data being a trend that museums recognize and are in various stages of digital maturity to address data collection and use; each museum finding a different pathway to their North Star or state of desired digital maturity.

6.1. About the Santa Cruz Museum of Art and History



Figure 9: Santa Cruz Museum of Art and History

The first museum to complete the digital data maturity self-assessment and individual interviews is the Santa Cruz Museum of Art and History (MAH) located in southern California. The MAH acted as the control museum for the Researcher to gauge the strength and completeness of the maturity self-assessment and interview questions. In comparison with the other museums included in this analysis, the MAH is a relatively young institution in comparison to the other case study participants. The MAH is a 501(c)3 non-profit organisation, and the Institution is the product of a 1996 merger of the Santa Cruz Historical Society and the Art Museum of Santa Cruz County (Santa Cruz Museum of Art and History, 2018a). The physical footprint of the MAH is also unique, as it is a former jail building. The museum has an art collection of approximately 300 objects and a history collection of over 7,000 items (ibid). The collections and archives occupy 2,750 square feet within the museum's total 8,000 square feet of exhibition and gallery space (Santa Cruz of Art and History, 2018a).

The MAH's mission is "to ignite shared experiences and unexpected connections" (Santa Cruz Museum of Art and History, 2018a). The Institution's collection is limited to the local history and contemporary art relevant to Santa Cruz County (Santa Cruz Museum of Art and History, 2018b). The MAH operates the museum and three additional historic sites: Evergreen Cemetery, Davenport Jail, and the Octagon (Santa Cruz Museum of Art and History, 2018b). The MAH (Santa Cruz Museum of Art and History, 2018a) does not attempt to be all things to all people, rather, the museum is laser-focused on establishing a foothold in the local Santa Cruz community and through dynamic exhibitions, events, partnerships, and programs, to "build a stronger, more connected community." Executive director, Nina Simon, has been at the helm of the MAH since 2011 and has been the standard bearer for the museum's hyper-local community focus. Simon (2016, 2:19) states, "I think that what's most important is where we focus and where we've really grown in our staff over the last few years which is really about respect, curiosity, empathy, and desire to work with outsiders."

When Simon took over the MAH, the Institution was in dire financial straits. By 2015, Simon had moved the museum out of the red to three years budget growth and surpluses, tripled attendance, and increased membership by 50% (Isenberg, 2015). To achieve this drastic turnaround, the MAH adapted a new business and staffing model with a community-centric focus (Robinson, 2015). No longer slave to programming for a fickle tourist visitor, Simon realized the key to the museum's success was to break down the physical walls of the museum and bring the objects and related activities to all residents of Santa Cruz. Simon (2016, 2:01) knew this change could not occur overnight, so the focus of she and her team was on "experimental prototyping, trying things out and being comfortable with hacking what a museum could be."

6.2. MAH Maturity Matrix: Overview

The MAH scored a total of 84 points out of the possible 155 on the digital collection and use maturity matrix (see Figure 1). The highest scoring categories were community and management. Simon completed the digital data maturity self-assessment before meeting with the Researcher in an informational interview to discuss responses in each of the six categories.



Figure 10: MAH digital data maturity.

MAH Maturity Matrix: Governance

Governance	Standards / Policy	Select	Operate	Integrate	Adopt	Adapt	Consistent
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The governance category has one sub-category level, standards and policy, and six capabilities: selection, operation, integration, adoption, adaption, and consistency. Four of the six capabilities scored a level two maturity, meaning the capabilities are in the infrastructure stage. The MAH is in its infancy of digital data maturity and is strategically setting itself up for success by selecting technologies that integrate well with each other. While the Institution is in the process of articulating its data needs and uses, the selection of a digital asset is evaluated with the knowledge of the number of dependencies and data integration points with other existing legacy systems or platforms. The MAH has little to

any shared knowledge of how the digital assets will be used or discarded based on new or growing uses of the data. Maintenance of the few digital assets is documented, however the onboarding training, guidelines, and best practices for use of the existing or incoming digital data assets is in the process of being documented.



MAH Maturity Matrix: Tools

Tools		Databases	Collaboration		Digital Assets	Information Security	
Fundraising	Collections	Events	Marketing / Communications	Social Media	Content Management	Networks	Data Security

The tools category has four sub-category levels. The first sub-category level, databases, has three capabilities: fundraising, collections, and events. The MAH scored a level-three integrated stage maturity meaning it was actively using database for increased member intelligence for revenue and front-line staff decisions. In the latter two capabilities, the MAH scored the Institution as having level-two infrastructure stage maturity, meaning it has a visitor-centered architecture with light integration with other systems across the Institution.

In the collaboration sub-category, there are no additional capability levels. The MAH indicated it has a searchable central repository for digital asset management cataloguing current and historical assets. This level three maturity supports an integrated structure and lays the groundwork required for a defined a managed maturity level marketing group who owns and develops the marketing and communications technology strategy and defined technology roadmap, using assistance from information technology resources as needed.

The digital assets sub-category is split into three capabilities: marketing / communications, social media, and content management. This is the strongest sub-category within the tools category. The MAH is operating a managed and mature marketing / communications and social media program with a strategic plan for providing contextual and relevant experiences for visitors. Visitor sentiment is captured and content management experiences are consistent and becoming contextual across channels as the MAH matures in digital data capture, A/B testing, and analysis. Simon (2016, 9:26) says the MAH has a

comprehensive audience and partner surveying methodology and an internal self-tracking program to better understand and evaluate if MAH is hitting all of their engagement goals around relevance, sustainability, bridging, participation, and ignition.

The final sub-category within tools is information security and consists of two capabilities: networks and data security. The MAH scored the institution as having a level two-infrastructure maturity because it is connected to the Internet via ISDN, DSL, cable, dedicated lease lines, fibre-optic networks, or cellular networks. Similar to the other sub-categories within tools, some of the institution’s data needs and uses pertaining to data security have been clearly defined, but not uniformly documented.



MAH Maturity Matrix: Community

Community	Culture	Diversity / Inclusion	Active Listening
Change Management	Talent	Leadership	Soft Power
			Engagement

The community category is split into three sub-category levels and is the highest scoring section in the MAH digital data maturity matrix. The first sub-category level, culture, is split into three capabilities: change management, talent, and leadership. The talent and leadership capabilities were scored as a level three-integrated maturity because MAH staff is aware of the museum’s performance drivers, can articulate how their work contributes to the institution’s performance, and senior leaders have developed a vision of the institution and its processes. Change management was the highest scoring capability in this sub-category, scoring a level four-managed maturity because MAH employees recognize change as inevitable and embrace change as a regular phenomenon.

The second sub-category, diversity and inclusion, has a single associated capability: soft power. MAH scored a level four-managed maturity as a result of the institution defining and operating as “the third sector” – a social commons where people generate “the goodwill that allow society to cohere as a cultural entity.” Simon (2016, 10:01) says the MAH has met their community goal to reflect the diversity of Santa Cruz County in age, income, and ethnicity. This capability scored the same as the engagement capability associated with the final sub-category, active listening. The MAH senior executive team

exercises leadership through vision and influence rather than control. For example, Simon says the MAH is focused on ethnicity. When Simon took on the mantle of change agent at the MAH, the museum audience was comprised of 70% Caucasian and 30% other. In Santa Cruz County, there is a similar divide, but the 30% is Latino. The MAH set a community goal to involve more Latino people into the activities of the MAH to better reflect their whole community (Simon, 2016, 10:18).



MAH Maturity Matrix: Management

Management	Leadership	Strategy Development	Organisational Support	Communications
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The management category has four sub-categories. Two sub-categories, leadership and organisational support, were scored by the MAH as a level three-integrated maturity because there is strong alignment in the senior team regarding the how processes are documented and process owner's share accountability for the institution's performance. There is also a network of people throughout the enterprise helping to promote leadership processes.

The remaining two sub-categories, strategy development and communications, were scored by the MAH as a level four-managed maturity because staff work across the institution to integrate strategic processes, and there is a strategic plan for engaging with visitors across physical and digital channels and/or devices in real-time. The MAH is increasing their data-informed decision-making as they bring in new technologies to better capture primary and third-party research, analyse what is happening in the audience segments and if MAH activities are contributing to their community goals, and then cutting or adjusting programming and resources as needed (Simon, 2016, 11:43).



MAH Maturity Matrix: Metrics

Metrics	Definitions / Uses	Customer / Visitor Analytics	Sales Analytics	Marketing Analytics	Digital Analytics
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The metrics category has one sub-category, definitions and uses, and four capabilities: visitor analytics, sales analytics, marketing analytics, and digital analytics. The highest scoring capability in this category is visitor analytics with a level three-integrated maturity because cross-process metrics have been derived from the MAH’s strategic goals, and senior management presents the metrics results to the staff for awareness, motivation, and day-to-day management of processes. Simon (2016, 5:15) says the MAH does not identify or treat volunteers, donors, or collaborators differently, rather the MAH thinks of all as partners who should be “engaged as a human on multiple levels” and then use what you learn from these human interactions to “create opportunities for partners to get together and get value from one another.” Two years after this interview, Simon shared the MAH’s inclusion framework as part of the OF/BY/FOR ALL Project (Chapter Four) and aims to connect 200 civic partners with cultural organisations by 2020 (OF/BY/FOR ALL, 2018).

Two of the capabilities, sales and marketing analytics, were scored by the MAH as having an in-development level two-infrastructure maturity. The institution has identified areas across the visitor journey to capture primary information at the time of activity or touch point, and the staff is becoming trained for analytics and reporting needs, but is still developing processes to diligently mine visitor data to create programming and other services that may delight their most valuable visitors. Simon (2016, 12:00) admits that when the MAH began its heavy surveying, they had an “unrealistic expectation that we were going to have this magic bullet” and found they had to test, learn, and iterate their survey and data capture process to revise the survey methodology, get a representative data sample of their community, and move their audience information out of email and into an integrated database.

MAH Maturity Matrix: Processes



Processes	IT Alignment	Planning / Prioritization
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The processes category was the lowest scoring category overall across two capabilities: IT alignment and planning and prioritization. IT alignment scored a level two-infrastructure maturity because MAH does have an IT system constructed from functional components to support the processes, but planning and prioritization scored a level one-

initial maturity since MAH is still identifying business processes that maximize and optimize the strategic plan. Simon (2016, 18:18) says the museum has an informal process structure where leadership and staff may use different tools to accomplish the same goals and it is not until a process or technology has proliferated in majority use or there is an undeniable level of frustration that acts as a tipping point before processes and technologies are then standardized.

6.3. MAH Maturity Matrix: Conclusion

While the MAH had the least amount of technical or digital capabilities overall, Simon acknowledged the museum is growing and serving various people and communication needs that require different data skill sets than the museum employed before 2015. Simon (2016, 3:06) has made a concerted effort to hire new talent focusing on data collection and use of a newly built Salesforce Customer Relationship Management System (CRM). I categorized the MAH as having the core ‘P’ of *personalization* because the museum’s focus is on creating relevance in the physical environment and exploring how this experience or insights from this experience may inform the digital ecosystem architecture and experience. As the secondary ‘P’, because the museum is hiring outside talent to build a connected digital data architecture, I categorized the MAH as also displaying the beginning characteristics of a *platform* institution.

The MAH is small, but mighty and is using an agile approach to learning and integrating data-informed decision-making into its culture. Simon (2016, 31:42) says the MAH is:

Continuing to work on building a people and culture of comfort around data, but also prototyping. And so there is this iterative loop of pilot something, learn from it, and try something else. You know keep it moving. And I think that I’m always surprised having an engineering background how unfamiliar to me those things are kind of baked into who I am and how I approach the world.

Simon is driving the museum to transcend the physical footprint of the museum and bring the museum’s objects and activities into the community with the enablement of digital and data resources.

6.4. About the Peabody Essex Museum



Figure 11: Peabody Essex Museum.

The Peabody Essex Museum (PEM) was the third institution to complete the digital data maturity self-assessment and information interviews. The first objects of the PEM’s collection were part of the East India Marine Society’s “cabinet of natural and artificial curiosities (Peabody Essex Museum, 2018).” The East India Marine Society, an organisation of Salem, Massachusetts captains and supercargoes who sailed beyond either the Cape of Good Hope or Cape Horn, amassed a collection of objects from the northwest coast of America, Asia, Africa, Oceania, and India (Peabody Essex Museum, 2018).

In 1848, the Essex Historical Society merged with the Essex County Natural History Society to become the Essex Institute (Peabody Essex Museum, 2018). It was not until the institution refined its mission to the collection and presentation of regional art, history, and architecture, that it changed its name to the Peabody Academy of Science, dropping the historic ties of the East India Marine Society, and honouring the institution’s greatest benefactor, George Peabody (Peabody Essex Museum, 2018). In the early

20th century, the institution changed its name to the Peabody Museum of Salem and existed alongside the Essex Institute, which was expanding its focus and collection to early American architecture and historic preservation (Peabody Essex Museum, 2018). In 1992, the Peabody Museum of Salem and the Essex Institute merged to form the Peabody Essex Museum. This merger amassed a collection of more than 840,000 works of art and culture from all over the world, two libraries with over 400,000 books, manuscripts, and documents, and 22 historic buildings (Peabody Essex Museum, 2018).

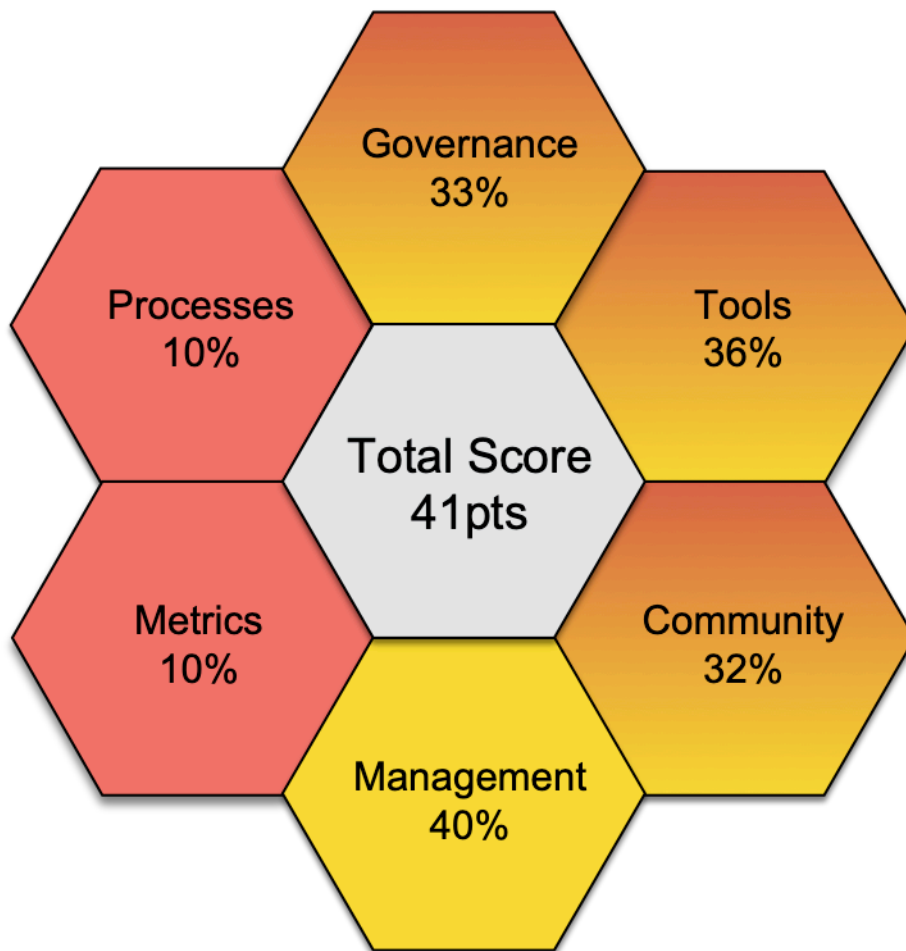


Figure 12: PEM digital data maturity.

6.5. PEM Maturity Matrix: Overview

The PEM scored a total of 41 points out of the possible 155 on the digital collection and use maturity matrix. The highest scoring categories were management and governance. The high-scoring areas are not surprising for such a well-established and large museum. The lower scoring areas are not weak links, but areas of opportunity for PEM to surpass

institutionalism and embrace the digital future (and even become a leader in the area) of integrated data. Ed Rodley, Associate Director of Integrated Media at the PEM, completed the digital data maturity self-assessment before meeting for an informational interview with four members of the PEM digital team to discuss responses in each of the six categories.

Two years prior to the interview for this thesis, Rodley was part of a team of museum technologists compiling essays for an online publication (updated and printed one year following), *Code|Words*, exploring technology theory and application in cultural institutions. Rodley contributed his own essay to the collection, *The Virtues of Promiscuity or Giving It Away is the Future*, in which Rodley (2015, p. 228) advocates for museums to “focus more on creating and spreading the ‘digital DNA’ of our shared cultural heritage and less on controlling access to those assets.” Many of the concepts Rodley (2015) championed in this essay are echoed in the interview following the completion of the digital data maturity self-assessment: challenging museums to look outward, not inward; finding ways to reimagine, adapt, and share digital assets in the spirit of openness; and recognizing that transformation can only occur once the goal is clearly stated and has support at the most fundamental level.



PEM Maturity Matrix: Governance

Governance	Standards / Policy	Select	Operate	Integrate	Adopt	Adapt	Consistent
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The governance category has one sub-category level, standards and policy, and six capabilities: selection, operation, integration, adoption, adaption, and consistency. Three of the six capabilities scored a level-two maturity, meaning the capabilities of selection, adoption, and adaption are in the infrastructure stage. The selections of data assets are dependent on the number of integration points with other existing legacy systems and platforms. The museum is beginning to document how users will operate the digital assets, point solutions, and platforms, and a roadmap of how point solutions will gradually shift to suite or platform solutions. Two of the capabilities, operation and integration, scored a level-one initial maturity, meaning there is little to no documented operation of the digital

assets, and digital assets are not chosen specifically for potential integration; any integration is currently happenstance.

During the interview, it was shared the Chief Financial Officer had conducted lean training with a subset of PEM staff with the goal of identifying spending and process inefficiencies. Of the digital staff members in the interview, only one had attended the training and shared there was hostility to the change being requested (Rodley, 2016, 1:01:46). Overall, at the time of this maturity snapshot and interview, PEM was taking baby steps to build its digital infrastructure and struggling with a variety of change management practices. A common theme surfaced during the interview shed some light on various blockers of this infrastructure development. The museum is constantly in reaction mode. Many of the infrastructure developments, at the time of the interview, were the result of legacy systems at end-of-life, and the PEM staff were caught in a vicious cycle of little time to scan marketplace or invest in development and training, because in some cases, staff had a few months to replace the system (Rodley, 2016, 56:43).

The capability with the highest score is that of consistency, scoring a level-three integrated maturity score. The museum is starting to identify gaps and opportunities within the overall visitor journey that can be solved or assisted with digital assets. As the museum shifts to a more data-informed institution, an intake form, requirements, and business case are a desired requirement before any digital asset is reviewed or selected. Ultimately, PEM wants to develop capabilities to allow museum employees a way to develop empathy, a better understanding of the visitor experience (Rodley, 2016, 45:41).

PEM Maturity Matrix: Tools

Tools		Databases		Collaboration		Digital Assets	Information Security
Fundraising	Collections	Events	Marketing / Communications	Social Media	Content Management	Networks	Data Security

The tools category has four sub-category levels. The first sub-category level, databases, has four capabilities: point-of-sale, fundraising, collections and events. In three out of four capabilities, point-of-sale, fundraising, and collections, the PEM scored the Institution as having level-one initial maturity, meaning the databases are stand-alone, silo

external point solution, for information use only. The events capability scored the highest with a level two-infrastructure maturity indicating the museum has a visitor-centered architecture with light integration with other systems across the institution. In the digital data maturity assessment, PEM indicated they are making improvements in this capability and evolving maturity to use digital to grow revenue and sales intelligence, as well as, integrate systems tied to cross-channel goals. The integration and development alluded to in the digital data maturity matrix was dependent on three major tools being on boarded within the museum at the time of the interview: an enterprise CRM system, content management system, and digital asset management system (Rodley, 2016).

In the collaboration sub-category, there are no additional capability levels. The PEM indicated it is beginning to build sufficient resources to analyse and create the online and offline content necessary to meet the institution's needs. This level-two maturity supports infrastructure maturity. During the interview, the digital team said the internal collaboration space across PEM is quite fragmented, and various teams use the tools they feel most comfortable using or that which is requested by leadership (Rodley, 2016, 01:12:37). The digital team shared that it is confusing having to buy-into different systems (Rodley, 2016, 01:13:33) and that this mentality of keeping information in departmental siloes extends to databases (Rodley, 2016, 36:09).

The PEM indicated it is developing select areas of the managed maturity elements, meaning it has a defined marketing group who owns and develops the marketing and communications technology strategy and defined technology roadmap, using assistance from IT/S as needed; however, PEM does not yet have the level-three integrated maturity element of a searchable central repository for digital asset management that catalogues current and historical assets., but as previously stated, this system was close to implementation at the time of interview.

The digital assets sub-category is split into three capabilities: marketing / communications, social media, and content management. Of the three capabilities, content management scored the lowest with a level-one initial maturity score indicating the museum is still striving towards the ability to capture, store, and analyse all touch points in the visitor journey. There are insufficient resources to manage content necessary to meet the Institution's needs. PEM indicated the marketing / communications capability has level-

two infrastructure maturity because it is starting to bridge visitor-centric processes of engagement and content marketing to chosen assets. The strongest capability in this sub-category is social media with a well-established level-one initial maturity score, meaning external communities and participation is identified. While engagement may be scattered and inconsistent, PEM indicates it is making strides to increase the level of maturity through active listening of social activities by empowering multiple voices to speak on behalf of and create compelling content for PEM (Rodley, 2016, 50:16).

The final sub-category within tools is information security and consists of two capabilities: networks and data security. This is the highest scoring sub-category overall in this category. The networks sub-category scored the highest with a level-three integrated maturity, meaning the institution has a virtual private network (VPN) offering greater flexibility to remote workers, more stringent security controls, and scalable systems. The data security sub-category was scored as level-two infrastructure maturity, indicating some of the Institution’s data needs and uses have been clearly defined, but not uniformly documented.

PEM Maturity Matrix: Community

Community	Culture		Diversity / Inclusion	Active Listening
Change Management	Talent	Leadership	Soft Power	Engagement

The community category is split into three sub-category levels. The first sub-category level, culture, is split into three capabilities: change management, talent, and leadership. The change management and talent capabilities both scored solid level-two infrastructure maturity, meaning PEM employees are prepared for significant change in how work is performed and staff can adequately describe how their work affects other staff and visitors. PEM’s talent pool is limited because the museum is located in Salem, Massachusetts outside of the thriving Boston technology and digital talent hub (Rodley, 2016, 21:36). In this example, because no one clearly owns digital data collection and use, it is not valued or advocated as a strategic component of the museum mission and overall digital strategy.

The lowest scoring capability is that of leadership with a level-one initial maturity score indicating the Institution’s senior executive team recognizes the need to improve operational performance, but has only a limited understanding of the power of business processes. Not all transformation efforts will be successful. Rodley (2015, p. 234) recognizes the benefits of failure, saying “Even efforts that didn’t bear fruit, like a major digital presence, resulted in our staff working together in new ways and raising our gaze to see new possibilities.” The type of digital promiscuity Rodley says is needed to deliver on museums’ missions is not gained without taking on a certain level of risk, realization of failure, and support of museum employees by both leadership and the museum’s community.

The second sub-category, diversity and inclusion, has a single associated capability: soft power. The PEM scored a level one-managed maturity meaning the museum was addressing tolerance and diversity through inconsistent programming. The final sub-category with the single capability of engagement scored a level-two infrastructure maturity indicating the senior executive team has started to shift from a top-down hierarchal style to an open, collaborative style, and is passionate about the need to change through evolving processes. Rodley (2016, 49:05) shared the Director (at time of interview), Dan Monroe, sees the museum as being a collection of people and stresses the importance of storytelling, content creation, and managing those assets (2016, 01:05:28). While museums like the MAH are focusing on co-creation community efforts in the physical ecosystem, Rodley encourages a change in museums’ DNA through the sharing of digital assets so the community may incorporate their voices or interpret and build on these assets and amplify the museums’ mission beyond the museums’ networks.

PEM Maturity Matrix: Management



Management	Leadership	Strategy Development	Organisational Support	Communications
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The management category has four sub-categories. Three of the four sub-categories- leadership, strategy development, and communications-scored a level-one initial maturity, meaning the PEM has a lot of room to develop leadership processes and distinct operational

improvement techniques. It is generally perceived the PEM senior leadership encourages a “why-not” mentality that results in innovative thinking, but lack of resources which prevent these innovations from becoming reality (Rodley, 2016, 17:22). It is not that senior leadership is opposed to digital transformation or does not grasp the importance of digital infrastructure, but competing goals like the PEM’s expansion compete for resources and leadership focus resulting in perpetual fire-drills (Rodley, 2016, 01:01:07). If a museum innovated in the community and managements categories, the spirit of openness may “infect the entire process” as Rodley (2015, p. 234) suggests and influence new and innovative employee and visitor experiences.

In his Code|Words essay, Rodley (2015, p. 233) alludes to the institutional support required, saying: “Adaptation requires not only opening access to resources, but also a readiness to adapt institutional practices based on that openness.” Adaptation is obtained through a test-and-learn approach to discern what enables the museum’s mission. Such adaption may begin with a change-agent or hacker like Rodley, however for these processes to take hold and permeate throughout the museum, leadership is needed to champion this continuous learning and combat assumptions with data-informed decision making.

The digital data maturity score indicates the communications team is developing the necessary skillsets to analyse and create visitor segments used for targeting, and aspires to consistently communicate and interact with visitors across physical or digital channels and/or devices in real-time. Once again, this maturity score is dependent on the enterprise CRM system and other digital tools recently purchased prior to digital team interview. Also, at the time of the interview, PEM, like MIA, had recently hired an Evaluator to assist with the understanding and interpretation of the visitor experience (Rodley, 2016, 23:45).

The sub-category of organisational support scored level-two infrastructure maturity because process owners have accountability for individual processes, and a steering committee is responsible for the Institution’s overall progress with processes. Further development in this sub-category is dependent on functional managers being held responsible for performance and project managers for improvement projects. Accountability may have been difficult to score in the digital data maturity matrix because PEM has a limited number of related goals or consistently tracked metrics, but during the interview the team indicated this was changing (Rodley, 2016, 25:30).

PEM Maturity Matrix: Metrics



Metrics	Definitions / Uses	Customer / Visitor Analytics	Sales Analytics	Marketing Analytics	Digital Analytics
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The metrics category has one sub-category, definitions and uses, and four capabilities: visitor analytics, sales analytics, marketing analytics, and digital analytics. The highest scoring capabilities in this category are customer/visitor analytics and digital analytics. As described in the previous section, the communications team aspires to develop the skills to use data for targeting visitors and prospective visitors, but process and performance metrics are basic and limited to point solutions versus integrated or end-to-end platform solutions. It was difficult to score the exact maturity level of these two capabilities because PEM has efforts underway to address these capabilities at all maturity levels. There is a desire to know more about the PEM's different audiences, but decisions about what gets digitized or understanding the rationale of different visitor audiences are made based on demand from external researchers, leadership requests, or grant projects (Rodley, 2016, 30:55). Before the Museum can do anything, it must build the digital ecosystem to enable staff to track and sift through activity.

Two of the capabilities, sales and marketing analytics, scored a level-one initial infrastructure because PEM has limited collection-centric strategies, and secondary demographic information is not yet being used for decision making. For example, PEM conducts visitor pattern analysis for temporary exhibitions, but the process to obtain this information is arduous and manual (Rodley, 2016, 25:17). There is a desire, once the infrastructure and outcomes-based goals are in-place, to develop consistent processes and metrics to view visitors in aggregate or segmentation (Rodley, 2016 29:36).

PEM Maturity Matrix: Processes



Processes	IT Alignment	Planning / Prioritization
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The processes category has two capabilities: IT alignment and planning and prioritization. IT alignment scored a level-one initial maturity because PEM has a fragmented legacy IT systems support processes, but planning and prioritization scored a level one-initial maturity since PEM, like the MAH and ISGM, is still identifying business processes that maximize and optimize the strategic plan. Another theme that surfaced during the interview with the PEM digital team is the constrained resources (Rodley, 2016, 8:07). When discussing the concept of the hacker ethic, all interviewees agreed the PEM staff excelled at finding work-around solutions by being creative with their limited resources (Rodley, 2016 9:18). These “hacks” were of many varieties including the self-inflicted solution-finding that are required when having a proprietary database of any kind (Rodley, 2016, 9:50). Rodley suggested replacing ‘hackery’ with ‘makery’ because it more accurately describes the PEM staff. He (2016, 10:32) says:

You go a certain distance with existing things without actually ripping them apart and have them do things they were supposedly not designed to do and creating new things they were supposedly not designed to do and creating new things pretty much out of whole parts.

While this mentality helps PEM attempt to do more with less, there is lack of documentation of these creative work-around solutions or any formal processes are not documented.

In fact, during the interview, some expressed dislike of documentation. One digital team member shared she had seen some of the documentation of another comparable museum and considered the documentation to be “stifling (Rodley, 2016, 50:52).” Another digital team member had created documentation for a system she manages and said no one had read the manual (Rodley, 2016, 1:10:05). The conversations throughout the interview kept highlighting a lack of documented processes, resource training, and the desire and self-discipline of individual staff members to embrace a growth mind-set and carve out time to learn or practice new tool or system capabilities (Rodley, 2016, 1:08:03).

6.6. PEM Maturity Matrix: Conclusion

PEM's digital ecosystem building through the concurrent implementation of an enterprise CRM, DAM, and CMS influenced the core 'P' categorization of *panoramic*, because while it may be in the infancy of tool and process maturity, the museum has the opportunity to bridge disparate systems with a holistic vision, goals, and metrics. The concept of the museums' terroir is analogous with a museums' DNA. Rodley (2015, p. 235) says, "The more we sow the seeds of culture and the more effective we are at seeing those seeds take root, the more likely museums are to see cultural ideas persevere in the constantly-changing world." The secondary 'P' categorization of *personalization* is due to the added opportunity to leapfrog segmentation tactics and focus on personalized visitor experiences with a holistic digital ecosystem. With an outside-in approach, PEM is positioning itself to be able to collect and use data to make decisions at a macro and micro-level.

6.7. About the Minneapolis Institute of Art



Figure 13: Minneapolis Institute of Art.

The Minneapolis Institute of Art (Mia) located in Minneapolis, Minnesota, was the fourth and final museum to complete the digital data maturity self-assessment and informational interviews for this research. The spirit of Mia took root in 1883 as the Minneapolis Society of Fine Arts and became the Minneapolis Institute of Arts in 1915 (Minneapolis Institute of Art, 2018). The permanent collection contains approximately 89,000 objects (Minneapolis Institute of Art, 2018). The museum serves more than a half-million visitors each year and reaches an additional hundred thousand through elementary school art education (Minneapolis Institute of Art, 2018).

In a similar way to the MAH, Mia is experimenting with various change levers to determine “more effective ways of reflecting a community’s voice – first inviting it, and second welcoming it, and then third, reflecting it back out (Hegley, 2016, 19:13).” Mia’s strategic plan that covered the years 2012-2016 was dubbed the Dynamic New Approach (DNA). It provided the museum with three primary focus areas: Audience Engagement, Globalization, and Museum Inc. (a nod toward researching and implementing innovative

ways to run a museum business). The DNA was built on the strengths of past plans, responded to current economic conditions, and positioned Mia for future, on-going success. The process of developing the DNA included an analysis of current cultural, social, economic, technological, and political trends affecting museums. The results of this analysis indicated an opportunity for changes in the museum's business and program model.

A then-current report on the condition of art museums from the Innovatrium (2019) at the University of Michigan put the challenge in stark terms:

The bad news is that all of the museums are facing declining attendance, donor fatigue, siloed operations, and increasing competition for the time and attention of both paying and non-paying customers. The museums also lack the flexibility to respond in real-time, are inwardly focused (often seeking to please professional but not popular audiences), and do not have the technology they need to keep pace with visitor expectations or improve operational efficiency?

The good news remains, of course, the outstanding quality of the museum's collection, the dedication of its staff and volunteers, and the community, foundation, and corporate support it has built over its nearly 100-year history.

The goal of the 2012–2016 plan was to animate Mia with a dynamic 21st-century program and operational model that would ensure the institution's long-term success. The plan maximized new opportunities to engage people powerfully in the art and history of world cultures past and present.

With the understanding that the traditional museum model is no longer sustainable, the DNA identified innovative ways for the museum to adapt. In doing so, the new museum model had to meet the expectations of audiences by offering them opportunities to participate in the creation of the museum's content and brand and by engaging them through their preferred communications channels. The model also incorporated additional ways to raise revenue. To establish this new model, Mia staff members and supporters adopted the practices of thinking creatively, leading collaboratively, and taking measured risks.

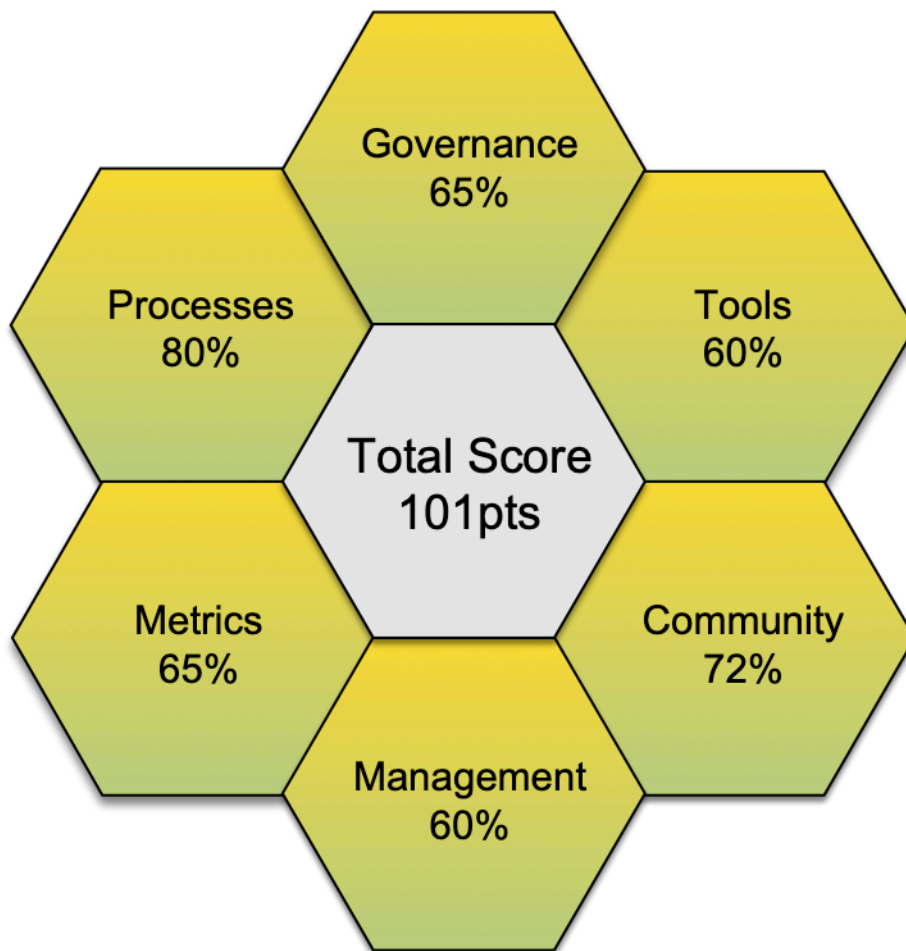


Figure 14: Mia digital data maturity.

6.8. Mia Maturity Matrix: Overview

Mia scored a total of 101 points out of the possible 155 on the digital collection and use maturity matrix. The highest scoring categories were community and metrics. Of the four museums, Mia had the highest rating. This institution strives to achieve constant relevance through experimentation and values knowledge about the visitor and his/her preferences and history with the museum. Douglas Hegley, Chief Digital Officer at Mia completed the digital maturity matrix before conducting a verbal interview via Skype in late 2016. Hegley (2016, 3:05) defines himself as a ‘change agent’ brought into Mia to “find a way to reinvigorate and repair what was a very broken technology operation.” During his more than 18 years in the museum technology field, Hegley has helped create collaborative technology environments, set the vision and strategy for technology and

digital media, and sought to deeply engage with great stories delivered digitally (Minneapolis Institute of Art, 2018).



Mia Maturity Matrix: Governance

Governance	Standards / Policy	Select	Operate	Integrate	Adopt	Adapt	Consistent
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The governance category has one sub-category level, standards and policy, and six capabilities: selection, operation, integration, adoption, adaption, and consistency. The first three of the six capabilities scored a level-four maturity, meaning the capabilities are in a managed state of maturity. Selection, operation, and integration capabilities to support standardization of how, why, and what digital data is being collected and used is well established. Hegley (2016, 27:26) admits the Museum will never be 100 percent data-driven because of the importance of curatorial practice and scholarly content creation, but says Mia is striving to become more data-informed. Assets are not being determined on an ad-hoc basis, rather, the museum is strategically evaluating the selection and frequent review of assets at a Team level to ensure the right fit for purpose.

At this stage in the digital data maturity process, the institution is practicing system thinking strategy and skills. Through the digital data collection maturity index, the museum indicated they are embodying this systems-thinking approach through quarterly reviews of assets, specifically to determine if integration into the broader digital ecosystem is still relevant, check for future integration opportunities with legacy or new systems and assets, and to challenge the reviewing team to validate assumed or previous efficiencies.

The final three capabilities in this sub-category scored a level-three maturity, meaning Mia has supporting infrastructure in place, and is working towards integrating the capabilities of adoption, adaption, and consistency into its systems-thinking approach. While gaps and opportunities for how and when to use digital data collection and use may exist, the museum is reviewing assets and practices quarterly for greater efficiencies and effectiveness, and has established an intake form or other requirements to review the selection and adoption of any assets that may present themselves between review cycles. As indicated in the digital data maturity matrix, Mia has established user operation and

adoption guidelines and is working to develop a more thorough roadmap and training to address when to use what, where, how, and why.

Mia Maturity Matrix: Tools

Tools		Databases		Collaboration		Digital Assets		Information Security
Fundraising	Collections	Events	Marketing / Communications	Social Media	Content Management	Networks	Data Security	

The tools category has four sub-category levels. The first sub-category level, databases, has four capabilities: point-of-sale, fundraising, collections and events. In two out of four capabilities, Mia scored the museum as having level-two infrastructure maturity, meaning the point-of-sale and events databases have a visitor-centered architecture with light integration with other systems across the Institution. The fundraising and collections databases are a level higher in maturity generating greater visitor, sales, and revenue intelligence.

In the collaboration sub-category, there are no additional capability levels. Mia indicated it has reached a level-five maturity, optimizing the database with a searchable repository for digital asset management that catalogues current and historical assets. There is a defined marketing group who owns and develops the marketing communications technology strategy and defined technology roadmap, using assistance from IT/S as needed. Mia was considering to take a page out of the Dallas Museum of Art's (DMA) playbook by implementing a points and rewards program. At the time of this interview, it was shared that Mia would aim to launch the program in Summer 2017 (Hegley, 2016, 23:12). Mia staff worked with the DMA as a collaborative partner through a grant-funded second phase of the DMA Friend's Project, and has evolved the DMA software to integrate with their enterprise CRM (Hegley, 2016, 23:12). The goal of the museum is to incentivize visitors into opting into the program and sharing data about themselves and their experiences (Hegley, 2016, 23:37). As indicated by the digital data maturity matrix, Mia self-identified optimized status, meaning IT/S is not a separate function and truly a partner in defining business strategy and funding for digital / interactive platforms, and tools are a percentage

of operating fund. Operating as unified teams, Mia is able to capitalize on their digital transformation.

The digital assets sub-category is split into three capabilities: marketing / communications, social media, and content management. All three categories are on the brink of levelling up maturity from integrated to managed. The digital assets are almost fully integrated with end-to-end processes, platforms, and a strategic plan for providing contextual and relevant experiences for visitors. Visitor sentiment and third-party data sets are not fully integrated with analytics data and used to influence the visitor profile. Just as segmentation drove the core of the 2012-2016 strategic plan, the core of the 2021 strategic plan is enterprise-level CRM enabling the museum to move from segmentation to personalization (Hegley, 2016, 15:34). While the museum is investing heavily in improving the visitor experience, the experiences are not fully consistent or contextual; however, through a test-and-learn approach Mia is using this information to make data-informed decisions.

The final sub-category within tools is information security and consists of two capabilities: networks and data security. Mia scored the institution as having a level five – optimized maturity for the networks capability, meaning the network has been selected based on security and bandwidth needs, the sophistication of setup, projected growth, and dedicated resources and funding. The data security capability maturity is less clear. While Mia has defined and mostly documented its data needs and uses for each area of service, the data is not entered from all sources, thereby scoring a level-two infrastructure maturity score with strong momentum towards achieving integrated maturity.



Mia Maturity Matrix: Community

Community	Culture	Diversity / Inclusion	Active Listening
Change Management	Talent	Leadership	Soft Power
			Engagement

The community category is split into three sub-category levels and is one of the lowest scoring sections in the Mia digital data maturity matrix. The first sub-category level, culture, is split into three capabilities: change management, talent, and leadership. Overall,

Mia scored a level-four managed maturity score for the talent and leadership capabilities, meaning the museum staff can describe how their work affects the Institution's performance. Also, the senior executive team sees its own work in process terms and perceives process management not as a project, but as a way of managing the Institution. In the self-assessment, Mia flagged some areas as red, not because the museum did not have the support of leadership in these sub-categories, but to indicate the ownership and support of the strategic plan went beyond ownership of the senior leadership. In the follow-up interview, Hegley (2016, 6:28) added additional clarity: "We apply a lot of the practices of an open organisation, meaning there's not a lot of hierarchy here and everyone's opinion matters....and we have to hire people who are comfortable collaborating, changing, and working iteratively." While they are in the midst of their digital transformation, Mia is cultivating a growth mind-set across the workforce to adapt and adopt people and processes.

Mia scored a level-three integrated maturity score on the final capability of change management because the majority of staff is prepared for significant change in roles and responsibilities as the museum readies itself for major multidimensional change. In fact, to ensure change sticks, Hegley reiterated the desire for employees to be empowered and autonomous in decision-making process. He says (2016, 8:36), "They already own the changes themselves. It's really not up to me [making change stick]. I'm sort of fertilizing the ground and they're the ones doing the planning and harvesting." The museum values the team over any single staff member to drive the evolution and optimization of Mia efforts and digital ecosystem.

The second sub-category, diversity and inclusion, has a single associated capability: soft power. Mia scored a level two-infrastructure maturity meaning the museum documents diversity and inclusion action items in mission and within all documented material. According to the Mia 2021 strategic plan (Minneapolis Institute of Art, 2016), the museum is actively pursuing consistent diversity and inclusion practices across all employment and programming. Through expanded storytelling experiences, the museum is also striving to become a social commons where people generate "the goodwill that allows society to cohere as a cultural entity" (Minneapolis Institute of Art, 2016).

The final capability of engagement scored a level four-managed maturity score because the senior executive team exercises leadership through vision and influence rather than command and control. Hegley (2015, 4:51) reinforced Mia’s management philosophy in the follow-up interview saying, “Because you can try as you might from top-down to create real innovation...my perspective is that approach doesn’t really work. And so it’s really a ground-up approach.” This hyper-vigilant focus and determination on continuous adaptation is evident in the museum’s management practices and published strategic plans.



Mia Maturity Matrix: Management

Management	Leadership	Strategy Development	Organisational Support	Communications
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The management category has four sub-categories. The first sub-category, leadership, received a level three-integrated maturity score because a senior executive has taken leadership of and responsibility for the process program, as well as, Mia has a network of people throughout the museum helping to promote the process program. In fact, as Hegley (2015, 33:11) noted in the follow-up interview, “there is a strategic commitment to moving to that sort of optimized column.” This commitment is reinforced and amplified in the museum’s published strategic plans – the “dynamic new approach” or DNA, the museum’s source code it pulls from to learn from and evolve previous strategies, respond to local and global influences, and position Mia in the 21st century ((Minneapolis Institute of Art, 2016).

The strategy development sub-category scored a level two-infrastructure maturity score, meaning an informal coordinating body provides needed program management while a steering committee allocates resources for process redesign projects. It should be noted that Hegley questioned the linear progression associated with this section of the digital data maturity matrix. For Mia, the development of a formal and centralized program management office would actually be a step-back for the museum and as Hegley (2016, 35:19) stated, “undermine our strategic approach to empowering staff across the entire organisation.” While this museum may have been able to weave strategic understanding and enablement at all levels of the institution into its DNA, other cultural organisations may

first have to establish a standardized approach before evolving or optimizing a hub-and-spoke approach. The organisational support sub-category scored a level three-integrated maturity score because process owners share accountability for the museum's performance. The remaining sub-category of communications scored the highest in this category with a level four-managed maturity score because there is a strategic plan for communicating and interacting with visitors across physical or digital channels and/or devices in real-time. Data is shown as a driver of change by the inclusion of a Success and Outcomes section in both of Mia's strategic plans. Mia is not only documenting its long-term goals in a transparent document, but committing to improved experiences benefitting the needs of their community.

Mia Maturity Matrix: Metrics

Metrics	Definitions / Uses	Customer / Visitor Analytics	Sales Analytics	Marketing Analytics	Digital Analytics
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The metrics category has one sub-category, definitions and uses, and four capabilities: visitor analytics, sales analytics, marketing analytics, and digital analytics. The highest scoring capabilities in this category are customer/visitor analytics and digital analytics. While Mia indicated their process metrics have been derived from the Institution's goals, and managers regularly review and refresh the process metrics and targets for strategic planning, complete end-to-end metrics derived from visitor requirements are still in development. During the course of the 2012-2016 strategic plan, Mia partnered with external market researchers from General Mills to apply the John Falk model of museum visitor experience identities to discover growth opportunities within MIA's population (Hegley, 2016, 14:00). Hegley (2016, 14:42) recalls this work helped Mia focus efforts during that strategic plan cycle. He says, "That plan was really based on audience engagement and we shifted our perspective completely from being collection-based to being audience-based, and it was really effective." Mia has well-established metrics and is using lifetime value and loyalty calculations, response and purchase propensity, and micro segmentation. Digital analytics are comprised of maximizing email

campaigns, testing content, and analysing digital pathways for improved web site use and experience.

The sales analytics sub-category scored a level two-infrastructure maturity, meaning Mia diligently mines visitor data to create programming and other services that delight their most valuable visitor/visiting groups. Mia also indicated it is actively pursuing systems and processes to automate reporting and data distribution, reports based on complete and integrated data systems, and identifying and continuously awarding best members, visitors, and visiting groups in alignment with level three-integrated maturity characteristics. Ultimately, Mia aspires to effectively respond to visitors' preferences captured formally through surveys and observation to informally through social media sentiment analysis to network analysis to transaction behaviour (Hegley, 2016, 16:08). The marketing analytics sub-category scored a solid level three-integrated maturity score because Mia uses analytics to understand how well they generate demand and the quality of visitor experience they provide and steer value-adding activities for a single view of the visitor. Hegley (2016, 15:14) states, "We are now methodically rolling out new improvements, better, more direct and more transparent ways both of collecting data and then reflecting that data back out to our audiences." Ultimately, the museum aspires to creating a unique experience every time a visitor interacts with Mia (Hegley, 2016, 18:19).



Mia Maturity Matrix: Processes

Processes	IT Alignment	Planning / Prioritization
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The processes category was the one of the highest scoring categories overall across two capabilities: IT alignment and planning and prioritization. Mia scored a level-five optimized maturity score indicating the Mia has a real-time infrastructure that is established and maintained, supported by an IT system with a modular architecture that adheres to industry standards for interenterprise communications, and supports processes. Of the four museums interviewed, Mia staff seemed to have the best understanding of what information was being collected, how it was being used, and how prospects and visitors were made aware of the data use. Hegley (2016, 30:06) says, "We are as transparent as possible about why we're collecting data and what we do with the data, how we anonymise it, how we

protect it, and how we don't collect [certain types of data]." While the museum may be clear about collection and use, the processes, while in development at the time of the interview, these are not clearly documented (Hegley, 2016, 31:08).

Where Mia may have an advantage over other museums either thinking about or actively managing digital transformation, is that Hegley has extended the traditional IT/S staff with a team of museum outsiders who are subject matter experts in many fields impacting the transformation. In both the follow-up interview and at a Museum Computer Network (MCN) conference the same year, Hegley elaborated on this strategy, saying Mia may be the only art museum to have a statistician on staff in addition to an enterprise CRM specialist, and evaluator and communicator to assist the team in interpreting the data, then communicating this information to staff and key museum audiences (2016, 28:04 and 2016b). Mia has built cross-discipline teams to prioritize, build upon, and execute museum processes. Mia also has extended the process model to connect with visitors and suppliers, and actively uses the model in strategy development.

6.9. Mia Maturity Matrix: Conclusion

In Hegley's (2016, 21:38) own words, experimenting with various change levers is at times a painful process and failure is inevitable, but Mia is "trying not to be a classic museum and panic the first time it's not perfect." The emphasis of the museum's evolution from segmentation to personalization influenced the obvious core 'P' categorization of *personalization*. The secondary 'P' categorization of *panoramic* is due to the intense focus on museum staff digital literacy growth and overall institutional digital confidence. Mia's digital data readiness demonstrates the power of a systems-thinking behaviour positioning Mia as proactive institution learning from and building upon knowledge gained.

6.10. In summary

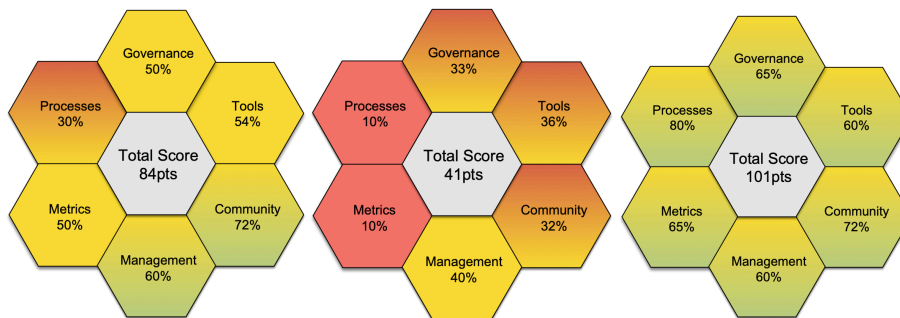


Figure 15: Summary of case study models (MAH, PEM, Mia).

While each case study participant had different maturity scores, the museums shared similar digital aspirations while taking charting different paths to reach various milestones along their journey of digital maturity. Unplanned, each institution had a different ‘P’ categorization, though each shared the benefit of having change agents influencing digital activities. In the next chapter, we will delve into scenario planning and suggest how this exercise may help cultural institutions, in the context of museums and data literacy, when combined with the digital data self-assessment; and how to deploy realistic, timely, and measurable digital maturity strategies and activities.

Chapter Seven:

Scenario Planning

The digital data maturity model is one of two key business objects cultural institutes may apply to better understand the current state of governance, tools, processes, measurement, and community integration. No matter the type of organisation, to increase maturity through awareness and consistent practice within each category is not simply a matter of checking a box. An organisation needs to factor in the drivers, uncertainties, trends, cycles, and choices of many potential futures to plan best next actions aiding in the growth and development of the organisation within each category and capability. The second key business object proposed as part of this research to compliment the maturity matrix is a framework for scenario planning. Traditional strategic planning fails to capitalize on the unpredictability of the future, whereas scenario planning consists of constructed strategic responses across multiple possible futures. Scenario planning is a step towards advancing more consistent agile outcomes and cohesive digital transformation.

Similar to many of the catalysts igniting the digital age in the 1960s, world events also influenced the way business strategy was being discussed and designed. The academic practice of scenario planning began with Herman Kahn's work assessing the possibility of nuclear war and economic uncertainties of a potential boom in the 1980s (Schwartz, 1991). Scenario planning came into the business mainstream in 1971 within the Royal Dutch/Shell Company under the vision of Pierre Wack and Edward Newland (Schwartz, 1991). It is this process of examining potential futures and structuring narratives to influence business leadership and decisions adopted by Shell and other business titans over the course of three decades that will be the focus of this study and ultimate creation of a final framework adapted for cultural institutions.

Futurist and president of Global Business Network, Peter Schwartz, captured the theory of scenario planning in bestselling publication, *The Art of the Long View*, in 1991.

Schwartz learned scenario planning under the tutelage of Pierre Wack (1991). Scenario planning was crystalized for the business community formally in 1985 as part of a pivotal two-part Harvard Business Review series, 'The Gentle Art of Reperceiving' and 'Shooting the Rapids,' penned by Pierre Wack. It is this initial article that began to make transparent the "special sauce" employed by Royal Dutch/Shell to escape financial and industry turmoil in the 1980s (Schwartz, 1991). Wack introduced scenario planning as a shift in managerial mind-set from the traditional forecast planning. Scenarios are a set of hypotheses with three prerequisite conditions of relevance, coherence, and likelihood (Godet and Roubelat, 1996). Scenarios are developed from "outer space," meaning they incorporate information external of the company, such as business cycle information, technology trends, demand and supply pricing, and more quantitative variables (Wack, 1985). This type of data crowds the pages of forecast planning, yet does not address the "inner space" or the mind and personal factors managers use to judge these scenarios for potential business strategy and outcomes (Wack, 1985).

Scenario planning bridges the inner and outer spaces to surface the unknown and challenge assumptions required to address and influence actions of decision makers. Wack emphasizes the required philosophy embracing scenario planning is understanding the power of responsibility and ripples of impact at all levels and various timelines. Wack states (1985), "...power comes with an understanding of the forces behind the outcomes. Scenarios must help decision makers develop their own feel for the nature of the system, the forces at work within it, the uncertainties that underlie the alternative scenarios, and the concepts useful for interpreting key data." It is useful to understand what resources the organisation has at any given time and the extent to which those capabilities may be affected. The maturity model serves as the business object to understand the current state, but the value is only reaped when this understanding is paired with the drivers, interdependencies, and trends of possible futures impacting the tasks and timeline an organisation may or should take to optimize assets.

The elements of forecast planning are essential ingredients for a scenario to plant inside the mind of a manager. Wack (1985) calls this process "rooting" because a narrative without such predetermined data "would be effective and alive in the minds of managers as long as a tree without roots." The futurist maintains the image of the tree to further relate

scenarios to cherry trees where the fruit is not born on the trunk or larger boughs, but the smaller branches (Wack, 1985). The fruit of labour that is the outcome of a scenario requires the extraordinary foundation of the tree trunk, the protection and resourcing of the boughs, and the focused and agile investment channelling through the smaller branches. To pluck an element explained in a previous chapter, the tree is part of an ecosystem fuelled by specific nutrients derived from its environment, developing a unique signature or terroir. The scenario outcome or fruit is only as sweet and rich in flavour as all of the elements required for it to take life.

Academia is not short on models or frameworks devised to shed light on topics of interest or bearing on cultural institutions and when aligned with thinking inspired by Wack (1985), “scenarios can effectively organize a variety of seemingly unrelated economic, technological, competitive, political, and societal information and translates it into a framework for judgment – in a way that no model could do.” Just as a cherry tree could not take hold on the Arctic, scenarios are meant to represent different worlds with various outcomes that are consistent with the internal fundamental structure or life force of the cultural institution. Scenarios represent the many pathways to achieve that life force (Wack, 1985). There is no one right answer, but a small number of narratives exploring these pathways that when synced with capability status of a maturity grid, will prepare an organisation to weather any circumstance and bear fruit for the next generation.

Since the official entrance of scenario planning as a viable business tool, scenario plans have had scenario planning conducted on it by former Royal Dutch/Shell team members, academics, and other business wonks hacking different pathways to unlock the perfect balance of qualitative and quantitative combinations of variables for crucially challenging future perspectives for any organisation to employ. To better understand how scenario planning has been adapted over the past five decades, a common language must first be established to discuss the contexts for the complex array of seemingly impossible factors of any scenario process. According to Schwartz (1991, p. 4), who participated in and authored the framework employed by Royal Dutch/Shell so other organisations could plan and learn from this process rather than be side-lined by poor planning misfortune, he defined scenarios as:

Scenarios are stories about the way the world might turn out tomorrow, stories that can help us recognize and adapt to changing aspects of our present environment. They form a method for articulating the different pathways that might exist for you tomorrow, and finding your appropriate movements down each of these possible paths. Scenario planning is about making choices *today* with an understanding of how they might turn out.

If we apply Schwartz's logic, scenarios go beyond the "what if/then" stories to construct narratives that have come to pass and how organisations would address these new realities and challenges. Such construction challenges the mental models of participants and surfaces biases, assumptions, and desires that may have gone unnoticed or untapped in any other assessment process. Scenarios are to extract and blend such information into narratives that are then part of the everyday DNA of the organisation. Being comfortable with uncomfortable is the hallmark of scenario planning change management.

Many organisations take steps to question and plan for the future. While these actions are commendable, some of the planning exercises may be causing more harm than good by advocating deterministic thinking and unintentionally supporting the assumptions of decision makers. Schwartz (1991, p. 3) recommends asking the following open questions to begin mapping the gaps and opportunities of the organisation: "What challenges could the world present me? How might others respond to my actions?" Museums and other organisations are primed to ask such clear and open questions about the futures of their physical spaces, collections they represent, and communities they serve. In 2011, a group of museum leaders participated in a workshop hosted by Center for the Future of Museums (CFM) founding director, Elizabeth Merritt; Peter Bishop, director of the Future Studies program at the University of Houston; and Gary Golden, lead futurist at the management consultancy Futurethink, to discuss how museum strategic planners could intertwine traditional forecasting methods with scenario planning (Cohen, 1991). Rather than a lecture, the workshop resulted in a tangible object museum planners could share with their organisations and others in the industry. Merritt explained the exercise purpose, "We reviewed the basics of futures studies in the morning, explaining how trends and events can disrupt our path to the 'expected future'" (Cohen, 1991, p. 58). The workshop is a first step

to begin asking questions of cultural institutions and unearth blind spots that may prevent immediate or future reaction and adaption to uncertainties. Scenarios are not meant to be predictions of the future. Rather, these narratives are tools organisations may use to help take a long view into potential futures.

Scenario planning is not limited to thinking or planning about negative-based futures and may also be applied for organisations dreaming about greater opportunity and viability in the years to come. Scenarios are narratives constructed around various plot points of quantitative and qualitative data that paint a distinct worldview for that scenario (Schwartz, 1991, p. 4). Forecast planning may be the default for decision makers because fault can be traced back to the past quantitative data extrapolated for future consumption without context. It appears easier to take this route for action rather than the continuous barrage of questions and challenging of status quo driven by the scenario planning process. Blame can and is shifted down instead of accountability being at the top for action of success and failure. Schwartz does not side-step failure as a reality, but strengthens the argument for scenario planning as giving the manager a degree of confidence not viable in any other planning situation and being prepared for any outcome. Schwartz (1991, p. 6) counsels, “It is this ability to act with a knowledgeable sense of risk and reward that separates both the business executives and the wise individual from a bureaucrat or a gambler.”

7.1. Scenario planning as a strategic planning tool

The origins of scenario planning—its creation, need, and urgency—are similar to that of the birth of modern computerization and the Internet. The timing of both innovations is quite similar too. The birth of the Internet was a result of a need issued by the Department of Defense, as was strategic planning. In the 1960s, American futurist, Herman Kahn, was part of the United States Air Force’s initiative to determine alternate strategies for a possible nuclear war (Schwartz, 1991). Fast forward three decades to when executives at Royal Dutch/Shell asked planners, including Pierre Wack and Ted Newland, to conceive parallel worlds in which the prosperity of oil production and pricing were significantly impacted.

Schwartz gives much of the scenario planning credit at Royal Dutch/Shell to Wack, but credits the roots of future development to Newland in the Long-Term Studies

department and Jimmy Davidson, head of economics and planning in the organisation. Newland, Davidson, among other planners developed future outlooks, including a “Year 2000” study in 1967 (Wilkenson and Kupers, 2013). It was at this time that Wack was hired. In a Harvard Business Review article, ‘Living in the Futures,’ it is reported that Wack, then head of planning for Shell franchise, was brought into the team because of his background as a “former magazine editor with a bent for Eastern philosophy and mysticism, focused on telling plausible stories about how the wider business context of Shell might develop (Wilkenson and Kupers, 2013).” When Wack and Newland initially proposed the possibility of an oil crisis fuelled by increase in American demand and renegotiation of oil prices by Arab countries, there was no recognition or change in behaviour by Royal Dutch/Shell executives (Schwartz, 1991). The outcomes presented were not realities that felt real enough to alter the executives’ actions.

Wack and Newland offered a second iteration at outlining the potential realities of an oil crisis with details turning these disconnected sets of qualitative and quantitative information into narratives. The futurists described these tales as scenarios that “to be truly effective, they had to ‘change our managers’ view of reality’ (Schwartz, 1991, p. 8).” These potential outcomes helped Royal Dutch/Shell prepare for the oil price shock that did indeed occur in 1973. The company was not only ready to take action; the executives were also prepared emotionally to make changes (Schwartz, 1991). Change is difficult for a company of any size in any industry. True transformation occurs when actions and mind-sets align towards mutual positive outcomes. Wack (1985) termed this behaviour modification as “reperceiving” or to sync one’s reality with reality as it is perceived or may become in time. The end result is not to prescribe exact outlooks, but begin emotional and actionable tangible preparations for addressing any significant potential future. These early futurists pioneered the blend of art and science that would become the art of the long view Schwartz and the next generation of futurists would document and explore.

Steps to Developing Scenarios	
Step One	Identify focal issue or decision
Step Two	Key forces in the local environment
Step Three	Driving forces

Step Four	Rank by importance and uncertainty
Step Five	Selecting scenario logics
Step Six	Fleshing out the scenarios
Step Seven	Implications
Step Eight	Selection of leading indicators and signposts

Table 5: Steps to developing scenarios (Schwartz, 1991).

Scenario planning requires preparation and interdepartmental cooperation. As the futurists' method began to solidify and gain traction, Peter Schwartz documented the steps towards successful planning for the future in *The Art of the Long View* published in 1991. Schwartz outlines eight steps or building blocks necessary to create powerful narratives meant to deconstruct a manager's reality and re-perceive an uncertain world with confidence. The first step in Schwartz's (1991) process is to identify a focal issue or decision that is specific to the company constructing the scenarios. Schwartz (1991, p. 241) counsels to begin "from the inside out" versus "from the outside in thinking," but human-centred design thinking has gained momentum since this initial scenario planning documentation, and aligns well with the process, allowing a blend of both worlds of thinking to be considered and weighed. Homing in on a specific issue may be obtained by understanding the needs, challenges, and desires of the organisation executives, staff, and stakeholders. Ask what keeps them up at night?

While the first step focuses on internal specifics of an organisation, the second step begins to parse apart the motivations of influence from outside the organisation and identifies key forces in the environment (Schwartz, 1991). In this second step, success and failure criteria of the current state are fully fleshed out, and the factors of influence are understood. The third step brings together the threads of information and observations gathered in the first two steps and are combined to become the most research-intensive step of Schwartz's process. Driving forces are now separated into lists identifying if they are macro- or micro-environment influencers and if they are predetermined, inevitable, predicted, or the level of uncertainty associated with each force (Schwartz, 1991). Examples of information gathered during this step for a cultural institution may include

(but not exclusive to) visitor demographics, visitor and community surveys, and urban planning and economic trend analysis specific to the hyper-local or regional location.

In the fourth step, these driving forces are then ranked by importance and uncertainty (Schwartz, 1991). Ultimately, the scenarios selected to pursue narrative development will include a high ranking of importance and level of uncertainty. Schwartz (1991, p. 243) cautions ranking predetermined elements too high in the force list because these elements will be the same across all scenarios. Scenarios act as the learning tools with which executives rally their troops, gain support, and take actionable steps towards change or preparation for large-scale change. The scenarios require the substance to craft the narratives and tug at the heartstrings of the executives to attach importance to the selected scenarios. Not all scenarios can make the cut. In this fifth step, variables are mapped out on an axis or matrix to visualize the differences and importance of key driving forces and levels of uncertainty. There may be countless variations and such variations should be clustered to driving forces and uncertainty to pare down the number of scenarios selected. Scenarios consist of narratives requiring strong plot lines, so Schwartz (1991, p. 245) counsels organisations to identify “the plot that (1) best captures the dynamics of the situation and (2) communicates the point effectively.”

Once the scenarios have been selected, it is time to add the details to be addressed in the narratives. The sixth step is distinguishing the key factors, trends, connections, and mutual implications that should be featured within each scenario (Schwartz, 1991). Just like a word math problem or construction of a story, a scenario is made of pieces that may seem at once disparate, but must be stitched together, layered, to clearly show the work of how one started with a certain amount of evidence and concluded with the believable scenario. With the story details emerging, it is time for the seventh step of adding implications. All actions have consequences and whether it pertains to a children’s tale or a story crafted by corporate masterminds, implications of potential futures need to be surfaced from all angles. Scenario planning is not gambling on the future because any action, reactionary and planned, is a bet on the future. Certain narratives have more probability than others. Schwartz (1991, p. 246) suggests this is time in the scenario-planning framework to return to the first step and ensure the clarity of the focal point and decision is carried through in the detail of the narrative. Decisions and vulnerabilities begin to reveal themselves in the

scenarios, and it is now time to test if same or similar decisions can be used across multiple narratives. Schwartz (1991, p. 246) encourages the scenario planners to ask, “How could that strategy be adapted to make it more robust if the desired scenario shows signs of not happening?”

The final step in Schwartz’s (1991) scenario planning process includes the identification of leading indicators or signposts indicating how close the scenarios are to what actually occurs over time. This level of detail requires going back to the information gathered in the third step and determine what key performance indicators may be associated with the trend or action and how such indicators would be monitored over the course of the scenario. In the final step, Schwartz assumes the planner and organisation have scoped out such forces in a logical way that planners have “built into” these scenarios indicators where implications may be “drawn out” (1991, p.247). It is at this point that 21st Century futurists differ in their interpretation of this documented scenario planning process to include outcome-based planning specifically into the development of the narratives.

Futurist and Director of the Scenario Planning Institute at Colorado State University, Thomas J. Chermack (2011), contends that scenario planning is missing the critical piece of determining measurements for expected outcomes. This data gathering or projection cannot be an assumed sub-step and when actively incorporated may provide insight into savings, profits, and opportunities that could be part of the scenario planning prioritization process. Just as Wack and Schwartz advocate for the careful and limited selection of scenario plans, Chermack calls for outcome information to assist in scenario scoping, and states: “The more narrow the scope of the project, the more defined the estimates of system results can be (2011, location 3,231).” As scenario planning becomes a more mainstream business object and the impact more thoroughly researched by academia, outcome-based measurement will become an essential ingredient of the planning process to gauge the success of the scenarios anticipated with actual history. A strategic planning academic journal article cautions, “Without transparency, forthcoming results will be unadaptable and will not enable implication of the actors (the public) with whom we wish to involve through the scenarios (Godet and Roubelat, 1996).” Cultural institutions may benefit from heeding this advice to secure the monetary and emotional support of the immediate and regional communities served as outlined in the examples in Chapter Three.

According to the Economist (2006), the use of scenarios has risen from 40 percent of those surveyed in 1999 to 70 percent in 2006. Another survey conducted by Germany's EBS Business School discovered "strategic foresight efforts add value through (1) an enhanced capacity to perceive change, (2) an enhanced capacity to interpret and respond to change, (3) influence on other actors, and (4) an enhanced capacity for organisational learning (Wilkenson and Kupers, 2013)." Uncertainty is baked into scenario planning and organisations buying into the emotional and physical change required to adapt to the scenario planning process require the certainty of knowing that efforts will be measured to determine success, failure, and additional input to ever-evolving scenario plans.

Scenario planning is an act of assessment and action readiness. Linking performance-based measurement to the process, formally, adds another indicator to any other assumptions surfacing within the organisation (Chermack, 2011). The "future-now thinking" first introduced by Kahn in 1967 has not fundamentally changed, but that the thinking has been added on to by futurists' actual application for a variety of situations and industries. Chermack outlines the various schools of thought that encompass or employ scenario planning. The first of the three is the rationalist school of thought advocating there is one best solution (Chermack, 2011). The second is the evolutionary school of thought of a winning strategy only determined in hindsight (Chermack, 2011). The third school of thought is processual, advocating for optimal strategy with a fusion of rational thinking and learning from documented failure (Chermack, 2011). Kees van der Heijden (2005), former chief of scenario planning at Royal Dutch/Shell and an Associate Fellow of Templeton College, University of Oxford, and a Visiting Professor at the Netherlands Business School, Nijenrode University, offered the following metaphors to explain the three schools of thought: "The rationalistic paradigm suggests a machine metaphor for the organisation. The evolutionary school suggests ecology. The processual school suggests a living organism." If the act of continuous learning as part of the scenario planning process becomes a part of the organisation's DNA, perhaps the best of all three schools of thought determining the good, the bad, and the ugly may be considered for holistic, realistic, and significant narratives. To live in the future, an organisation must apply everything it has learned.

The outcome of scenario planning may lead to or be part of a vision-led organisation, and as author, Jim Collins (2001), wrote in his book, *Good to Great*, such

organisations have proven to be more profitable than those without such a beacon. Creating such a vision and developing the buy-in needed to prepare for any proposed scenario requires a collaborative and participative approach versus top-down management. A considerable portion of Schwartz's formal scenario planning documentation outlines the ingredients required of such an approach to hold a strategic conversation. Of the two business objects this research is promoting use of for cultural institutions, this area of Schwartz's instruction is not foreign. Museums have been struggling with the line of inclusiveness since their inception. Where businesses may be able to share planning formulas that could sustain the growth and prosperity of cultural institutions, perhaps museums can take the lead on sharing lessons learned about the conversations needed to gather information essential for scenario planning execution.

Steps to Hold a Strategic Conversation	
Step One	Create a hospitable climate
Step Two	Establish an initial group including key decision makers and outsiders
Step Three	Include outside information and outside people
Step Four	Look ahead far in advance of decisions
Step Five	Begin by looking at the present and past
Step Six	Conduct preliminary scenario work in smaller groups
Step Seven	Playing out the conversation
Step Eight	Living in a permanent strategic conversation

Table 6: Steps to hold a strategic conversation (Schwartz, 1991).

Just as there are eight steps to the scenario construction, there are eight elements of the strategic conversation and together this articulates the framework of the long view. The first step is to create a hospitable climate where diverse thinking and conversation are welcomed and encouraged (Schwartz, 1991). This step is the cornerstone of the scenario planning building blocks. The key to structure and stability is ingrained in the culture construction. The narratives crafted may have issue being considered of high merit unless action is taken at all levels of the organisation. The second step is to establish an initial

group including key decision makers and outsiders (Schwartz, 1991). A differentiator of scenario planning is the level with which senior managers or executives are involved. Schwartz advocates that leaders be participants in the discovery process to cement the understanding of emotional and physical impact of the scenarios proposed versus being spectators of the process and at arms-length of the actions being recommended (Schwartz, 1991).

The third step is to include outside information and outside people (Schwartz, 1991). This step does not run counter the scenario planning process advocating an inside-out understanding of what elements of a scenario plan are going to resonate to enact organisational change. This third step of the conversation process is to offer an opportunity of thinking and action that would not organically occur within the organisation. This “range of information” adds variety to the area of the unknown or the heart of scenario planning (Schwartz, 1991, p. 230). The fourth step is to look ahead far in advance of decisions (Schwartz, 1991). Just as Royal Dutch/Shell was gearing up for uncertainties not considered in the immediate future, cultural institutions need to have an eye for what is immediately impacting their organisation, but also be aware of and fully comprehend how driving forces will impact the industry and region. Schwartz councils (1991, p. 231), “The need to act overwhelms any willingness people have to learn. Thus, well-designed strategic conversations occur long before the moment of decision. They are not oriented to crisis, but to the on-going affairs of the enterprise.”

The fifth step is to begin by looking at the present and the past (Schwartz, 1991). To fully comprehend the impact of future uncertainties and map a course or courses for the future, an organisation needs to know how it came to be in its current state. There is still potential untapped value from previous investments not yet analysed or realized as fuel or implications for possible futures. It is the conversations about the trends that inform the driving forces listed and prioritized in the scenario planning process. The sixth step is to conduct preliminary scenario work in smaller groups (Schwartz, 1991). As a chef would not serve any menu item in a restaurant without first testing ingredients and taste with consumers of the restaurant or crafting test batches, an organisation may leverage subgroups or work streams to conduct deep dives in various areas or drivers prioritized during the discovery process. Acting small and thinking big is the momentum behind the

scenario planning process. The seventh step is playing out the conversation (Schwartz, 1991). Incorporating the diverse viewpoints at all stages of the scenario planning process allows for the organisation to prepare for questions and formulate hypotheses to address. While there is no version of events that will prepare an organisation to address all uncertainty, having preparedness to act on multiple fronts gives the organisation flexibility and agility to react to novel stimuli.

The eighth and final step is living in a permanent strategic conversation (Schwartz, 1991). The scenario planning Royal Dutch/Shell completed in the early 1970s is not the same set of narratives presently guiding the company. The organisation has undertaken several rounds of scenario planning over four decades to continue to address the uncertainties of their industry and have also been transparent in sharing the outputs of the scenario planning process. On the company's website, Royal Dutch/Shell shares the lessons learned from their scenario planning process and shares scenario plans of the past and present to help other organisations visualize what is possible to produce (Royal Dutch/Shell, 2016). The conversations that occur during the construction of the narratives act as a model for the organisation's decision process; the framework remains consistent and the outputs are fluid to address potential futures (Schwartz, 1991). Royal Dutch/Shell advocate for scenario planning not as a future corporate planning, rather "its value lies in how scenarios are embedded in – and provide vital links between – organisational processes such as strategy making, innovation, risk management, public affairs, and leadership development. It has helped break the habit, ingrained in most corporate planning, of assuming the future will look much like the present. As unthreatening stories, scenarios enable Shell executives to open their minds to previously inconceivable or imperceptible developments (Wilkenson and Kupers, 2013)." It is this mind-set that has the power to enable and empower the learnings of this proposed research.

A former Shell scenario planner and a former Shell executive partnered with a Shell scenario editor employed in the 1990s to continue documentation of the organisation's success with scenario planning in addition to what had been captured by Wack and Schwartz. Data is inert. The scenarios crafted were not merely data-driven; they were probable – even plausible (Wilkenson and Kupers, 2013). The output of scenario planning not only impacted Royal Dutch/Shell, but also influenced an entire industry. An example of

this is in a Shell sustainability report published in 1998 which was the first formal documented acknowledgement by a major energy corporation of climate change (Wilkenson and Kupers, 2013). Cultural institutions are a gold mine of physical and digital information that may have similar impact if leveraged by the organisation, region, or industries and cultures represented by the collections. The power of the long view is not limited to the application of the cultural institution with these business objects, but may potentially have a ripple effect impacting significant change outside of its walls and permanent collection.

Another valuable takeaway from the execution of scenario planning over four decades is to strike a balance between challenging the norms of the organisation while delivering a relevant and believable narrative. Head of the Shell scenario team from 1999 to 2003 counsels, “All successful scenarios are focused in the sense that are derived from a fundamental consideration of their client’s dilemmas and needs (Wilkenson and Kupers, 2013).” It is important to make note that Royal Dutch/Shell was not a centralized company at the time scenario planning was birthed from its bowels, but happened in spite of a decentralized environment with two parent companies and headquarters (Wilkenson and Kupers, 2013). To break through the noise of corporate planning procedure, scenarios must walk the fine line of disruptive and challenging with relevance.

Stories resonate more so than an endless barrage of disparate facts. Like any good story, scenarios are crafted to include a clear beginning, middle, and end and are peppered with heroes, villains and comic relief. The characters of the story are relatable, but not directly attributable to the actors within in the organisation. Part of the art of “reperceiving” is keeping the narratives at arms length while creating an emotional connection and remembrance that is not seen as a direct challenge to the managers or executive authority. Scenarios are carefully selected to not overwhelm with too many futures. In the early days of scenario planning, Royal Dutch/Shell introduced six or more possible futures and then pared down to two or three plausible and discrete stories (Wilkenson and Kupers, 2013). Scenarios shed light into the innermost fears, challenges, and desires and with such behavioral information gleaned over time, planners or employees can begin to anticipate the reaction and action of the organisation and stakeholders, thus feeding an ever-evolving inciting event, climax, and finale or outcome.

Not to be confused with consensus building, scenario planning surfaces diverse opinion and action rather than burying or glossing over alternate beliefs. Newland cites disagreement as an asset and says, “In hindsight, the greatest value of scenarios is that they created a culture where you could ask anyone a question, and the answer would need to be contextual. Answering ‘Because I’m the boss’ or ‘Because the business case is positive’ was out of bounds’ (Wilkenson and Kupers, 2013).” Narratives with performance based-outcomes fuel an environment of learning, common taxonomies, and shared experiences. At Royal Dutch/Shell, scenarios became a business object facilitating mediation and “redirected attention and encouraged dialogue rather than prescribing action, which made them non-threatening (Wilkenson and Kupers, 2013).” The act of reconsidering helped the organisation not only anticipate the needs external to Royal Dutch/Shell, but also the internal dynamics within the company.

At the end of the day, the question each organisation must answer on its own is whether the scenarios have impact? Wack (1985) suggests asking these two questions to determine the value of scenarios: What do they leave out and do they lead to action? If nurturing an environment of continuous learning and scenario planning cycles, the answers to these two questions can fuel additional narratives or enhancements of current version scenarios. The scenario planning framework is structured to gather all the information needed to see a holistic view of the issues and potential and then focus on a limited and prioritized number of gaps and opportunity combinations. The output of scenario planning assists in the craft of organisation vision and option planning or specific actions (Wack, 1985). Uncertainty cannot be commanded or controlled by anyone, but managers or executives employing the scenario framework may enjoy the control of response aided by realities imagined.

Scenario planning is not a silver bullet ensuring an organisation’s success. The process must jive with the culture of the organisation and constituents, managerial action, and a host of other factors. In an increasingly digital world, action is driven by agility and adjacency. The preparation outlined for massive organisational change is at the very essence the steps required of software developers to create output that is fast-to-market and built to evolve incrementally. Similar to the proposed idea that cultural institutions take a page from the hacker’s creed that built the Internet as we know it, it is possible to hack the

time-saving and planning techniques software developers have instituted to behave differently in the digital environment than those in the slower-paced physical environment. Scott Brinker (2016, location 453), CTO of Ion Interactive, a software company and author of a popular marketing technology blog and recent book, *Hacking Marketing*, describes the ‘Hacker Way’ as “an approach to building that involves continuous improvement and iteration. Hackers believe that something can always be better, and that nothing is ever complete. They just have to fix it—often in the face of people who say it is impossible or are content with the status quo.” Brinker encourages marketers, and indeed all areas of an organisation, to embrace the best practices of agile software development and management.

Scenario planning consistently challenges the status quo of the “Official Future” as Schwartz termed the “future based on the idea that ‘things will work out today, because tomorrow will basically continue the experience of today’ (2001, p. 237).” This mentality exists for the feeling of security across the organisation and may be a necessary element for morale, but it does not secure the future existence of the organisation. Executives need to have uncertainties on their organisational radar, so they may begin to prepare their teams and actions emotionally and tangibly.

It is possible that when scenario planning is executed with the incremental and iterative approach to building software, an inquisitive mind-set, and a framework to seek out strategic conversations, the combined outcome results in the leverage cultural institutions need to continuously evolve offerings and solidify their place in the physical and digital community. When successfully deployed, Wack infers that the process may have a “breeder effect” and the continuous exploration and action planning is self-fed because of the positive outcomes generated (1985). The layers of scenario planning learning first employed by Royal Dutch/Shell is contributing advancements in gap analysis and strategic variants used for decision making from science to the iron and steel industries (Zahrandnickovia and Vacik, 2013 and Godet and Roubelat, 1996). All industries have a stake in accelerating the pace of change and embodying an agile decision and action-planning environment.

7.2. Scenario planning as a tool for the ‘museum of the future’

Just as social media was disrupting one-to-many communications in 2008, the Center for the Future of Museums (CFM) was founded as a division of the American

Association of Museums (now the American Alliance of Museums, AAM) (Merlin, 2018). The initial idea for the CFM emerged from AAM centennial planning. Founding director of the CFM and current Vice President of Strategic Foresight, Elizabeth Merritt (Merlin, 2018), recalls the birth of the CFM, saying:

Centinnials lead people to dream big. The Board of Trustees invited the staff to brainstorm and submit a bunch of concept statements about what AAM could do to lead these museums into the 21st century. What could we do differently over the next hundred years? One of the groups also came up with the concept of a centre for the future of museums.

Merritt accepted the challenge of creating such a centre and has been incorporating futurist thinking and frameworks into AAM content and professional development opportunities for several years. The original CFM business plan developed in 2006 called for museums to think critically about the external changes impacting the industry, and Merritt recalls, “It asked: what will be the measures of how we impact the field? What are the goals? How are we going to fund this over the long term? In addition, how do you do a new thing with very little new funding? It was an interesting challenge” (Merlin, 2018). The business plan concept was adopted in 2008 and solidified the ambition of the CFM as future-proofing museums through the monitoring of trends impacting cultural institutions, assisting museums with strategic planning, and connecting the cultural sector with civic and community partners (Merlin, 2018).

The CFM has been monitoring various social and technological trends impacting the future of the museology and sharing these trends through their weekly news summary emails and the annual *TrendsWatch* reports published since 2012. Generally, the CFM has highlighted five-to-six major trends impacting the museum industry and featured various museums on the forefront of addressing challenges associated with these trends. Past examples of trends highlighted include: agile design and artificial intelligence (TrendsWatch, 2017); happiness (TrendsWate, 2016); and open data and personalization (TrendsWatch, 2015).

The TrendsWatch 2018 report broke format; rather than featuring a deep-dive into a select number of trends, the CFM developed a guide for museums to better understand how trends are selected and how such trends may impact the possible, plausible, and probable futures of the museum. Merritt and the CFM Team (Trendswatch, 2018) solicited input from the museum community “to develop four stories of potential futures to help museums come up with creative solutions to the central challenge: how can we create a world informed and enriched by thriving museums? How can museums thrive, in the face of diverse forces of change.” All scenarios in this *TrendsWatch* edition occur in the year 2040. The CFM chose this time frame because it was not so far into the future that museum professionals could not ground responses with their current experiences of social and technological advancement, as well as, far enough into the future to foster creative and critical thinking (Trendswatch, 2018). The four scenarios developed for *TrendsWatch 2018* (Merritt, 2018) represent a potential future:

- A **bright future** is based on the hopes and dreams shared by museum people when we asked, “What’s the best future you can imagine?” Exploring optimistic outcomes helps organisations test their assumptions, build alignment among stakeholders, and identify actions they can take to make their own vision of a bright future come true.
- A **dark future** embodies the fears that haunt museum people in the middle of the night. Thinking about worst-case outcomes can actually be empowering. Events that at first glance seem to presage the end of the world may turn out to be manageable when confronted with reason and ingenuity. Besides, dark futures make for compelling storytelling and can energize planning by capturing participants’ imaginations.
- An **equilibrium** might result from existing limits and challenges as they play out in coming decades. This scenario reflects people’s common unconscious assumption that the future will be pretty much like the present, only more so. The details are based on credible, mainstream forecasts on topics ranging from the economy to demographics to climate change. (This scenario was the jumping-off point

for *Museum 2040*, an issue of the Alliance's *Museum* magazine that explored how museums might thrive in this version of the future.)

- Finally, a **wild card** illustrates the kind of low-probability, high-impact event that can disrupt the best-laid plans. Though you shouldn't obsess about these possibilities, including a few wild cards in your museum's planning deck will help you prepare to respond should the best *or* worst occur. And as you consider how you could handle these disruptions, you may discover actions that improve the museum's performance whether or not a particular wild card comes into play.

Each scenario challenges museums to ask and answer the following questions to assist in the development of a multi-year strategic plan:

- Do you think the world might really be like this by the year 2040?
- How would you edit this story to make it reflect your vision of the future?
- What are the implications of this future for museums?
- What would you, your family, your organisation, your community be doing, in this world, in order to thrive (Merritt 2018 Scenarios)?

The CFM encourages museums to use these evocative scenarios and questions to spark critical thinking and conversation to evaluate future forecasts. Before applying any scenario discovery to the development of the museum's strategic goals and actions, Merritt (2018) recommends museum planners ask themselves, "What forces would create this or that future? How can we spot those forces at work early on? What is our preferred future, and what steps can we take to make that future come true?" This type of discovery prevents superficial planning and increases the likelihood of more resilient operating environment planning because the institution is challenging its assumptions, examining, and preparing for a multitude of economic and social shifts.

To increase the believability of the scenarios, the CFM also transformed their November/December 2017 print publication, *Museum*, into a collection of news and activities from the New Equilibrium 2040 scenario. The CFM (Merritt, 2017) grounded this scenario with data-informed premise of external and internal forces, including:

- The US population is older and more diverse than it is now. The ratio of retired people to people of working age (so-called “old-age dependency”) has climbed to 38% from 25% in 2017.
- Economic stratification has continued to grow in the past few decades. The top 10% of families now hold 85% of the wealth in the US, while the bottom 60% hold 1%.
- In education, there has been significant growth in the number of private schools, and charter schools now serve 15% of the public school population (triple the number in 2014).
- Impact philanthropy has become the dominant guiding principle of individual and foundation funding, and non-profits are expected to provide concrete, measurable data of how they have improved the environment, or people’s lives, in order to secure support.

Each article in the *Museum 2040* issue is authored by (current) museum professionals who immersed themselves into this scenario, agreed-upon data points and signals, to reimagine their institutions and roles as they foresee in the year 2040. When unveiling the shared future fiction of *Museum*, Merritt (2018) said the CFM would be using its broader digital platform to explore the scenario in more depth, as well as, coach museums on how to integrate scenario planning into strategic development.

In many ways, the CFM has traded in the TrendWatch report and *Museum* publication structured around teaching or showcasing what is already known, and replaced the report with a guide to fostering and facilitating conversations around a shared challenge. In an interview with Smith College, Merritt (Weld, 2015) suggests the shared challenge of the ‘museum of the future’ is making the museum’s “resources—physical, digital, and intellectual—accessible to as many people as possible.” It is up to the individual museums to collect, interpret, and incorporate signals unique to the institution into the analysis of plausibility, possibility, and probability each scenario. However, the analysis, conversations, and questioned generated from this exercise may be shared beyond the museum and inform the scenario exercise for other cultural institutions with similar or inherent characteristics.

7.3. Scenario planning as a tool to practice systems thinking

Scenario planning is a critical component of systems thinking. The term “systems thinking” was coined in 1987 by Barry Richmond and is defined as, “the art and science of making reliable inferences about behaviour by developing an increasingly deep understanding of underlying structure” (as quoted in Schuster, 2018). In the Fifth Discipline Fieldbook, author Peter Senge states, “Systems thinking [is] a way of thinking about, and a language for describing and understanding, the forces and interrelationships that share the behaviour of systems. This discipline helps us to see how to change systems more effectively, and to act more in tune with the natural processes of the natural and economic world” (as quoted in Schuster, 2018). Maturity analysis and scenario planning are not business tools to solve ad hoc problems; rather, these tools are meant to aid museums in holistic strategic planning and such planning requires evaluating the many change levers impacting a greater system.

As outlined in Chapter Three, data is the lifeblood of a cultural institution. A museum’s terroir is influenced by site specific characteristics interrelated to the environment wherein the cultural institution’s community is cultivated. Chapter Four further demonstrates how the museum is a system within a larger physical and digital ecosystem – a system that is permeable and influenced by internal and external actions. Scenario planning when used in combination with the digital data maturity assessment (Chapter Four) are two business tools a museum may use to parse out the drivers, uncertainties, trends, cycles, and choices impacting their place in the physical and digital ecosystem. These tools encourage a continuous learning environment when used in strategic planning and practice. When using these business tools with a systems thinking mind-set, museum planners may uncover challenges associated with traditional, compartmentalized, and hierarchal organisations and discover the benefits of the museum as an open and dynamic learning system.

The digital data maturity assessment and scenario planning may help museums look at problems in a way they have not before; by seeing how every resource, every decision, and every piece of data are interconnected and part of a whole, rather than independent inputs or parts. Psychologist and business author, Steven Schuster (2018, p. 188), in his book, *The Art of Thinking in Systems*, writes, “The problem is that when we fail to take the

time to examine our internal systems as well, sometimes our solutions create new problems. These problems can be significant, serious, and very hard to overcome, if they are really ingrained in the structure of a system.” The digital data maturity assessment allows the museum to assess internal factors, while scenario planning allows the museum to assess the impact of external factors on the museum’s function. As the museum works through the self-assessment, museum planners should take note of the current drivers, uncertainties, cycles, trends, and choices influencing the current state of the digital ecosystem, then that of the various scenarios. The museum is assessing the behaviour already present and how the strategic structure may be suppressed or expanded based on how well the museum interprets and understands future signals.

In the book, *Thinking in Systems: A Primer*, technologist, Donella H. Meadows (2008, p. 2) advocates that systems’ thinking “gives us the freedom to identify root causes of problems and see new opportunities.” Using the scenarios, museum planners could test various actions to determine the impact of changing one part of the digital ecosystem. Every action and decision may have unintended consequences, so incorporating scenario planning allows the museum the time and space to analyse their digital ecosystem carefully. Museum professionals, Yuha Jung and Ann Rowson Love (2018, p. 3), explore how systems thinking are applied in museums in their book, *Systems Thinking in Museums: Theory and Practice*. Jung and Love define systems thinking as seeing “the world as open and interconnected to and interdependent with all parts of the world; the parts are situated in context, shaping the whole, which is better understood by examining dynamic interrelationships among its parts.” Systems will look different from museum to museum because the parts and interrelationships are contextual, meaning the museum’s community relationships, organisational structure, and more inform the specific conditions of the system environment. When scenario planning is approached with a systems thinking mindset, challenges are evaluated contextually, from a multitude of perspectives, and the chances of finding innovative paths to long-term digital maturity solutions are greater.

An example of a museum applying systems thinking to strategic business planning is demonstrated in the book, *Museums and the Paradox of Change*. The book is authored by Robert R. Janes, the Glenbow Museum President and CEO and is a case study of how that institution developed the capacity to adapt and adopt organisational change to address

pressure in the late twentieth century. In the preface of the book, Janes' (1995, p. xiv) emphasizes the opportunity for museums to focus on continuous care of the institution and not be distracted by "interventionist cures." Janes' (1995, p. xv) was hopeful the book would "serve as a bridge between organisational method and theory gleaned from the private sector, and the needs and aspirations of museum workers." The book may be described as a case study of creative destruction; the connotation being how the Glenbow Museum systematically dismantled, questioned, rebuilt and repositioned the Museum. Janes' admitted the tools the Glenbow would use to renew the institution may be revolutionary for cultural institutions, but proven successful in the private sector. Janes' (1995, p. 11) says:

None of what we have done to create Glenbow's future is particularly original, and the value may lie only in the fact that we are doing it. Many other museums have also donned their parachutes, and are electing to define their own futures. There is more at stake here than the future of museums as social institutions, however. We must also confront some of the paradoxes of our time, including the paradox of the organisation (Handy 1994:34-36). The museum of the future may not be recognizable, when you consider that it will have to be planned, yet flexible, differentiated and integrated, use new technology but allow respect for the object and individual self-determination, and appeal to all while catering to niches. We have no choice but to reconcile what we have always thought of as opposites.

The Glenbow took an outside-in approach to evaluate organisational coherence because the institution recognized that what made them a successful museum in the past may not make them successful in the future. The museum did not cut and paste private sector frameworks; rather, over a period of seven years, the museum tested various management solutions though continuous discussion and reflection, trying to determine the impact on the entire museum and community system (1995). Fast-forward almost two decades and museums grappling with how to adapt and adopt to interactive and disruptive media and communications, have to realize this persistent paradox: at a time when museum staff are

stretched and juggling multiple roles, every museum staff member needs to be digitally confident and understand the role of data in the development of the museum's terroir.

Jung and Rowson Love (2018, p. 9) caution museum professionals not to ignore internal and external connections or risk becoming a dysfunctional museum, saying:

This happens through not applying its resources toward a unified goal or ignoring its connection to the larger community and not maximizing various backgrounds or ideas from all involved individuals, and therefore becoming a less relevant organisation or even elitist when seen by the public. A hierarchal or mechanical museum still exists within a larger social ecosystem and is itself a system, but not a healthy one. An unhealthy ecosystem can cause failure, even as extreme as permanent museum closure.

Perhaps the change agent or hacker mind-set is able to initiate the digital maturity process, but how does the museum sustain continuous conversations and planning to keep the system from becoming stagnated? Scenario planning adds a dimension of contextual relevance to imagine new advantages of the system and outcomes of combined variables. Narratives highlight the links between quantitative and qualitative data within the whole digital ecosystem. To harvest business value, museum planners need to consider how to sow the seeds of change and make data-informed strategic business decisions with information that is consistently analysed, understood, used, and converted into institutional knowledge. By using the maturity model, scenario planning, and systems thinking frameworks the museum may transform its data collection and use to advance organisational goals.

Museums may choose to use the planning framework originally adapted for for-profit organisations, like Royal Dutch/Shell, as outlined in this Chapter, to build their own plausible, possible, and probable scenarios. Or the museum may choose to build off the scenarios crafted by the CFM and augment these stories with primary, secondary, and tertiary data. In either case, the museum is proactively challenging their assumptions and taking strides to future-proof the museum with the creation of a resilient strategic plan, flexible enough to adapt to the museum's needs in any future or system.

All industries are faced with the dilemma of acting before it is too late with the constant juggle of reaction of novel stimuli with the action developed through preparedness. Employing the two business objects of the survey and the scenario planning framework, museums of all shapes and sizes do not have to win the employment lottery with a hacker or a futurist and may perhaps begin to address and build these skillsets and business object deployment into all departments. Cultural institutions cannot simply appropriate the business objects of others, but adapt the objects to address the unique quirks of cultural institutions. By knowing the strengths of our actors and actions, institutions can better gauge the impact of perceived weaknesses either created by internal factors or experienced as a result of external factors. Museums may use digital data maturity (Chapter Five) self-assessment alongside the scenario planning exercises described in this chapter to help their institution plan where to target their resources. When using the P's of digital data maturity (first introduced in Chapter Six) to focus a museum's energy, the spotlight becomes not on technologies (current or planned), but on the people and processes enabling the successful implementation of these technologies and the unblocked flow of information through these systems.

Chapter Eight:

6Ps of Digital Maturity

Maturity is the act of knowing when and how to behave at the right time and in the right place. Maturity is subjective. Maturity is a fluid state. Just as there is no one path to maturity for a human being, there is no one path towards digital maturity for a museum. The quest for digital maturity is not clear cut or straightforward. The quest is under continuous scrutiny and revision. The quest is occasionally derailed by unforeseen circumstances. New paths are sought out; old paths reflected upon. Paths bifurcate and challenge our resources and assumptions. The digital transformation is not linear. In fact, the journey towards digital transformation can be quite complicated – one step forward and two steps back. As reflected in the digital data maturity assessment and follow-up interviews with the staff of the three US museums studied in this thesis, the museums are not systematically tackling all areas of digital data maturity one category and one maturity level at a time. These institutions are simultaneously experimenting with many change levers in many of the categories and maturity levels.

Upon analysing the evolution of technology in museums and the impact of data to improve the community and visitor experience, I have discovered an opportunity for museums to adopt private sector business tools to improve the operational excellence of the museum. After examining maturity models and scenario planning as potential business tools the museum may adopt, I intend in this penultimate chapter to contribute something positive to museum literature to lessen the pain and frustration of museums embarking on their own digital transformations. Whilst my research and analysis has led me to dismiss the idea of a single path to digital transformation, I advocate in this chapter for museums to expand their digital toolboxes to include private sector, road-tested tools, to assist the museum in determining the path or paths that best suit their quest for digital maturity. I will expand on the 4Ps of digital transformation (Figure One) that I introduced in the previous

context chapters (categories: personalization, platform, panoramic, and paradox), and add 2Ps (categories: pollination and pathways) to make the case that these 6Ps form an essential set of core elements that make up and nurture the museum's terroir. The six categories or 6Ps in total are: personalization, platform, panoramic, paradox (of change), pollination, and pathways (Figure Three). The data that emerged from the case study participants is evidence of the urgency with which we adapt and tune the maturity model to best reflect the circumstances of museums in a digital context. The museum sector is not slowing down or decreasing the number of digital activities; so how might we surface best practices and processes, as well as chart our progress similarly to benchmark against ourselves, the museum sector as a whole, and other industries facing similar challenges and opportunities?

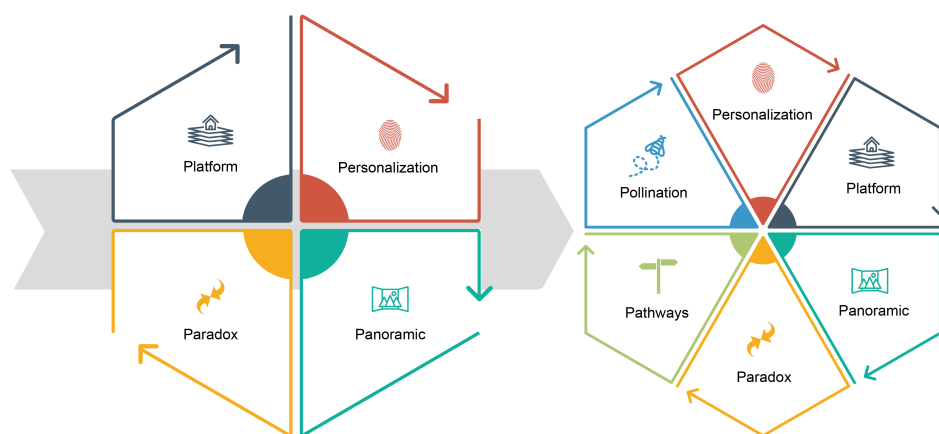


Figure 16: The 6Ps of digital data maturity evolution (Source: Author).

8.1. Paradox: Organisation design challenges continue to exist in digital

A paradox is commonly used to challenge assumptions or criticize an idea and think about a statement or problem in a new way. In his book, *Museums and the Paradox of Change: A Case Study in Urgent Adaptation*, Robert R. Janes documents the organisational change of the Glenbow Museum over seven years. The final two chapters of this book record the persistent paradoxes facing museums transitioning from the 20th to 21st Centuries. Janes' (1995, p. 214) says:

A new future, rather than demise, is achievable if a second or new curve is started before the first one dies out. Starting the new curve means challenging all assumptions and devising alternatives, including everything from new ways of operating to meaningful public service.

The digital data maturity assessment is a snapshot in time. When this business tool is paired with a scenario planning exercise, museum planners may begin to assess where the museum should prioritize and invest resources. The museum should be aware of all signals impacting the trajectory of any of the digital maturity categories as they fold in other signals and data points to support scenario planning narratives.

Gartner, the consulting organisation, introduced in Chapter Five to support the use of a maturity model as a business tool, conducts a Hype Cycle that provides “a graphic representation of the maturity and adoption of technologies and applications, and how they are potentially relevant to solving real business problems and exploiting new opportunities” (Gartner, 2018a). A Hype Cycle identifies the curve or trajectory of a technology across five phases of the technology’s life cycle:

- **Innovation Trigger:** A potential technology breakthrough kicks things off. Early proof-of-concept stories and media interest trigger significant publicity. Often no usable products exist and commercial viability is unproven.
- **Peak of Inflated Expectations:** Early publicity produces a number of success stories — often accompanied by scores of failures. Some companies take action; many do not.
- **Trough of Disillusionment:** Interest wanes as experiments and implementations fail to deliver. Producers of the technology shake out or fail. Investments continue only if the surviving providers improve their products to the satisfaction of early adopters.
- **Slope of Enlightenment:** More instances of how the technology can benefit the enterprise start to crystallize and become more widely understood. Second- and third-generation products appear from technology providers. More enterprises fund pilots; conservative companies remain cautious.

- **Plateau of Productivity:** Mainstream adoption starts to take off. Criteria for assessing provider viability are more clearly defined. The technology's broad market applicability and relevance are clearly paying off (Gartner 2018a).

The Hype Cycle may be used by a museum to determine a second or new technology curve to explore as it assesses plausible, possible, and probable futures.

The Hype Cycle has been used to track the maturity of emerging technologies, such as big data. In 2015, however, Gartner removed big data from the Hype Cycle. Betsy Burton (Woodie, 2015), the analyst authoring, stated:

We've retired the big data hype cycle. I know some clients may be really surprised by that because the big data hype cycle was a really important one for many years. But what's happening is that big data has quickly moved over the Peak of Inflated Expectations and has become prevalent in our lives across many hype cycles. So big data has become part of many hype cycle.

The Hype Cycle assists CIOs and other business leaders in understanding the maturity of any potential technologies they are evaluating for inclusion in their organisation's digital ecosystem. Big data is now considered a mega trend and appears in seven Gartner Hype Cycles, including: Hype Cycle for Data Management, Hype Cycle for Customer Experience Analytics, and the Hype Cycle for Analytics and Business Management (Gartner, 2017b).

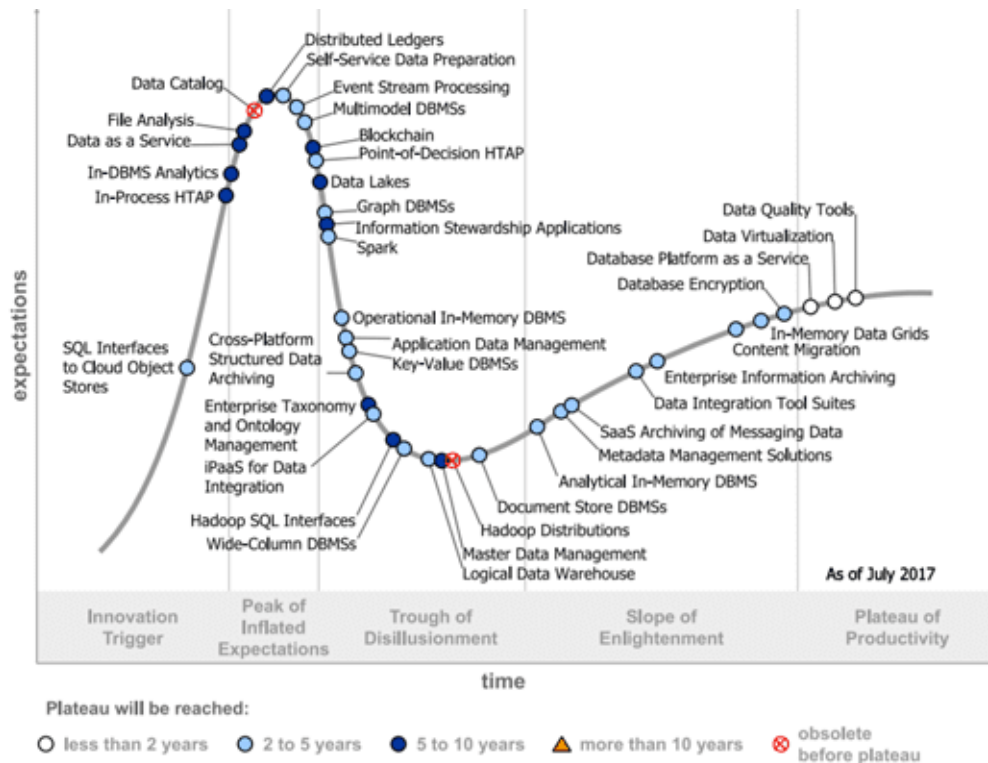


Figure 17: Hype Cycle for Data Management (Gartner, 2017b).

As exemplified in the digital data maturity matrix, data may be assessed across many categories and sub-categories. As technologies continue to evolve, the fragmentation of data and the digital skills and technology integrations required to make sense of the data will continue to expand. Gartner vice president and analyst, Donald Feinberg (Gartner, 2017b) alludes to this rapid growth when introducing the 2017 Gartner Hype Cycle for Data Management (Figure 15) saying:

Data management continues to be central to the move toward digital business. As requirements change within the architecture of the organisation and place greater demands on underlying technology, the maturity and capability of many of the technologies highlighted in the Hype Cycle will change radically.

Tools and techniques for big data or any data management have been adopted ahead of learned expertise and optimization. This lack of consistent deployment and digital skill has created confusion, and in some cases, frustrations, as institutions feel the pressure to

include emerging technologies into their organisation. As outlined in previous context chapters and as discovered in the digital data maturity assessment conducted in fieldwork analysis, cultural institutions may place data management between the Peak of Inflated Expectations and Trough of Disillusionment because of the inability to spot big data opportunities, formulate the right questions and execute on data insights.

The data from the case studies museums and the examples featured in the first four chapters of this thesis showcase the inadequacy of thinking or practicing in silos. Organisations are not conducting digital-only activities; there is a ripple effect of how and when visitors consume and participate any media and communication. Peter Samis references (as quoted in 2019, p. 60) a study conducted in 2007 by artist, Matthew Barney at SFMOMA that evidenced the need for blended analogue and digital solutions; the study revealed:

1. In terms of sheer numbers, traditional interpretive media such as wall texts and object labels are the foundation on which visitor learning is built. Digital or electronic media act as a supplement, used by a minority of the visitors.
2. The most effective interpretive strategy is born of a mix of the analogue and the digital, providing visitors with a menu of diverse, yet complimentary offerings.
3. For those unfamiliar with a contemporary artists' work, presence of interpretive resources may make the difference between alienation and engagement.
4. Use of a greater number of interpretive resources correlates directly with enhanced meaning-making, greater appreciation of the artist, the exhibition and the museum experience.

It is clear that museums can no longer depend on what made their institutions successful in the past to sustain or ignite future growth and success. Greater visitor engagement will require museums to accept the question is not either/or analogue or digital solutions, but the answer is analogue 'and' digital-both are needed when designing future interpretive strategies. Cultural institutions cannot ignore this paradox, rather they can begin to view

their organisations as businesses and adapt business tools to ensure a relevant role within their communities. Circling back to the Glenbow Museum transformation case study, Janes' (1995, p. 214) concluded, "We are fortunate, however, that asking questions and generating new possibilities do not cost money. It is essential that this questioning become an urgent task for all museums, if we are to find a path through this paradox of sustainability before events overtake us." The digital data assessment and scenario planning business tools allow for museums to ask questions and generate new plausible, possible, and probable futures of the museum. These business tools do not cost money to implement, but if museums do not include such tools in their strategic planning toolkits, it may result in the museum not transforming as rapidly as their peer or their constituents expect.

8.2. Personalization: Visitor experiences drives prioritization of digital innovations

Just as a museum's constituents may expect their cultural institutions to adopt digital tools at a rate similar to competing leisure and lifestyle organisations, digital practices, such as personalization, are becoming table stakes for any customer-facing business. Customers now expect relevant information delivered at the right time, anywhere and in any format on the device of their choice. Despite this desire, there exists a gap between how museums serve up their media and communications in their physical and digital ecosystems, and how visitors "opt-in" to consume this information and establish any communication exchange. Samis (2019, p. 63) refers to this gap as the "interpretive deficit". He goes further to say:

The public isn't demanding tech per se. What they're asking for is *meaning*: a memorable, emotionally compelling experience, no matter how it's delivered. Technology, for all its changing form factors and expanding capabilities, is optional; relevance however simply is not.

Personalization does not simply mean a museum's database can differentiate between a new and returning visitor, but that the museum recognizes the visitor has specific characteristics and needs across both the physical and digital environments. According to the International Data Corporation (IDC) FutureScape: Worldwide Digital Transformation 2016 Predictions, two-thirds of the CEO's of Global 2000 companies will shift their focus

from traditional, offline strategies to more modern digital strategies within the next year. Digital transformation outside of the cultural heritage sector is far from reaching completion or high-level of maturity.

In a State of Digital Business report conducted jointly by Progress, an application development service, and Loudhouse, a specialist research division of Octopus Group, a sales-driven content marketing agency, 47% of the companies surveyed had not yet started their digital transformation and 59% claimed it may might already be too late for them to begin such a transformation of their business (Lund, 2018). In the same study, 55% of the companies feared they have less than a year before they begin to suffer financially and lose market share (Lund, 2018). The hope and promise of digital transformation is to create highly engaged customers. Museums are not immune from the expectation of the institution changing the way it interacts with its visitors to provide a consistent and compelling experience whenever and wherever the visitor desires.

In a similar vein, a study conducted by technology firm, SAP Digital, and Oxford Economics (2017) examined the difference between leading companies (3%) that achieve significant results from their digital transformation efforts, as defined by being more profitable and growing faster than their peers, and found the leading companies did not treat digital transformation as an IT project, but rather as a need to transform the all aspects of the organisation. The study also found these companies initiated digital transformation by addressing customer-facing efforts before operational efficiency. Rather than making business decisions to deliver consistent and standardized customer experiences exclusively, these leading companies had to discover ways to unlock emerging technologies that could be applied at scale, so customers experiences could become an input, rather than exclusively an output, to the operations core (Oxford Economics, 2017). Customer experience is now driving a new operating core of businesses. How might these lessons learned impact museums looking to initiate a digital transformation?

First, we must review the current state of museum visitation before we can assess the opportunities personalization may present to increase positive sentiment of customer or visitor experience within museums. According to Chief Market Engagement Officer at IMPACTS Research and Development, a global leader in predictive market intelligence and related technologies, Colleen Dilenschneider (2017a), “Data suggests that cultural

organisations are still not representatively engaging new audiences – and our [museum] inability to meet this challenge may be exacerbating an already existing problem.” The problem Dilenschneider is referring to is the negative substitution of the historic visitor. Dilenschneider (2017b) defines negative substitution as “a phenomenon occurring globally wherein the number of people who profile as historic visitors *leaving* the market outpaces the number of people who profile as historic visitors *entering* the market.” IMPACTS data reveals that “on average, approximately 4 out of 10 people in the US don’t feel comfortable at an art, science, or history museum – including science museums and historic sites” (Dilenschneider, 2017a). While overall attendance levels have increased, museums have not adjusted these statistics to account for population and unique visitor growth.

Second, museums must address another paradox: to gain new visitors, museums must get better at addressing current visitor needs and experiences. Dilenschneider (2017a) says, “There is potential for the revenues derived from maximizing repeat visitation to financially support an expanded effort to engage new audiences.” To better understand the drivers of repeat visitation and new visitor engagement, museums need to apprehend intent versus interest in visiting cultural organisations. According to IMPACTS data, “on average, more than thirty percent of people who report an interest in visiting any kind of cultural organisation haven’t attended one in the last two years” (Dilenschneider, 2018). A museum’s data may shed light on why interest supersedes actual intent.

Interest is an indispensable factor driving the museum visit. Dilenschneider (2018), however, warns museums not to rely on interest metrics exclusively because often these data do not address the functional barriers that hinder actual attendance, such as accessibility and visiting schedule conflicts. Interest metrics are often easier to collect than “intent to visit” metrics and may assist the museum in creating the right mix of messages and programming for existing visitors, thereby inadvertently increasing the chances of (2018) has discovered intent to visit metrics are a reliable indicator of attendance within a certain timeframe, while interest metrics do not correlate with actual visitation within a certain timeframe. Museums must bridge the gap between interest and intent metrics for the institution to expand the museum audience and determine key drivers towards improving the visitor experience and ultimately, providing a personalized approach of museum engagement.

As evidenced in the digital data maturity assessment and follow-up interviews with the museums studied in this thesis, there is a broad spectrum of how personalization is applied within museums. In the case of the MAH and their use of the OF | BY | FOR ALL framework, the Museum is actively seeking visitor input for the creation of exhibitions, programming, and communications. It is the goal of the MAH to eventually incorporate this information into a customer relationship database and learn from their forays into hyper-local community development to inform new and engaging content that can scale to new visitors and participation opportunities. The MIA, on the other hand, has undertaken a more systematic approach similar to the leading companies featured in the SAP/Oxford Economics survey. They have invested in personalization at a strategic plan level and systematically prioritized and invested resources to capture and analyse visitor data to continuously improve their visitor experience. Analytics have evolved from providing basic data reporting to delivering vital insight into the behaviour of a MIA visitor.

The transformation of a museum into a digitally mature institution reflects recognition that integration of marketing and operational data is a competitive requirement amongst all cultural institutions. Museums are striving to gain a more complete view of their visitor, as well as understanding the chasm that exists between the current visitor and those who have never visited the institution. Digitally mature organisations invest in an integrated digital ecosystem, so they benefit from the ability to combine and leverage data sets, identify and target audiences, improve analytics, plan for engaging programming, and optimize messaging and communication campaigns for web and mobile applications. Before a museum can realistically experiment with and actively integrate emerging technologies, such as artificial intelligence and machine learning, the museum must have relevant, well-organized, and updated data to take advantage of advanced automation and targeting.

8.3. Platform: Understanding the meaning of digital skills drives digital adoption

To deliver on continuous innovation and emerging technologies, organisations are challenged to not “build a better mousetrap,” but rationalize legacy technology and architectural debt with completely rethinking how technology and data unlock core assets and business capabilities enabling significant advances in customer-facing experiences.

This is no small feat. Before museums can reap the benefits of systems thinking, they must first embrace platform thinking.

Platform thinking is a “plug-and-play” approach to digital transformation and is simply defined as “something that lifts you up and on which others can stand” or in terms of a digital platform, “other businesses can easily connect their business with yours, build products and services on top of it, and co-create value” (Bonchek and Choudary, 2013). The platform enables a ‘pull’ versus ‘push’ interaction between producers and consumers of value to create timely and relevant experiences that are of value to both producer and consumer. In the era of an “open museum” (Chapter Four) museums are now bridging the physical and digital visit with the creation of new digital experiences inviting visitors to contribute to the digital flow through crowdsourcing curated exhibits and other social interactions.

Technologists, Mark Bonchek and Sangeet Paul Choudary (2013), claim the success of a digital platform is defined by three factors: connection, gravity, and flow. Connection may refer to how easily visitors or prospects can access the museum’s digital platform to interact with the museum and share experience or other relevant information with the museum and the broader museum community. Gravity may refer to how well the digital platform attracts participants, both repeat museum visitors and those who may be interested in visiting or learning more about the museum. Flow may refer to how well the digital platform fosters the exchange and co-creation of value between the cultural institution, visitors, and prospects. Bonchek and Choudary (2013) also claim a successful platform thinking strategy achieves connection, gravity, and flow with these three building blocks:

1. **The Toolbox** creates connection by making it easy for others to plug into the platform. This infrastructure enables interactions between participants.
2. **The Magnet** creates pull that attracts participants to the platform with a kind of social gravity. Platform builders must pay attention to the design of incentives, reputation systems, and pricing models. They must also leverage social media to harness the network effect for rapid growth.
3. **The Matchmaker** fosters the flow of value by making connections between producers and consumers. Data is at the heart of successful matchmaking and

distinguishes platforms from other business models. The Matchmaker captures rich data about the participants and leverages that data to facilitate connections between producers and consumers.

The museum must transcend its physical presence and transform its services and offerings to mimic a platform where all visitor, prospects, and broader community value is aggregated, and this data may be used or transformed by museum or visitor into net new values. This means that a museum cannot simply design a website or mobile application, ad hoc but think about these digital sites and tools as hooks into a larger digital platform. The “platform” approach for museums may be summarized with this question: How can we redefine the visit through omni-channel (Chapter Three) experiences?

Technology itself does not provide value; rather the value is derived from the community and content it creates. Traditional enterprise data management system, websites, and mobile applications have been developed and designed inside-out, along the lines of functional silos to serve a particular type of user and functional outcome. The design has followed a traditional, linear model. These systems have been closed and ‘push’ value as an output, rather than ingesting value as a potential input.

As evidenced in the digital data maturity assessment and follow-up interviews with the museums studied in this thesis, the Mia is an example of a museum embracing internal platform thinking. The museum is thinking about technology as a platform to digitally connect visitors with the museum. Thus, museum programming is the output of recognizing the value derived from all visitor-prospect-museum interactions. Mia is able to personalize communication and programming because all interactions and transactions across the physical and digital experiences are captured in their customer relationship management database. The customer relationship management database is the platform from which all value is input and becomes the system of record or the single source of truth (Chapter Three) to align internal operational processes, as well as, customer engagement and interactions.

Another example of platform thinking may be the creation and proliferation of “digital DNA” as expressed by Ed Rodley and the work of PEM with the artist Theo Jansen to create the Strandbeest exhibition. In his CODE|WORDS essay, *The Virtues of*

Promiscuity or Why Giving it Away is the Future, Rodley (2015, p. 225) shares how the Dutch artist, Theo Jansen has spent the past two decades creating wind-powered kinetic sculptures he calls Strandbeests, and how Jansen has shared the digital files that contain the ‘DNA’ of his creations via his website for the world to use, adapt and remix. Rodley recalls the experience of the Museum working with Jansen was drastically different from working with traditional artists. He (2105) says:

In Jansen’s case, his openness infected the entire process, the result being an exhibition that is far from traditional. Curatorial texts were replaced with videos of the artist discussing his process and motivations. The museum hired new staff to operate and interpret the Strandbeests and let visitors operate them as well. A string of pop-up events were hosted where we brought the objects out into the community. A hackathon occurred in conjunction with the opening events, the teams competing to build their own new species of Strandbeest. Even efforts that didn’t bear fruit, like a major digital presence, resulted in our staff working together in new ways and raising our gaze to see new possibilities. The benefit that accrued to the institution will live long past the closing data of the exhibition.

Platform thinking and design in the digital era has upended industries such as media and hospitality. Museums have the potential for creating massive industry change if they embrace the power of and see the value derived from internal platform thinking and expand that practice to build connections between the museum-artist-community, as exemplified in the PEM Strandbeest example, as well as, connecting the museum and its visitors with other cultural museums and their visitor networks, so all may enjoy and expand cultural heritage experiences together.

8.4. Panoramic: Systems thinking helps achieve organisation and community impact

Just as platform thinking may aid the connection of internal operations with customer engagement and interaction data, systems thinking allow museums to take a wide-angle or panoramic view of the digital landscape. As depicted in Chapter Six, Museum professionals, Yuha Jung and Ann Rowson Love, explore how systems thinking are applied

in museums in their book, *Systems Thinking in Museums: Theory and Practice*. Jung and Love (2018, p. 3) define systems thinking as seeing “the world as open and interconnected to and interdependent with all parts of the world; the parts are situated in context, shaping the whole, which is better understood by examining dynamic interrelationships among its parts.” Digital is no longer a strategy for differentiation; digital transformation is now table stakes for any organisation in any industry to continue operation. Museums are no exception. The editors of *The Routledge Handbook of Museums, Media, and Communication* (2019) use various forms of media and communication to chart the relationship museums have had with emerging technologies, just as this research attempts to view data as a way to look across museums and gauge digital maturity. In the opening chapter of the *Handbook* (2019, p. 6), editors say, “Implicit here is the challenge for the museum of the 21st century to reappraise the currency of certain of its beholden institutional values today.” Museums are confronted with how to relate to more visitors on a deeper level over various amounts of time. Museums are challenged with how to curate relationships alongside their duty and mission to preserve and protect their collections for future generations.

Understanding the interrelationships and dependencies among its parts is a key component of information ecology, as defined by Nardi and O’Day (1999, p. 49) (Chapter Three) as “a system of people, practices, values, and in a particular local environment. In information technologies, the spotlight is not on the technology, but on human activities that are served by the technology.” Digital transformation and maturity are much more than the acquisition or implementation of a new technology or digital service. When embracing a holistic view of the digital ecosystem or information ecology, organisations must account for its place in the larger community of in terms of economic, cultural, political, educational, and social systems. Jung challenges museums to become, as Peter Senge originally termed, learning organisations, and use collective knowledge to advance organisational goals. Senge (1990, p. 3) defined learning organisations as “organisations where people continuously expand their capacity to create results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning to see the whole together.” Jung (2018, p. 17) builds on the learning organisation, saying:

A knowledge-centric organisation creates a culture of learning and views knowledge as an institutional asset. Knowledge-centric organisations are able to gather and leverage disparate sources of data and information to create knowledge, and knowledge creation is a core value.

An example of a knowledge-centric organisation using systems thinking to address digital transformation is the Cleveland Museum of Art (CMA). In Chapter Two, I shared the story of the CMA's creation of Gallery One – the outcome of a completely revolutionized digital ecosystem. CTO, Jane Alexander, did not view the digital transformation as solely an IT project; rather, Alexander leveraged the digital transformation as an opportunity to include the viewpoints of all functional areas of the museum, as well as, reassess the relationship of the CMA with its hyper-local community.

This research is not stating that museums are limited to using digital activities to steer the strategic direction of the organisation. In the recent book, *Museum Activism* by Robert R. Janes and Richard Sandell (2019, location 854), they discuss “the growing and irresistible imperative to redefine the contemporary museum as an active agent in shaping the world around us and making a better place for all.” They may use this drive to establish greater community connections and impact to address their information flow and the resources they dedicate to support overall digital maturity. This research and breadth of the categories comprising the digital data maturity are meant to view digital collection data and use as something more meaningful than commercial education and entertainment purposes; the culmination of the model is a whole and healthy system transcends the “museum as a mall” concept or the embodiment of the dead end of materialism—over-merchandised and devoted to consumption and entertainment” (Janes and Sandell, 2019, location 905).

As addressed in Chapter Four, it is essential for museums to have a symbiotic relationship with its hyper-local community in the physical and digital ecosystems in which the museum operates. In an essay included in Jung and Rowson Love's book, doctoral student, Victoria Eudy, shares her findings of how systems thinking impacts digital strategy. Eudy (2018, p. 28) says, “When museums adopt systems thinking, traditional

functions, such as, collecting, preserving, researching, exhibiting, and educating are collapsed, blurred, combined, and shifted as more emphasis is placed on visitors and engagement as the centre of museum practice.” When a museum is practicing systems thinking, the institution is consistently questioning and ingesting how visitors and prospects are impacted by the museum’s efforts. In closed systems, museums are making communication and programming decisions based on a compartmentalized or siloed department structure and viewpoints. Systems thinking, like digital transformation, is not linear; rather, because system development and flow depend on feedback from its environment, the act of systems thinking is continuous and complex.

As evidenced in the digital data maturity assessment and follow-up interviews with the museums studied in this thesis, the MIA is an example of a museum actively practicing systems thinking. As Douglas Hegley shared in the interview (Chapter Six), the MIA multi-year strategic plan and supporting tactics are an outcome of using systems thinking, rather than history and tradition, to take a more holistic approach to seeking, defining, and solving problems impacting the museum’s constituents. MIA also practices systems thinking by adopting a team-based approach that includes voices from all levels and positions within the museum, to both inform the collective vision and accept collective responsibility for bringing the vision to life.

It may also be argued that the MAH practices systems thinking through implementation of the OF | BY | FOR ALL framework, because the museum is actively seeking visitor input for the creation of exhibitions, programming, and communications. The MAH demonstrates systems thinking practice by listening to what their visitors and hyper-local community desire from the MAH and build relevant exhibitions and programming that reflect the community’s local issues and concerns. This is an example of a museum’s healthy and symbiotic relationship with a greater system. Both the MIA and MAH place importance of diversity of staff, thought, and ideas to become institutions that are socially inclusive and engage museum visitors in collective actions that are important to their communities.

8.5. Pollination: Spreading of ideas challenges the museum and sector to be greater

While each museum interviewed for this thesis have taken different paths on the quest towards digital maturity, all museum staff stated they viewed digital confidence as a

vital enabler of their digital maturity strategy (Chapter Six). In the same SAP Digital and Oxford Economics (2017) study referenced earlier in this chapter, the third key finding was the pressing need to invest in up-skilling and retraining of current staff to support any digital transformation efforts. Digital transformation requires a significant investment towards the right set of technologies, but unless leaders also invest in training of how to properly use these tools and platforms, the technologies may not be used to their greatest potential. This finding is also supported in the information ecologies framework introduced in Chapter Three that specifies the need to imbue the ‘keystone species’ required to support the information ecology or digital ecosystem with the right skills and literacies.

While there are many competing terms and definitions to describe the scope of digital literacy, for the purposes of this thesis, I will share the definition put forth by the DigEuLit Project (Martin and Grudziecki, 2006):

Digital literacy is the awareness, attitude and ability of individuals to appropriately use digital tools and facilities to identify, access, manage, integrate, evaluate, analyse and synthesize digital resources, construct new knowledge, create media expressions, and communicate with others, in the context of specific life situations, in order to enable constructive social action and to reflect upon this process.

Educator, Doug Belshaw, recognized the importance of not just defining, but also scoping the literacy required to maximize and optimize the use of the advanced technologies in the digital and social era. Belshaw (2014) discovered previous digital literacy or other various interpretations of new media literacy definitions confining and too prescriptive. As outlined in his book, based on his Ed.D thesis, Belshaw (2014, p. 26) introduced a framework of eight essential elements of digital literacy that placed an emphasis on the recognition of multiple literacies that are context-dependent and “need to be co-constructed to have power.” Belshaw cautions the reader to find the right balance of these elements. He (2014, p.p. 43-44) says:

These elements are like ingredients – and you need to come up with the recipe. Just as anyone wishing to bake bread is going to need flour, water, yeast and heat, so to

develop digital literacies you're going to need to develop skills, attitudes and aptitudes in the eight areas I outline below:

1. Cultural
2. Cognitive
3. Constructive
4. Communicative
5. Confident
6. Creative
7. Critical
8. Civic

In some contexts, some of these elements may need to be privileged above others.

What might these elements look like from the point of view of museum employees looking to develop a digital confidence capability? The following is adapted from Belshaw's (2014) framework:

- **Cultural:** As a museum employee, I am aware of the social norms, values, and codes specific to my role and how these might impact my use of the digital technologies supporting my institution, so that I can immerse myself and seamlessly move across these digital environments.
- **Cognitive:** As a museum employee, I recognize that I need to hone the digital skills required to master a plethora of digital spaces including devices, software platforms, and interfaces, so that I can continuously stay-up-to-date on how to best apply the features and functionalities of the technologies required in my role.
- **Constructive:** As a museum employee, I have developed the digital skills required to master a plethora of digital spaces including devices, software platform, and interfaces, so that I can effectively use these technologies and continuously build, reuse, and adapt the resources created with this use of these technologies.

- **Communicative:** As a museum employee, I know, understand, and can apply the cultural norms of my institution, so that I can communicate purposely and effectively using digital technologies.
- **Confident:** As a museum employee, I take ownership of planning a continuous learning program to build a better understanding of the interrelationships of the digital ecosystem, so that I am able to solve problems and capitalize on the features and functionalities of any digital technologies required for my role.
- **Creative:** As a museum employee, I understand the processes, procedures, and systems supporting digital technologies required for my role, so that I can contribute something of contextual value for myself and museum.
- **Critical:** As a museum employee, I am able to reflect on what has influenced me, as well as, how I have influenced others, in my own literacy practices, so that I can structure and deconstruct texts.
- **Civic:** As a museum employee, I realize I have the ability to develop or consume content with the purpose of driving public engagement, democracy, and global citizenship, so that I can use digital technologies to connect people to one another, self-organize and participate fully in society.

Even more recently, digital strategist, Elizabeth Marsh (2018, p. 2), developed the Digital Workplace Skills Framework to measure the ‘Digital IQ’ of the organisation as a means to gauge insight into the workforce’s digital readiness, determine areas of prioritization and investment of skills and interventions, and measure the progress of the workforce’s understanding and practice of digital skills and attitudes. To support the creation of this framework, Marsh (2018) cited several studies conducted over the past decade of which all studies found that when a company invests in digital literacy development, the organisation has a more favourable technology adoption outcome, and similar to the findings of Belshaw, organisations realized digital literacy development is not a one-size-fits-all approach and that all groups of employees require contextual or nuanced skill building. The Digital Workplace Skills Framework (Marsh, 2018) is comprised of four overarching areas and sixteen sub facets (Figure 16).

The Digital Workplace Skills Framework

Using the digital workplace	Establish	The basic skills to use digital workplace devices and applications. Awareness of what is available, how to use it, and how to get help and support.
	Safeguard	Awareness of potential risks and issues relating to digital environments and understanding how to manage them in order to safeguard both individuals and the organisation.
	Optimise	The skills for employees to optimise their personal digital working environment in order to maximise productivity.
	Innovate	Leverage digital workplace tools and resources to come up with novel or innovative ideas, solutions, and ways of working.
Process & apply	Access	The ability to formulate a clear information need, navigate across disparate sources, and gain access to needed resources.
	Evaluate	Critically evaluating retrieved resources and interpreting their meaning in a range of formats.
	Assimilate	The ability to process a large amount of data and information from a range of sources for present and future use.
	Apply	Leverage the acquired information to perform day-to-day tasks and responsibilities as well as innovate.
Create & connect	Create	Create new resources in a range of formats, either from scratch or by re-mixing existing digital artefacts.
	Communicate	Communicate in the digital workplace using the most appropriate tools and in a manner that is suited to the audience, context, and channel.
	Relate	Establish an appropriate digital identity and use social tools effectively to connect with colleagues and build a network.
	Collaborate	The skills to work productively and effectively with others as part of a virtual team or community, including establishing trust and shared ownership.
Think & adapt	Attend	The ability to manage cognitive load in context of multiple real-time inputs and large quantities of data and information.
	Flex	The ability to work flexibly, independently and effectively by adopting tools and work practices that support both productivity and wellbeing.
	Learn	The skills to make the most of a range of learning opportunities in the digital workplace from personal learning and informal resources through to more formal mechanisms.
	Reflect	Being aware of one's digital practices, reflecting on what works well and identifying opportunities to enhance them.

Figure: 18: The Digital Workplace Skills Framework (Marsh, 2018).

There are numerous definitions, models and frameworks to document the new combinations of skills and understanding professionals may need in the 21st Century, regardless of industry or geographic region. Ultimately these structures are attempting to define what good means for users and stakeholders, so that scaffolding may be put in place to support the path to construct the desired meaning or outcome. When there is no such scaffolding in place and without a clear understanding of outcome, undesirable results may occur that could have otherwise been prevented with strategic planning and through continuously checking the pulse of critical understanding of desired skills. There is an inclination to simplify the complex, so the user—in this case, the museum professional or museum planner—is not overwhelmed by the numerous steps required to construct the scaffolding needed to contribute to the museum visitor experience. Information architect, Abby Covert, argues that complexity is a necessary state when trying to make sense of data management activities. Covert (2014, p. 17) states there are three types of complexity:

1. A common complexity is lacking a clear direction or agreeing on how to approach something you are working on with others;
2. It can be complex to create, change, access, and maintain useful connections between people and systems, but these connections make it possible for people to communicate; and
3. People perceive what's going on around them in different ways. Differing interpretations can make a mess complex to work through.

The business tools recommended in this thesis construct the scaffolding to make sense of such complexity by forming a common language, agreeing on how these terms are applied in numerous circumstances, consistently interpreting this information. In the process of creating this scaffolding, it is possible to identify not just the inputs making up the structure, but also to spot what information and support is missing from the structure. This understanding is needed to begin to demystify the complexity of any major change effort and increases the digital literacy and confidence of the cultural institution.

In early 2018, the United Kingdom's State for Digital, Cultural, Media and Sport released a report with the bold title and claim: *Culture is Digital*. The report (2018, p.1)

champions the urgency of digital transformation by stating its benefits: “Digital technology is breaking down the silos between the cultural sectors, blurring the lines between disciplines – theatre blends with film; computer programming merges with sculpture.” Whilst this thesis has laid out the context aligning with the claim and call for action, the examples of institutions coming together across cultural boundaries through digital activities is an exception and not yet the norm in any geography, museum genre, or size museum. I advocate that for this connection of sectors to occur, institutions may need to address the complexities of their own digital transformations and get a sense of their own digital literacy before they can cross-pollinate lessons learned, best practices, or even create something not yet imagined. An institution that is striving or sustaining a maximized or optimized level of maturity across all digital scaffolding categories is cultivating an environment where information is shared, owned by all, and transformed into knowledge by sharing the good, the bad, and the ugly ideas with their colleagues.

The UK museum sector is exploring what constitutes digital literacy and how digital literacy may be sparked and matured within museums as part of the ‘One by One’ Project. This project is a “30 month national digital literacy building project for United Kingdom museums of all sizes and types” and “is funded by the Arts and Humanities Research Council (AHRC), is led by The University of Leicester in partnership with Culture24, and is being delivered together with a range of museums, strategic sector agencies and academic partners” (One by One, 2019). Six museums are participating in this project where the interventions are being tested in the museums, then all digital fellows embedded in those museums will come together once the interventions are complete to share insights and package these learnings into a variety of resources and dialogue to benefit the entire museum sector.

As evidenced in the digital data maturity assessment and follow-up interviews with the museums studied in this thesis, the Mia is clearly the front-runner as a digitally mature institution recognizing the value of increasing the digital confidence of existing staff, which fundamentally alters the talent-mix of the museum and attracts new talent with the skills required to augment the on-going digital transformation (Chapter Seven). Although two of the museums interviewed did not have any training in place at the time of the interview, all interviewees emphasized the criticality of investing in such digital literacy development

beyond those employees supporting digital properties and activities but needed to enable all positions within the museum (Chapter Seven). It is important to note, that like the digital transformation process, digital literacy development is not a one-time event and best results are achieved when the curriculum is continuous, fluid, and contextualized with the stage, not age, of the individual.

8.6. Pathways: There is no single path to digital maturity

Digital transformation may have acceleration powered by advancing technology, but at its core the foundation required for the scaffolding of any transformation is based on change management principles. In a CODE|WORDS essay, director and chief executive officer of the Royal Ontario Museum (ROM), Janet Carding, contends museums absorbed change management principles in the 1990s at the peak of their business management application, but museums have been unable to practice these principles in the digital age. Carding wrote this joint-essay documenting the change management initiatives undertaken at the ROM with museum strategist, Katie Paul-Chowdhury, and shares how museums can build the capacity for innovation and adaptation. Carding (2015, p. 137) says, “I don’t think we’ll create museums that are appropriate for the digital age without changing our organisational cultures and how we work” and continues by saying (2015, pp. 139-140), “But to deliver successfully on a new strategic direction also requires accompanying change inside the museum in the behaviour, priorities and processes used by the staff and volunteers.” Change management has no one prescribed path, rather there are multiple pathways to an evolved and enlightened organisation.

Similar to the concept of digital literacy, change management has been interpreted through various frameworks and models. The model Carding references in her CODE|WORDS essay was conceived of by business management theorist John Kotter (1995, p. 7) (Table Seven). Whilst, Carding (2015, p. 140) believes museums may benefit from using the model, she advocates the application of these principles are not prescribed, linear or occur as a singular event. She (2015, p. 141) says:

It is true that in recent years strategic planning has often been more participatory with cross-sections of staff involved in visioning workshops, and project teams set up to support implementation, but even so *the idea that there is an endpoint to the*

change, a desired future state that can be achieved after-which everyone goes back to their day-day jobs seems increasingly old-fashioned (emphasis her own). Some commentators on Kotter's approach (such as Ashkenas, 2015) have pointed out that change is not finite and then institutionalized, but more continuous, and have encouraged more experimental, collaborative approaches at every stage.

And, analogous to the business management tools of maturity models and scenario planning, these change management principles are not necessarily activated in a sequential order. This non-sequential activation does not jeopardize the results. The principles are dependent on the contexts, inputs, and outputs particular to the museum.

Eight Steps for Successful Large-Scale Change		
Step	Action	New Behaviour
One	Increase urgency	People start telling each other, "Let's go, we need to change things!"
Two	Build the guiding team	A group powerful enough to guide a big change is formed and they start working together well.
Three	Get the vision right	The guiding team develops the right vision and strategy for the change effort.
Four	Communicate for buy-in	People begin to buy into the change, and this shows in their behaviour
Five	Empower action	More people feel able to act, and do act, on the vision.
Six	Create short-term wins	Momentum builds as people try to fulfil the vision, while fewer and fewer resist change.
Seven	Don't let up	People make wave after wave of changes until the vision is fulfilled.
Eight	Make change stick	New and winning behaviour continues despite the pull of tradition, turnover of change leaders, etc.

Table 7: Eight Steps for Successful Large-Scale Change (Kotter, 1996).

In Chapter Two, I laid out the previous five decades of museology in the digital era through the lens of a hacker or change agent. It was at the dawn of the digital age when Stanford University computer scientist and head of the Institute of the Future, Roy Amara, (Ridley, 2017) was cited as saying, “we tend to overestimate the impact of a new technology in the short run, but we underestimate it in the long run.” Business and science journalist and author, Matt Ridley (2017), writes about the hype cycle deriving from Amara’s Law and warns, “Forecasting technological change is almost impossibly hard and nobody—yes, nobody—is an expert at it. The only sensible course is to be wary of the initial hype but wary too of later scepticism.” The impact of Amara’s Law is being used to forecast technology lifecycles, such as the Gartner Hype Cycle. Museums need not be on the edge of discovery or use of any emerging technologies; however, the institution can set itself up to be a porous organisation and scan the ecosystem outside of its physical walls for digital innovations that it can bring inside the museum to interpret, reuse, remix, and adapt to increase the relevancy and stability of the museum. Museums are called to push past the edges of their current reality. Using the digital data maturity matrix and scenario planning exercise, museums can move from static and status quo strategic planning, question the what and how and for whom, and use these tools to continuously inform the potential paths the museum may take to progress its goals, while not losing sight of the cost of change management, required resources, and community impact. The interpretation of these business management tools informs the arrangement or sequence of paths towards digital data maturity and overall digital maturity.

There are many tools museum professionals may use to aid their strategic management navigation, but the lesson from the ROM included in the CODE|WORDS essay, and what may be deducted from the museums examples and museum staff interviewed in this thesis, is that museum tools may be more effectively understood and wielded if the museum is influenced by a diverse set of perspectives from inside and outside the museum and is biased towards a test-and-learn approach using the tools, rather than a set-it and forget-it strategic plan implementation. In all of the literature reviewed for this thesis and corresponding fieldwork, the ever-present goal for museums of all shapes

and sizes across the globe make a show of becoming “digital”. The process of becoming something other than what cultural institutions were or presently are, is the very act of transformation. Becoming digital may begin with the digitisation of museum collections or it may begin through the comprehension of the collection and use of its collections, facility, development and visitor data.

As evidenced in the digital data maturity assessment and follow-up interviews with the museums studied in this thesis, each museum has taken a different path to digital maturity. Whereas the Mia and PEM have the strategic imperative and capacity to plunge into many of the digital data maturity categories and levels simultaneously, the MAH chose a more focused approach and building their maturity layer-by-layer. The business management tools featured in this thesis assist in the development of a museum’s strategic plan by defining the what to aspire to and how the museum will chart its path towards that destination. Just as there are multiple ways to navigate a city for the quickest route to one’s destination or to avoid potholes or traffic congestion, so too can a museum manoeuvre and plot several paths to the digital museum of now and the future.

8.7 In summary

In a series of interviews with museum professionals speculating about the *Museum of the Future*, Chris Deacon, former director of Tate Modern London (Deacon as quoted in Baldessari *et. al.*, 2014, pp. 74-75), said:

The more artworks become digitally available, the more people will want to visit museums, paradoxically enough; they want to find out what the presence of that one strange object between other strange objects could mean, and how and why a curator or a collector decided to put them together. So we need stories. The future museum will no longer be about the new and the newest, it will be the perfect site for a combination of things.

No matter the museum location, number of employees, type of museum, or funding paradigm, all cultural institutions are being challenged to create connections betwixt and between the roots of the museum model and the plausible, possible, and probable futures of the museum that include the interpretation and use of emerging technologies. The museums

selected to test the digital data maturity matrix may have been US institutions, however I contend that similar to the global application of the business management tools featured in this thesis, every museum may use the digital maturity matrix to take a snapshot of their data collection and use the tool and scenario planning exercise to jumpstart conversations and actions to inform and further their overall digital maturity strategy.

In Chapter Three, I introduced the concept of the museum ‘terroir’: “the contextual characteristics unique to a certain place that influence and shape its character...For cultural institutions, ‘terroir’ might, therefore, be attributed to the type and size of the museum, its visitor demographics, its physical location, and all forms of media.” A museum’s terroir is cyclical; it begins and ends with the *pollination* of ideas, information, and knowledge within the museum and extends to and with the *panoramic* view of the museum’s community ecosystem. When museums embrace the *paradox* of accelerating change and innovation with traditional business management tools tested in the private sector, *personalized* museum visitor experiences powered by integrated technology *platforms* may yield many *pathways* for a museum to realize digital maturity. I refer to the collective elements impacting the museum’s terroir, the 6Ps.

The 6Ps are transient: they change over time, may involve using different tools or developing different habits of mind, and almost always depend upon the individual context of the museum. The business management tools recommended in this thesis may be used to construct the scaffolding of digital transformation and this structure may evolve with the museum’s use and understanding of these tools, but to achieve greater impact, digital maturity involves more than training of tools, it requires a discerning museum to continuously build the capacity of critical thinking into a digital evolution created by and for its employees and community. By deconstructing how data is collected, used, and flows within the museum and community ecosystem, a museum may commence a larger study and evolution of its digital strategy.

As in the case studies featured in Chapter Seven, the findings of the digital data maturity snapshot may be categorized by four of the 6Ps: personalization, platform, panoramic, and paradox. The first category of *personalization* infers the museum is focusing on micro and hyper-local relevancy that may or may not be scalable. The second category, *platform*, and means the museum is honing and expanding digital skills and

literacies though connected systems and services. The third category of having *panoramic* view is the concept of the museum taking an integrated-first technology and services approach to build a holistic ecosystem of people, collections, and events. The fourth category, *paradox*, surmises persistent paradoxes of change are accepted and viable options are explored and baked-into the museum's digital data strategy, allowing the museum to evolve with or within multiple scenarios.

Museums may find they have a dominant categorization shaping their internal view and decision-making. It may even be discovered through the completion of the digital data maturity matrix and scenario planning exercise that this dominant view may or may not have been strategically honed. Information architect, Abby Covert (2018, p. 65), recommends expanding the resources an organisation uses to make sense of any complex effort. She says, "The more diagrams you get to know, the more tools you have. The more ways you can frame the mess, the more likely you are to see through to the other side." The tools are not a prescribed path or solution, but a way for any museum to challenge assumptions and identify a path—or several—to meet the strategic needs of the institution and its community. The tools initiate the development of a common language for museum staff to understand the challenges and proposed solutions. This common language or rhetoric stimulates internal conversation that may lead to increased connectivity and pollination of ideas within the museum.

The evolution of a museum's management style and institutional culture does not have to be an incredibly slow or hierarchal process when these tools are owned, known, and activated by every museum employee. Through the assessment of data, museums may begin to address the many variables impacting overall digital maturity. Any one individual or team does not own a museum's data; rather, information is gathered and interpreted by multiple museum professionals for a multitude of reasons. What museums are currently lacking is a way to map all of the museum's data inputs and outputs, and then find the connections between this information and turn the data into knowledge that can be shared within the institution. If museums are able to baseline digital data maturity within their own institutions and effectively discern how the data is impacting the museum's terroir, museums may begin making data-informed decisions increasing the likelihood of sustainable community relevance.

The aim of this thesis is not to advocate that any single museum has a lock on digital data or even digital maturity. Nor is this thesis meant to provide out a step-by-step approach to achieve digital data maturity. The MAH is addressing digital data maturity at a hyper-local level. This embodies the core ‘P’ of *personalization* because the MAH’s focus is on creating relevance in the physical environment and exploring how this experience or insights from this experience may inform the digital ecosystem architecture and experience. The MAH is hiring external, non-museum talent to develop a *platform* approach enabled by connected digital data architecture.

Mia is another good example of the categorization of a platform approach because of the Museum’s determination to get the scaffolding of governance, management, and processes right at the start of their digital data journey. Mia also exemplifies the secondary ‘P’ categorization of *panoramic* due to the intense focus on the digital literacy growth of Museum staff and overall institutional goal of increased digital confidence. In contrast with the MAH, PEM’s digital ecosystem building through the concurrent implementation of an enterprise CRM, DAM, and CMS demonstrates the core ‘P’ categorization of *panoramic*, because while it may be in the infancy of tool and process maturity, the PEM has the opportunity to bridge disparate systems with a holistic vision, goals, and metrics. However, similar to the MAH, PEM recognizes an added need to build out the secondary ‘P’ categorization of *personalization* by leapfrogging segmentation tactics and focus to personalize visitor experiences with a holistic digital ecosystem. With an outside-in approach, PEM is positioning itself to be able to collect and use data to make decisions at a macro and micro-level.

The emphasis of the Mia’s evolution from segmentation to personalization epitomizes the core ‘P’ categorization of *personalization*. The secondary ‘P’ categorization of *panoramic* illustrates the intense focus on Museum staff digital literacy growth and overall institutional digital confidence. Mia’s digital data readiness demonstrates the power of a systems-thinking behaviour positioning Mia as proactive institution learning from and building upon knowledge gained.

None of the museums selected to test the business management tools featured in this thesis represent institutions perfectly designed to listen, adapt, and respond using the museum’s data. For the purposes of this research, each museum represented a core and

secondary 'P,' but to achieve maximized or optimized maturity, all elements of the museum's terroir require continuous attention and adaptation. The elements work better together, rather than in isolation. By conducting the digital data maturity matrix and constructing innovative approaches, any museum can test, learn, and optimize in plausible, possible, and probable futures, thus shifting away from one-directional data collection and use. Instead, the museum may begin to develop the skills needed to allow for data to flow inside and outside of the museum. The museum may learn from and build the capacity of adaption and innovation by viewing data within a feedback loop and as a conduit to strengthen the nourishment of a museum's terroir. In the process of strengthening its own digital maturity backbone through the assessment of data collection and use, a museum may begin to build a common language to understand how, why, and when technology has been adopted and adapted within the museum. This common language may result in the creation of an organizational memory, so that data collected and used, as well as why such data is collected and how it is used, is codified for future generations of museum professionals. The museum may begin to recognize how data, information, and knowledge is cultivated in its own ecosystem, and through continuous assessment, may begin to understand and nurture its own data terroir. Such assessment may also allow the museum to reflect on how data aids in the perception of how the museum is placed within the larger digital ecosystem and community relationships. Such consideration is continuous and is built through the adoption and adaption of new business practices and processes. This assessment is not only aided by the museum's use of business tools, but also, in how ideas, practices, and processes are spread or pollinate from one individual and one museum to the next to improve the global museum ecosystem.

Chapter Nine:

Conclusion

In this thesis, I have focused on the question of determining if there is one path to digital maturity for museums. The simple answer is no. Just as there are numerous ways to navigate through a physical city—taking short cuts or the scenic route—so there are also multiple paths to manoeuvre through the digital ecosystem. And, every move made, every twist and turn, has consequences. Digital efforts championed by innovative thinkers and change agents may not get the traction needed to support the investment. Museums may miss opportunities to determine and make connections between the institution and community if new technologies are not integrated with legacy systems. Without such connections and insights fuelling data-informed decisions, museums of the present and future may be unable to bridge the physical and digital institutions or offer a plethora of new visitors and visitor experiences. The role of the change agent or hacker in combination with the significance of the museum's terroir and the influence of social power and inclusion are required to make sense of disparate digital ecosystem.

Would it not be helpful if museums had a tool similar to that of the Waze application used to navigate the congested traffic of a busy city? Only in this case, the tool or tools would help a museum professional navigate the rapidly changing digital landscape and make strategic decisions impacting museum operations and visitor experiences; all based on data gathered by the institution and global museum sector, shared real-time best practices and lessons learned – all while saving the museum and its staff time and money in their technology investments. It is possible. And the business management tools already exist and have been road-tested by the private sector. There is an opportunity to continue to test and put these tools into context for the museum sector.

Digital maturity has multiple dimensions, however I chose to focus on data to slice across all dimensions and gauge overall digital maturity. To further ensure this research

was manageable, I chose to test the model in three museums in the United States of America. Digital maturity is achieved when all aspects of the digital ecosystem are understood and operate as a system (Figure Four); maintained and optimized (Figure Seven); monetary investments and resources are prioritized by offering expanded personalized experiences, well understood and used platform ecosystem is designed, legacy technologies are integrated with emerging technologies, and persistent paradoxes of change are accepted and viable options explored and baked-into the museum strategic goals (Figure One); and finally, innovation is cross-pollinated within the institution and community to allow for multiple pathways to set-up a successful digital transformation journey (Figure Three). Collectively, these elements (Figure 16) contribute the museum's unique terroir or signature—it is the way museums can more effectively build their brand and become increasingly more relevant to visitors and communities (Figure Two).

9.1. Change and transformation

To set the context for and support the urgency of this research question, I began by chronicling the previous five decades of digital within museology through the lens of a hacker (Chapter Two). In this thesis (Raymond, 2001, p. xii), when referring to a “hacker” the descriptor does not refer to cyber criminals, but “in its true and original sense of an enthusiast, an artist, a tinkerer, a problem solver, an expert.” These individuals and their underlying culture have changed the way people relate to and reshape their idea of a museum. To understand museum evolution in the digital age, I documented the progression in museology by those individual big thinkers or change agents that shaped how museums are implementing digital activities. Some of these people are well known as stewards of cultural heritage -- others are less familiar or even anonymous change agents. This chapter attempts to answer who drives digital maturity in museums and how one may apply the creative thinking of a change agent to how museums capture and classify collections, visitor studies and other museum information.

As documented in this select historical view of museology, museums are integral in the aggregation, interpretation, and development of societal culture as evidenced in the works by Peter Samis, Richard Sandell, David Williams, John Falk, George Hein and others. Such duty and representation require constant input into the community and understanding of the museum's constituents. A number of anxieties have plagued the

museum industry over the past several decades. Fear of technology investment, fear of technology becoming obsolete before there is a return on investment, fear of automated systems replacing the museum professional, and countless other reasons that have prevented museums from experimenting with new methodologies and systems. To continue relevancy, or the examination of relevancy, hackers or change agents may be a keystone species needed for museums to test-and-learn new approaches to challenge their place in the community.

For optimal growth a museum's knowledge base is not static and is continuously restructured for increased storage and application. The world's political and social contexts are continuously changing and impacting the life and times of cultural institutions. Museums are knowledge structures and in the 21st Century, these institutional cultures are continuously evolving or, in some cases, reinvented. Some digital strategies and innovations will not be successful. Hackers learn from these failures and use these lessons learned to construct more successful outcomes.

Like the constructivist museum, hackers are the students constructing "knowledge as they learn; they don't simply add new facts to what is known, but constantly reorganize and create both understanding and the ability to learn as they interact with the world (Hein 126)." Hackers embrace and encourage the unfamiliar and the new. Fear may paralyze movement, but it will not stave off the tear down or erosion of out-dated institutional organisation design. In this chapter, I advocated museums' need to look to the care and nurturing of hackers for the continued evolution of our cultural institutions. The hacker or individual change agent does not need to exist for change to occur, but history has shown these professionals spark an organisation's activities.

While this chapter introduced the concept of a museum hacker as a way to showcase the digital achievements of the cultural sector, this research does not delve into or assess how or if organisational change is maintained once activated by a museum hacker. This may be an area for further research as either an influence on data management or overall digital maturity.

9.2. Environment and context

In the second of three context-setting chapters (Chapter Three), I explore what constitutes digital maturity in the museum through the examination of how data is collected

and used. It is through data that museums may discern visitor behaviour and form a connection with the visitor resulting in an enjoyable and repeatable museum experience. This chapter considers how cultural institutions may begin to think about ‘big data’ in the context of the experiences, best practices, and scholarship developed outside of the cultural sector. This chapter presented examples of how some museums are responding to the necessities and opportunities of big data to mine for information about their visitors through new forms of media and take the time and resources to understand the wants, needs, and challenges of the communities they serve. With the knowledge of the power of ‘big data’ and its rapid growth, museums can adapt or adopt communications personalized for unique cultural experiences. These examples exemplify how museums can learn from the historical study of informatics and from each other to look towards a future where cultural institutions may manage their own growth curve through introspective study and predictive data modelling.

This chapter introduced the concept of information ecologies and how museums may use this theory to conceptualize how visitor collection data and museum media might be seen as, in essence, the ‘terroir’ of the museum. Drawing from the maturing scholarship of ‘information ecologies’ (Nardi and O’Day, 1999) amongst other researchers and business pioneers who are transforming data-informed analytics, the approach here was to present how organisations have been, and are still, challenged with the technology and conceptual frameworks and language circulating around ‘big data’. Here, ‘terroir’ was defined as the contextual characteristics unique to a certain place that influence and shape its character. In agriculture and ecological terms, a ‘terroir’ is the soil, the topography, and the climate, that collectively give produce grown there a particular characteristic. For cultural institutions, ‘terroir’ might, therefore, be attributed to the type and size of the museum, its visitor demographics, its physical location, and all forms of media. Collectively this information produced within the museum may potentially be a big data set and is influenced by external variables that may or may not be within the museum’s control.

This chapter also attempted to outline the process of defining actionable insights from raw data. Big data is not limited to big museums. Any size cultural institution may benefit from the understanding of its current data landscape. Once the museum has taken

the first step to clarify the ‘single source of truth’ of data collection and how the museum uses this data, the museum may move to the second step of the process and craft smarter experiences. To better understand visitors and act on this data, museums may need to visualize what the information is and find ways to communicate the impact of this data to internal and external stakeholders. Once a structure and data collection and use routines are established, the museum staff is then freed up to experiment the possibilities of what they can learn from this data and explore innovative and relevant exhibitions and communication initiatives. No one individual or department can take on the burden of solving for all steps by themselves. Instead, as new methods are explored, information policies revised, and technology evolves, knowledge must be documented and continuously updated. It is this last step that is the most vital to the success of the museum. By sharing the research context, successes, and failures, museums can expand and enhance their data skills and capability, allowing museum staff transition into new roles, and new staff – without any such background – can step into the museum and be able to learn from the organisational memory.

The five steps may be acted upon in sequence or in parallel to build a data-informed culture, test and learn different engagement approaches, and share valuable visitor behaviour across the organisation. Having access to and investing in the analysis of all types of data moves museums into taking actions based on what people want to see and do in their spaces. It was an excerpt of this chapter and the five steps that was published in *The Routledge Handbook of Museums Media and Communication* (Drotner et. al., 2019). This chapter in the *Handbook* sits alongside 24 other chapters exploring how museums are evolving and grappling with emerging technologies across media and communications—in a similar way that this research uses data as a proxy to establish overall digital maturity.

For the future of communication and media use in the museum, big data represents a new way for museums to learn from each other. However, like information ecologies, the terroir of the museum results in many and unique data types and sets, requiring time, patience, and constant cultivation. New forms of media and communication are generating new forms of data, and it is data, which can be leveraged and harnessed to give insights into visitors. Data yields a number of interpretations or stories, and it is up to a museum to take the time and resources to understand the specific wants, needs, and challenges of the

communities they serve. Knowing and understanding visitor behaviour and analysing in real time, yields insights that can be promptly used. In order to take advantage of this opportunity of big data, museums are confronted with acknowledging and understanding these new or newly combined datasets are part of wider information ecology. With the advent of big data opportunities, museums have the opportunity to challenge scholarship, reach into the past, and build on the questions originally posed by various museum professionals to look and think forward about how data is structured and shared amongst museum professionals. Museums now have the power to determine how visits to their institutions can become magical and repeatable experiences.

9.3. Experience and provision

In the final of three context-setting chapters (Chapter Four), I answered why data maturity is important to museums by depicting how data may connect and broaden the physical and digital visitor experiences and provide the museum the information needed to orient itself in an ever-changing edutainment landscape. The museum is a part of the physical community landscape and imbibed through the hearts of minds of many who walk through its physical or virtual doors as evidenced in the works by Elaine Gurian, Gail Dexter Lord, and Ngaire Blankenberg. The information about the collection and all aspects of the visitor experience comprise the museum terroir – in essence, making data the cornerstone of a museum and its place in the community. Innovators all over the world are building museums for the 21st Century block-by-block. An organisation's terroir is shown to be an essential element for ensuring the museum receives the nutrients from the community necessary for the museum to thrive.

This chapter examined the re-emergence of social inclusion with the popular term, soft power, and uses this understanding to clear away the distraction the term entails and rediscover the cultural institution's foundation. As evidenced by the research and debate of the Guggenheim Bilbao, other small and large museums will be examined to determine if the institutions have a firm meaning within the city they are located and if they have created safe spaces in their physical and virtual walls to intrigue and empower the communities they serve. Any cultural institution has the ability to think small and act big if they pair their understanding of their visitor with the growing definition and engagement of a citizen within smart or data-informed and powered cities.

Site or location of the cultural institution is crucial in determining boundaries and the context between the edges of other communities or hubs. Just as the physical location of a cultural institution contributes to the terroir of the museum, the site location in the digital space is unique and fed by community components and other external factors. The structure itself may be as eye-popping as a star architect design with a slick user interface design but must also be in a state of continuous evolution as new navigation pathways and user behaviour changes are identified. The skin of the online structure must be inviting and easy to navigate or a visitor will be turned off and may miss where the cultural institution buried the knowledge and collections information. The design of the space must be sustainable and efficient, so that it does not become ignored because it is too costly to change.

The working structure of a physical building like communications wiring, electrical wiring, plumbing, and sprinkler systems are mirrored in the online structures in the form of search, online chat, on-demand video, high resolution imagery, community management, and more services required to ensure the functional condition of the online structure. Each area of the online structure requires detailed thought about who is going to access the site and information and why. Just as MAH and the Brooklyn Museum are creating spaces to become more local, inclusive, and working with museum professions to be more aware of space-making through the Space Deck, a key component of navigation and engagement is making spaces for every type of one-to-one and one-with-many interactions. Cultural institutions could leverage the ease of access and design flexibility to offer more spaces and community inclusion in the online structure than the physical space could support and at possibly a lower cost point than physical changes to walls, ceilings, or floors. Last, but certainly not least, the structure is built to hold content. In the physical structure, museums are the home to a collection valuable to researchers and visitors of all interests and contexts. The value of the content must be just as focused and valuable in the online structure. Simply digitizing a collection is no longer a significant value draw as more cultural institutions make their collections available online. Museums must think about how they can layer value upon what exists. This may take the form of user generated content or open museum concepts like those explored by the Brooklyn Museum.

A connected world is an opportunity to extend a museum's influence into a space not constrained by geographical boundaries, but the limits of one's own imagination. New

York's Metropolitan Museum is hyper aware of its tourist attraction in the virtual world and how this part of the museum's community may never experience the physical space. Through a combination of traveling exhibits and strategic community engagement and content strategy, The Met is greeting people and captivating audiences at the virtual doors of its museums. The museum has 6 million onsite visitors annually and has a reach of 92 million people through its Facebook page (Lord et. al 106). The Internet is the ultimate centre of innovation. Cultural institutions can now influence behaviour using persuasion, attraction, and agenda-setting in a parallel setting in the online space and cultivate new social offerings, openness, and attract tourists with strategic organized online hub collaborations. The digital ecosystem and complimentary online structures may assist cultural institutions in reconnecting with the public and demonstrate their value and relevance in contemporary life.

9.4. Applying road-tested business management tools in new ways within museums

This thesis aimed to address if overall digital maturity could be gauged through the understanding how a museum collects and uses data. The framework I chose for the fieldwork was based on the maturity models established to assess business management processes and take a more dynamic approach leveraging real-time streams of data to identify and increase visitor interactions with their museum's collection, staff, or greater visitor community. To benefit from applying the featured business management tools, I proposed the blending of the expertise of industry analysts with academic rigor and offer museum professionals adaptive methods for team and technology organisation and workflow. Chapter Five set out to propose how museum professionals may use for profit business language and tools, in easy to understand, actionable steps, to assess their digital maturity and develop a strategy to assist the cultural institution to master the increasingly complex data-driven landscape.

Using information gleaned from the adapted business tools, I hypothesized that we will begin to see the missing pieces of the visitor engagement experience within the digital ecosystem and outline a plan to work towards solving for those opportunities and pursuing additional academic study to assess the role of analyst experience and tools in use in cultural institutions. The ultimate goal of this research was to identify gaps within the data collection process and solve for an integrated model to collect and analyse data for greater

insights into visitor behaviour within the museum walls and the digital ecosystem.

The digital data maturity model is one of two key business objects cultural institutes may apply to better understand the current state of governance, tools, processes, measurement, and community integration. No matter the type of organisation, to increase maturity through awareness and consistent practice within each category is not simply a matter of checking a box. An organisation needs to factor in the drivers, uncertainties, trends, cycles, and choices of many potential futures to plan best next actions aiding in the growth and development of the organisation within each category and capability. The second key business object proposed as part of this research to compliment the maturity matrix is a framework for scenario planning (Chapter Seven). Traditional strategic planning fails to capitalize on the unpredictability of the future, whereas scenario planning consists of constructed strategic responses across multiple possible futures. Scenario planning is a step towards advancing more consistent agile outcomes and cohesive digital transformation.

Perhaps the change agent or hacker mind-set is able to initiate the digital maturity assessment process, but how does the museum sustain continuous conversations and planning to keep the system from becoming stagnated? Scenario planning adds a dimension of contextual relevance to imagine new advantages of the system and outcomes of combined variables. Narratives highlight the links between quantitative and qualitative data within the whole digital ecosystem. To harvest business value, museum planners need to consider how to sow the seeds of change and make data-informed strategic business decisions with information that is consistently analysed, understood, used, and converted into institutional knowledge. By using the maturity model, scenario planning, and systems thinking frameworks the museum may transform its data collection and use to advance organisational goals.

Employing the two business objects of the survey and the scenario planning framework, museums of all shapes and sizes do not have to win the employment lottery with a hacker or a futurist and may perhaps begin to address and build these skillsets and business object deployment into all departments. Cultural institutions cannot simply appropriate the business objects of others but adapt the objects to address the unique quirks of cultural institutions. By knowing the strengths of our actors and actions, institutions can

better gauge the impact of perceived weaknesses either created by internal factors or experienced as a result of external factors.

9.5. Case studies

This thesis takes a snapshot in time of the digital data maturity of three small-to-midsize art museums across the United States to identify how all museum data are preserved and if any trends, patterns, and connections are recognized in the technology used, business insights, volume of repeatable experiences derived from data, and how or if the data is connected to or impacts the museum's physical and virtual environments. The research was collected over a period of four months and includes museum staff interviews about data familiarity and use, existing technology mapping exercise, and assessment of community impact through socioeconomic and visitor engagement criteria. A follow-up interview took place with all the museums about the status of their digital data goals and introduced the scenario-planning framework as a means to deconstruct and project the progress of the maturity assessment.

Prior to verbal interviews and electronic status updates, each museum completed a data collection and use maturity analysis across six categories: governance; tools; community; management; metrics; and processes. Each category consists of capabilities scored on a maturity scale of 0-5 (0 being non-existent solutions or capabilities and 5 being optimized solutions or capabilities). Each capability was then given a second maturity score with a red, yellow, or green indicator (red meaning the capability maturity statement was not true; yellow meaning the capability statement is somewhat true; and green meaning the capability statement is accurate).

The three museums selected for this thesis research employ a change agent or innovative group of talent and is a good representation of size and funding models of art and history institutions across the United States of America. These three museums (in order of interview schedule) include the Santa Cruz Museum of Art and History, the Peabody Essex Museum (PEM), and the Minneapolis Institute of Art (Mia). The objective was not to compare the three museums to each other; rather, to document the differences in staff, budgets, technologies, and strategic goals to assess the possible, multiple pathways to digital maturity. Each of their particular approaches to digital data collection and use uncovered insights about how a common framework to manage the challenges of digital

data may be applied to museums of all sizes and types. Rather than testing or analysing the ever-shifting trends of the digital evolution, this thesis and the accompanying case studies tested the self-assessment digital data maturity and scenario planning frameworks.

To better identify trends or patterns in the analysis of the completed digital data maturity matrix and personal interview, I developed four categories to group museum analysis. The category definitions were pre-determined before the analysis; however, the analysis determined how the museums in this thesis were categorized. The four categories are: personalization, platform, panoramic, and paradox (of change). The first category is that of *personalization*, meaning the museum is focusing on micro and hyper-local relevancy that may or may not be scalable. Personalization was demonstrated in Chapters Two and Three where we explored how the focus needs to extend beyond technology per se, but developing our processes and outcomes to reflect the people museums serve. The second category is *platform*, meaning the museum is honing and expanding digital skills and literacies through connected systems and services. This concept was demonstrated in Chapter Three where we explored the five steps that make up a cohesive digital ecosystem and one of the key enablers of such is to think of technology as connected platforms rather than a collection of ad hoc tools. The third category is *panoramic*, meaning the museum is taking an integrated-first technology and services approach to build a holistic ecosystem of people, collections, and events. This category is captured in Chapter Four and then surfaces again in Chapter Eight as we continue to expand the opportunity for museums to consider technology as an enabler versus an end-goal. We saw how important it was to establish community ties with the examples in Chapter Four and again in Robert R. Janes and Richard Sandell's work in Chapter Eight. The fourth category is *paradox*, meaning persistent paradoxes of change are accepted and viable options are explored and baked-into the museums digital data strategy, allowing the museum to evolve with or within multiple scenarios. This concept was clearly drawn from the earlier works of Robert R. Janes and is adopted for further expansion in Chapter Eight as we explore the need for museums to focus on digital literacy versus the technology itself. For each of the museums interviewed for this thesis, I selected a core and secondary 'P' categorization to illustrate the depth and breadth of the work required to achieve any single level of digital data maturity.

The case studies of the three museums are evidence of data being a trend that museums recognize and are in various stages of digital maturity to address data collection and use; each museum finding a different pathway to their state of desired digital maturity. No matter the museum location, number of employees, type of museum, or funding paradigm, all cultural institutions are being challenged to create connections betwixt and between the roots of the museum model and the plausible, possible, and probable futures of the museum that include the interpretation and use of emerging technologies. The museums selected to test the digital data maturity matrix may have been US institutions, however I contend that similar to the global application of the business management tools featured in this thesis, every museum may use the digital maturity matrix to take a snapshot of their data collection and use the tool and scenario planning exercise to jumpstart conversations and actions to inform and further their overall digital maturity strategy. The use of the digital data maturity self- assessment encouragingly points in the direction of further use by museums through the development of other dimensions of digital maturity—when these tools are adapted for the museum context.

In Chapter Three, I introduced the concept of the museum ‘terroir’: “the contextual characteristics unique to a certain place that influence and shape its character...For cultural institutions, ‘terroir’ might, therefore, be attributed to the type and size of the museum, its visitor demographics, its physical location, and all forms of media.” A museum’s terroir is cyclical; it begins and ends with the *pollination* of ideas, information, and knowledge within the museum and extends to and with the *panoramic* view of the museum’s community ecosystem. When museums embrace the *paradox* of accelerating change and innovation with traditional business management tools tested in the private sector, *personalized* museum visitor experiences powered by integrated technology *platforms* may yield many *pathways* for a museum to realize digital maturity. I refer to the collective elements impacting the museum’s terroir, the 6Ps.

The 6Ps are transient: they change over time, may involve using different tools or developing different habits of mind, and almost always depend upon the individual context of the museum. The business management tools recommended in this thesis may be used to construct the scaffolding of digital transformation and this structure may evolve with the museum’s use and understanding of these tools, but to achieve greater impact, digital

maturity involves more than training of tools, it requires a discerning museum to continuously build the capacity of critical thinking into a digital evolution created by and for its employees and community. By deconstructing how data is collected, used, and flows within the museum and community ecosystem, a museum may commence a larger study and evolution of its digital strategy.

Museums may find they have a dominant categorization shaping their internal view and decision-making. It may even be discovered through the completion of the digital data maturity matrix and scenario planning exercise that this dominant view may or may not have been strategically honed. The tools initiate the development of a common language for museum staff to understand the challenges and proposed solutions. This common language or rhetoric stimulates internal conversation that may lead to increased connectivity and pollination of ideas within the museum.

Through the assessment of data, museums may begin to address the many variables impacting overall digital maturity. Any one individual or team does not own a museum's data; rather, information is gathered and interpreted by multiple museum professionals for a multitude of reasons. What museums are currently lacking is a way to map all of the museum's data inputs and outputs, and then find the connections between this information and turn the data into knowledge that can be shared within the institution. If museums are able to baseline digital data maturity within their own institutions and effectively discern how the data is impacting the museum's terroir, museums may begin making data-informed decisions increasing the likelihood of sustainable community relevance.

9.6. Future research and limitations

As previously stated, a future question or research opportunity is assessing how or if organisational change is maintained once activated by a museum hacker or change agent. In each of the museums profiled as a case study to support this thesis, a strong museum hacker or change agent was present at the time the digital maturity matrix snapshot was completed. The impact of a hacker on sustainable digital maturity would be a compelling area to explore. The aim of this thesis is not to reveal that any single museum has a lock on digital data or even digital maturity. In addition, this thesis does not determine the overall state of digital maturity within museums; propose a step-by-step playbook to activating a digital strategy within museums; or follow-up on the completion and impact of conducting a

scenario planning exercise of any of the case study museums; or delve deeper into a museum's activation strategy of any one of the digital data maturity categories. Whilst museums may boast to five decades of digital innovation, the state of digital is continuously changing and there are numerous questions to research and document the manifestation of the 'museum of the future.'

As addressed in Chapter Five, the digital data maturity matrix is a snapshot of the state of museum digital data collection maturity. In this instance, self-assessments and interviews were conducted in 2016. This thesis aims to be submitted in the first half of 2019. During the time of case study research and the write-up of the thesis, many technological and advances have occurred. Change agents have completed tenures at museums featured in the context and case study chapters. Emerging technologies have been added to, changed maturity, or simply fallen off the Gartner Hype Cycle. The museum sector, as a whole, has been impacted by societal developments. In short, there are many areas this thesis could have differed or been expanded.

9.7. In summary

Upon analysing the evolution of overall technology in museums and the impact of data to improve the community and visitor experience, I have evidenced the need for museums to adopt private sector business tools to improve the operational excellence of the museum. After examining maturity models and scenario planning as potential business tools the museum may adopt, I intend to contribute something positive to museum literature to lessen the pain and frustration of museums embarking on their own digital transformations. Whilst my research and analysis has led me to dismiss the idea of a single path to digital transformation, I advocate for museums to expand their digital toolboxes to include private sector, road-tested tools, to assist the museum in determining the path or paths that best suit their quest for digital maturity—and by doing so, museums will begin to understand the human, experiential, and organisational contexts of digital maturity.

None of the museums selected to test the business management tools featured in this thesis represent institutions perfectly designed to listen, adapt, and respond using the museum's data. For the purposes of this research, each museum represented a core and secondary 'P,' but to achieve maximized or optimized maturity, all elements of the museum's terroir require continuous attention and adaptation. The elements work better

together, rather than in isolation. By conducting the digital data maturity matrix and constructing innovative approaches, any museum can test, learn, and optimize in plausible, possible, and probable futures, thus shifting away from one-directional data collection and use. Instead, the museum may begin to develop the skills needed to allow for data to flow inside and outside of the museum. The museum may learn from and build the capacity of adaption and innovation by viewing data within a feedback loop and as a conduit to strengthen the nourishment of a museum's terroir. In the process of strengthening its own digital maturity backbone through the assessment of data collection and use, an outcome may not only benefit the terroir of a single institution, but through common language and consistent practices, museums can promote the cross-pollination of lessons learned and best practice that improve the global museum ecosystem.

Since embarking on this research, I have been afforded the opportunity to publish about the vital need for strong processes and structuring our digital ecosystem (whether museums are handling big or small data). This opportunity and research has opened other doors, including becoming a digital fellow as part of the 'One by One' Project. This project is a "30 month national digital literacy building project for United Kingdom museums of all sizes and types" and "is funded by the Arts and Humanities Research Council (AHRC), is led by The University of Leicester in partnership with Culture24, and is being delivered together with a range of museums, strategic sector agencies and academic partners" (One by One, 2019). As a digital fellow, I am embedded in two museums: Museum of London and The National Army Museum. In both museums, I am using the digital data maturity self-assessment I developed to establish a baseline of digital maturity to inform the development of digital interventions to help build the digital leadership confidence of all museum staff. While the interventions are being tested in the museums where I am embedded, all digital fellows will come together after the interventions are complete to share insights and package these learnings into a variety of resources and dialogue to benefit the entire museum sector. In response to the United Kingdom Department for Digital, Culture, Media, and Sport *Culture is Digital* report (2018), the 'One by One' Project is partnering with The Space, a UK agency supporting arts and cultural sector in using digital media, content, and platforms, to develop a Digital Code of Practice and a Digital Maturity Index for the cultural sector. In my role with the 'One by One' Project, I

am using this thesis and the digital data maturity self-assessment I developed to inform the development of this new tool and any related resources.

When I started this research, the business tools I feature in this thesis may have been used by various change agents or museums, but the awareness of and desire to use these tools was not wide-spread, or for that matter, of use or priority for a national project. This research is not the definitive solution to gauge digital maturity. Rather, this research should serve as one of the many triggers to continue a dialogue within the museum sector about how we effectively gauge and build consistent and cohesive digital activities. The more we know about the data flowing in and out of our museums, the more prepared we will be to participate in these conversations, and test and learn various tools and methods to evolve our use of emerging technologies.

Appendix 1: Fieldwork Schedule

Santa Cruz Museum of Art and History

Interview: 16 September 2016

Letter: 31 December 2017

Email: 25 August 2016; 21 November and 5 December 2018

Peabody Essex Museum

Interview: 27 October 2016

Letter: 31 December 2017

Email: 27 July 2017; 1 November 2016; 21 November 2018; and 25 February 2019

Minneapolis Institute of Art

Interview: 30 November 2016

Letter: 31 December 2017

Email: 18 and 30 November 2016; and 21 November 2018

Appendix 2: MAH Transcript

Interview date: 16 September 2016

Interviewed: Nina Simon, Direct of Santa Cruz Museum of Art and History

The following is a full transcript of the interview:

Lauren V: [00:00:01] What I'm trying to do is I'm trying to get a better understanding of how museums are collecting information. Whether it's just information about their collections but about the people that are coming into the institution, or trying to better understand who's not coming into the institution, who's connecting with the objects, why aren't they connecting with the objects, and how are we making those connections.

[00:00:24] And ultimately we have a lot of systems with a lot of this data and not a lot of them are talking to each other, much less the actual people within the institution talking amongst themselves to get to the heart of these questions.

[00:00:38] So what I'm trying to do is just try to understand just from a data and system's perspective how can we start to make the ties a little bit stronger or better understand where things are breaking down or best practices that museums of all shapes and sizes are employing so that we can emulate that in the systems that we create. Rather than force fit for museums.

Nina S.: [00:01:02] Sure Sure.

Lauren V: [00:01:03] So one of the reasons I chose you is because I do - full disclosure - I do talk about you in the first half of my dissertation having a hacking mindset. About having that innovation to do and a lot of grit to just dig in and dig deep and do what's necessary to have a vision and then to go for it.

[00:01:25] So...

Nina S.: [00:01:26] Thank you.

Lauren V: [00:01:29] So is that something that you actively tried to enlist amongst the individuals that you hire here that you build for your team? Do you ever actively think about that and what happens when you move on? Will this type of innovation - will this type of thinking move on if Nina Simon is no longer here?

Nina S.: [00:01:51] Well I hope so and I think we're doing better and better job at that. I would say that there's been a shift over the last few years here where in the beginning I think the focus really was on that experimental prototyping, trying things out. Being comfortable with hacking what a museum could be. And I think that now I would say that if I had to choose that's not the thing I think is most important to persist. I think that what's most important is where we focus and where we've really grown in our staff over the last few years which is really about respect, curiosity, empathy, and desire to work with

outsiders. And so I think that the, you know it's interesting as you say that I reflect because we've hired a lot over the last few years and I would say that flexibility is important to us and that fits a little into that hacker mindset but more so we're really looking for - are you somebody who cares about the people outside our walls and has walked in the door with some capability and some networks some ability to really engage with those folks. And so I think that's been a little bit of a shift here. I would really encourage you while you're here to spend some time with we just hired a guy two months ago named Jonathan Hicken who's our new head of developing partnerships and this probably plays into what you're doing but we've made the decision that, historically we had a development department that processed and managed data related to people who gave gifts and then we have all these community partners thousands of them literally every year.

[00:03:26] We were kind of managing through spreadsheets or you know various online tools and we started to realize wait a second -

[00:03:31] These are all people who are contributing to the MAH. And there's a lot more crossover between - there's a lot of people actually in both of these categories but they're getting different kinds of communication, different kinds of data tracking over here than they are over here. And so we hired Jonathan and are re-kind of-formulating our development department specifically to focus on how do we create systems to support all of our partners. And he comes from a company called User Testing that's a, like web site you know testing company. And so he's never worked in non-profit before. So in his case definitely you know that whole - his case - He's not just hacker but kind of startup culture element was a really valuable thing to bring in. Although there is some friction between that kind of culture and the activist kind of indigenous advocate kind of culture that has also grown. So that's also just kind of interesting in terms of is tech or terms like hacking aligned with a certain especially in this region a certain Silicon Valley white boy idea about who does that and what and how it helps people slash screws people over, you know the more we have activists on staff the more there's sort of both a desire for systems but also some political suspicion about systems.

Lauren V: [00:04:50] Excellent. And you do address this a little bit in your book when you talk about the measurement.

Nina S.: [00:04:56] Sure. Yes.

Lauren V: [00:04:56] Yes. Towards the end of Art of Relevance, you talk about making the room bigger and not targeting so that it silos more and more people. So how are you taking that mindset and working with this new gentleman to think about the system as a bigger room?

Nina S.: [00:05:15] That is a great way to put it. I think that first of all it starts with the fact that thinking about people - partners who work with us as people - and not in terms of transactions. So not saying a volunteer transaction lives in this world and a dollar transaction lives in that world and we're not going to really engage with you as a human, but instead of saying 'Oh you, Lauren, are human who's excited to be part of the MAH and we actually believe that we're going to raise more - we believe that you will give more, stay

longer, contribute more as a volunteer if you are engaged as a human on multiple levels. And we often find you know, unsurprisingly, they always say this in the arts, right? Donors want to spend time with the artists, right? And it turns out that that kind of relationship goes both ways. And instead of thinking of those as like donor cultivation events - how do you think about both and exhibiting art or artists and the donor as them both being partners? And then how do you create opportunities for partners to get together and get value from each other. So part of it came out of terminologies. So shifting from having different terms for a member or a donor or volunteer or a collaborator to saying these are all partners and we want to empower our partners and then thinking about how do we build a system then that tracks and supports partners where we're looking not at, you know, have you given money time after time but more looking at things like have you engaged in a partnership opportunity over time and things like that. So...

[00:06:44] And it also is coming with a system change for us where we were using Razor's Edge for donation tracking and a handful of spreadsheets for other kinds of tracking.

[00:06:53] And we're now shifting entirely to Salesforce and.

Lauren V: [00:06:56] Very nice.

Nina S.: [00:06:56] And yeah we're excited about that.

Lauren V: [00:06:58] Like the Non-Profit Starter package? Or something more in-depth?

Nina S.: [00:07:02] I don't know, but at the least Jonathan could definitely tell you more.

[00:07:06] I know that we are working with a consulting firm that specifically works with non-profits on kind of creating custom front end installs. And so I think it's on the non profit path but I'm not actually sure.

Lauren V: [00:07:19] Excellent. Yeah. Having full disclosure that was my previous world right.

Nina S.: [00:07:24] Oh absolutely and I think that we have a lot of trepidation.

[00:07:27] We looked at so many CRM systems and we felt like we just were just wanting to engage with these humans and how do we do this. And we were surprised that we didn't feel like the product was in the market. That was, you know, appropriate to our small size.

[00:07:44] And - I am excited about Salesforce, but it definitely feels like it was necessary for us to engage a consultant to help us wrangle a - and and install that is - that doesn't feel like you're going into the deep ocean, but like your source.

Lauren V: [00:07:58] Exactly. That you are not force-fit. Excellent.

Nina S.: [00:08:00] Right. Here's the piece of it that we need.

Lauren V: [00:08:00] That's good news. All right. So let's a little bit into - you do talk a lot about the community - place making piece in your book so a lot of those questions I have pretty much answered, but I would love to know more. You do address it a bit in the book, but do you - are you actively using or do you want to use data, in especially how you're thinking about this new system. Are you looking at it to help you, and I and by no means what I want to say you make all your decisions by data alone, but are you looking to help that prioritize what efforts you are making within the community? What with things you want to put on the prioritization?

Nina S.: [00:08:45] Yes definitely. And we actually have - So we have several different measurement systems not talked about at all in the books, so we have I think you've seen our theory of change right?

Lauren V: [00:08:55] Yes.

Nina S.: [00:08:56] OK so we basically just say, you know, in theory of change you have the activities you do, you have the outcomes in the community and then you have that ultimate impact you want to make. And so what we kind of noted was okay, we're going to do audience and partner serving here.

[00:09:15] So because we can't - you know, we can do activities hopefully to enable you to feel empowered to bridge with people but we don't actually know whether that's happening unless we really survey you. So we have a pretty comprehensive audience and partner surveying methodology that we use here. And then we also have an internal self-tracking and basically at the end of every project or every event staff have to - We tried to get it down to like a 10 minute self-survey that's just - that hits all of our engagement goals around relevance, sustainability, bridging, participation, and ignition, and so that staff are tracking. So for example, we've been focusing a lot on - We have this goal that our community - the community at the MAH reflects the diversity of our county in age income and ethnicity. And fortunately we already match. So this is based on this audience survey, we know that we match on income and we're really close on age. And so the place we really focus is ethnicity and so we're at this interesting place where Santa Cruz County is about 30 percent Latino, about 68 percent white, and like 2 percent other. It's really bicultural and the MAH, when we started this process was also about 70 percent white, but that 30 percent was not primarily Latino. It was about half Latino, but we were basically, for this demographic, in this county, over performing with African-Americans, Asians, Native Americans, and mixed race people, and underperforming with Latinos. So we really said OK, for us to reflect our whole community we have to be involving more Latino people in the work that we do.

[00:10:57] So obviously we can track, you know, in our audience surveying we can ask people, but what we also started doing is on the activity side saying, OK OK we're going to set a rule for ourselves that when you're recruiting collaborators for an event or for an exhibition, here's the threshold that you have to try and hit in terms of what percentage of the collaborators you work with are coming from a Latina X or a Latino background. And so, we actually ask everybody on staff to track that. So, you know, we're working with volunteers to produce a new history journal. How many articles in the history journal were

written by Latinos? How many articles spoke to Latino issues. Similarly, we are creating a third Friday festival. How many of the collaborators were from this cultural background you know about? And so we've been doing - I would say that that's where more than the Salesforce kind of stuff that's been a huge decision loop of us looking at what's happening on the audience side and then deciding based on that, oh this activity we were doing really helped contribute to that that activity maybe not and cutting things out and adjusting.

[00:12:00] I will say that when we started doing all this serving we really had an unrealistic expectation that we were going to have this like magic bullet where like, we can look at you know, like you know, like we all get out and out and it was really funny actually that people who are very are on our team who I think would self-identify as people who are math phobic or tech phobic.

[00:12:23] We're particularly interested in that kind of idea of like, oh data is going to answer a question for us. So, it wasn't that people didn't believe, you know, they weren't suspicious of the data but I think we had unrealistic expectations. For example one thing we really had to learn about was what does it mean to get a representative sample and if we're going to talk about audience shift over time, you can't actually say, like OK Lauren, that event you did last night we showed we had this many kinds of people and therefore X. You know, it's like you have to be seeing over time how things are changing. And we also realize we can't survey every single day of the year. And so I wanted.

Lauren V: [00:12:55] More longitudinal surveys?

Lauren V: [00:12:56] Exactly. So, I think that also shifted in terms of when we talk about data driven decision making, what's the timeframe on which we're making those decisions. And we've found that that's more doable on that three or six month kind of time horizon than it is to do it instantaneously.

Lauren V: [00:13:12] That's great feedback. Okay excellent.

[00:13:16] So for that feedback loop on that audience data, are you capturing that right now other than just paper it's actually in digital format?

Nina S.: [00:13:26] Yeah it's all in digital format.

Lauren V: [00:13:27] Do you have plans on marrying that up to your CRM or demographic information?

Nina S.: [00:13:34] Yes and no. So we're actually we - we also - so we use Survey Monkey as our survey base and we, you know, do - I call it the iPad deployments, so we have a whole bunch of I-pads and it's been pretty easy to train pretty skilled volunteers on. It's important for them to really understand how do you get a representative sample, how do you not have bias in what people you approach. But once you train people on like, it has to be every third person or every person who walks through this door whatever it might be. People have been pretty great at doing that capture. And then we subscribe to this service called Data Hero that sort of a data aggregation system, so we can it can auto pull from

Survey Monkey but it can also pull from Salesforce or from our POS which is where, you know, to be able to say okay, how do attendance patterns match with this mesh with that?

Lauren V: [00:14:28] Right.

Nina S.: [00:14:28] So yes there is some intention about kind of lining that up. I will say that on the partners side we know moving to sales - getting out of Razor's Edge is such a big deal for us in terms of just like getting ourselves out of that black box that I think we haven't even really considered the full scope of what this is going to enable, we just know it's going to be way better and I think also we know that because so many of our staff programmatically spend all their time communicating with collaborators in the community, it's all email. And so it's really important to us to have a sister you know in Salesforce where you can BCC and have that information of like.

Lauren V: [00:15:10] That audit trail.

Nina S.: [00:15:11] And we work with that person on that kind of thing. And so that's that's huge and it means that right now there's sort of a data hierarchy where there's a lot of data about you if you give money and if you are programatic partner it's all living in the informal worlds of these different staff members which I think is kind of a great, you know, metaphor for the problematic way that we treat donors relative to other kinds of partners.

[00:15:37] But I'm really excited to be, you know, capturing and tracking the data together and see where we can go next.

Lauren V: [00:15:44] Excellent. So when you talk about the partnerships with your community are you or do you have any formal data exchanges with any of them?

Nina S.: [00:15:51] We don't although it is interesting that - so one of our one of our favourite partners is sohawken it it's rooted in the sohawken music and dance, but it's really kind of youth cultural pride organisation.

[00:16:07] And when we first - I actually think the story is in the book, although I softened it a little bit of you know this first meeting where they were - we were all, you know, they were real clear this woman, Sullivan, saying that to us: you want Latino people and we want white people and so you know, there hasn't been necessarily a data exchange there, but I think there's been a real and often there's a real honest understanding of like, who are you trying to reach and what are your goals and what are my goals and then also coming together after a project to say were our goals met? And what do we want to do based on that? So sometimes that data is very informal based on how they feel about it. And sometimes it's somebody being able to say: Oh well I see that working with you brought X more people to my program, to my door, or whatever and therefore I want to do Y.

[00:16:57] But I don't think that - yeah I think that's the extent.

[00:17:03] I guess also say that when we started doing - when we started our whole Latino engagement focus, one of the first things we did was commissioned an ethnographic study

which we then shared publicly both on our website, but we also when it was done the researcher who did the study, we invited a whole lot of our community partners to his kind of reporting out.

[00:17:25] And I was really surprised how many people came and how many people were hungry and still I get contacted and not just by arts organisations, like by an environmental organisation or something saying: hey can you share that study with me? And it's interesting specifically around Latino engagement work, we frequently are asked by other organisations to share kind of our process and how that happened and the researchers part of it that they're interested in.

Lauren V: [00:17:48] That's excellent. That is really showing the hunger there. So you talked a bit about the different systems that you're using.

[00:17:57] Do you have formal procedures? Especially now that you're moving out of the black box of Razor's Edge. Have you started documenting the process of what data needs to go where and that type of thing that the longevity of it, so that you bring more people in or as they.

Nina S.: [00:18:18] Yeah not for Salesforce, but we have done it for other things and it's very mixed because what we find happens is we're pretty informal structure, but we've grown a lot we're up to 20 people now and so it's sort of this whole - there's this weird tension of like the whole exhibition's team decides Google Drive is better than the shared drive, so they move all their folders over there.

[00:18:39] But then the leadership team is using Dropbox, you know, and it's sort of like that kind of thing proliferates until there's enough frustration that somebody usually kind of, usually our amazing director of operations like: All right, we're coming up that process and everyone is going to follow this.

[00:18:55] But I think that we're naturally averse to the super bureaucratic like: you can't install it this on your computer or things like that and so we encourage people to kind of explore and use tools that work for them. And there's a lot of informal tool sharing that ends up happening. But I think that there is both a realization that there needs to be some process around this, but also we value more that people actually input the data, then that they follow the exact process. So, if the process becomes sufficiently onerous that people are creating their own site process instead to opt out then we know there's a problem. So I think people feel sufficiently empowered that they're not going to do something just because they're told this is the way it has to be done. If it doesn't work for them, like our perfect example is intern recruitment. There are like like half of our staff has really coordinated very specific process - shared process for intern recruitment. And then there are a few other people who are like lone wolf intern recruiters who have their own approach and they don't do orientation and it's like always like this weird problematic thing, but then it kind of work you know.

[00:19:58] So, there is this sense of as long as the interns are getting recruited it's ok until there becomes a pain point where now we have to kind of process this together. So, I think

that with Salesforce there will be an initial let's - oh and also say we tried maybe two years ago to switch to another CRM called Artfully that was in beta and it was a mess and we unfortunately played the mistake of like, let's decide what all the tags are we want to use before we input anything and let's you know, let's do a huge amount of brute force work on the front and ask everybody to do it with their own data and like it was a disaster and nobody ended up using the system. So, that put a really bad taste in people's mouth so I think we've also learned to socialize new technology in new ways so for example there's a group of about five people out of 20 right now who've started using Slack and they're sort of been a discussion.

[00:20:52] There's a general acknowledgement of like we're all kind of unhappy about e-mail, but I think there's also a sense of like the good way to roll this out is with a small group who then start if it really gets traction is going to work socializing into everybody.

Lauren V: [00:21:08] Excellent. OK. Perfect. So, we've talked a lot about the visitor data and information.

[00:21:14] What are - what are you doing to collect the data around the objects or the different things that are happening within your galleries? Do you have any specific pain points or areas that you want to grow in that area as they start to fuse? Or do you want to fuse that data with the visitor data?

Nina S.: [00:21:33] Yeah we're not actively collecting - we're not actively collecting institution - we don't show a lot of our permanent collection. Well I guess we do in the history gallery, but so the kind of collections management world there is a group of very engaged partners - volunteers who work in the archives who are constantly working on a mixture of digitisation and just creating fighting aids online. We're still a small enough organisation that the way most research happens is our goal is to get as much in finding aids as possible so that it is indexed, so if you search a particular name you're going to find out we have something, but you're not going to find that thing online. You're going to then e-mail Marla to learn more about it like: Hey can I get more information about that thing? We do interestingly have two volunteers who I think self-initiated and got very into doing this certain kind of photography to create 3-D models of objects to put on this open website and that's been super interesting because that data gets really used by very random people all over the world who decided like, I want to take these dresses from 1902 and apply my own patterns to them or whatever might be. So that's just been kind of like data in the wild experiment for us that's been interesting. I think the place where we've - we're comfortable, but continue - it may make sense because the kind of organisation we are there's a lot of participatory content created by visitors that we don't catalogue and we've kind of taken the attitude that just like a temporary show this stuff exists here for a while. It's somewhat documented whether that means, you know, photographing the show, there's some text, maybe we keep a couple of visitor elements, but then most of it just gets thrown away at the end. And so we do for every participatory element, we do one very basic form of data collection which is, we always capture what is considered to be an on-topic response, an off-topic response, and an offensive response. And so we just like to see. And our goal is an on-topic can be any kind of quote unquote legitimate response it doesn't have to mean it's good, but that it is doing what is being asked to do there.

[00:23:47] So, if it says, you know, tell a story about your childhood - we don't care what kind of story you tell. If you're a bit generally doing that task, you count in that category. If you're doing something else with that piece of paper, you're in another category, and if you're, you know, putting swear words down you're in a third category, and that we just use as a form of kind of informing our process, so that we basically feel like a good participatory element mostly is things in this category because these are waste and these are problematic.

[00:24:18] And so - but beyond that we're not - we've only a couple times we've had a graduate student who was the one who was doing research associated with the participatory element and has really catalogued everything and done a lot data collection around it.

[00:24:34] But most of the time that material is just, you know, disappearing at the end of a show.

Lauren V: [00:24:38] OK. And I already asked you about the data for the community partners, so let's see. Do you need specific needs - I think you touched a bit on this, but are there certain touch points or interaction points at your museum where you have found that it is best to get the data versus where it's not best ask for information or follow ups - that type of thing?

Nina S.: [00:25:09] Yeah we did a lot of experimenting with our surveying and especially because we ask the explicit demographic questions: race, ethnicity, age - which is not usually an issue for people income level. And we, and I actually specifically, really resisted asking the income and the race ethnicity questions because I felt like, you know, we're doing all this work to welcome people to this space and this doesn't feel friendly. And yet, when we got back the first round of data, it was so useful to us in terms of helping us understand where we had gaps, but also to see where we were doing well and didn't have to worry, that I just felt like, we got to find a way to do this and feel good about it. And we did a lot of experimenting with do you know - do we query you - do we query a representative sample for an email address and then send you a survey you can do privately 72 hours later?

[00:26:02] Well then we found out that not only was there a low response rate, but that people with email addresses - it was suddenly biasing toward certain kinds of people who are more likely to respond. Interestingly women are way more likely to respond to an email than men. And then you know there was whole question about does paper feel more - so we've done a lot of experimenting around that to get to a place where we feel pretty solid about this iPad approach. I would say one of our biggest data collection challenges and even just identifying touches is that 70 percent of people who come here come here for free. And so when there's a paywall it's pretty easy at that point to have an interaction to count the person to you know say hey would you be willing to take a survey at the end of the night whatever it might be. If you were flowing in - or even just to know you are you a member, you know, but if people are flowing in for free we don't know if you've been here before you know check him moment. And so that's been a really interesting challenge for us because we know that actually most of the time we are coming here, they're coming here

for free. And yet we have not figured out a way to send them to do anything like a check in. So you know originally one of our data goals was just to know how many times do people come, but we have not really figured out how to figure that out. Understanding that many of the times that people are coming - there's no reason for them to check in in any way where we could identify them. So that's been a really interesting kind of problem of like the unique identifier of a human.

Lauren V: [00:27:28] Very good. Yes. That was one of - you just answered one of my questions.

Nina S.: [00:27:32] We did create a system to help with our membership cards in the last couple of years. We did it as a custom build where we put QR codes on the back of membership cards. And it's pretty clunky because we basically manage a spreadsheet on the backend where you know it sends - It does this little programming thing so it basically time stamps when you come, when you're scanned. And so we have that data for members but nothing else.

Lauren V: [00:27:56] All right. As you go through the data maturity, were there any were there any questions or anything that may be like stood out, saying I wish I had the opportunity to do that for my museum or I haven't even thought about that? And anything that really kind of caught your interest?

Nina S.: [00:28:14] I think we've been you - well - we have been doing more and more as we grow to build some of those areas. The thing I reflect on is because I was thinking about gosh what's the range of size of institutions that you're talking to because it seems you know the culture of the MAH, partly is predicated on being small. That hacker culture is easier when you're smaller and it's also easier to have standards and policies when you're bigger for good or ill whatever. And so I'm just curious about that in terms of what you're seeing in terms of, is there a correlation between institutional maturity or size and extent to which this is happening or not? Because a bigger organisation is less likely to adopt new technologies or be open to experimentation different ways, so that I was curious about that.

Lauren V: [00:29:09] So my PhD work, the case studies, I have two small, one midsize, and a large institution. For the Ph.D. work and then the master's thesis before that, I have noticed and documented that there doesn't seem to be - just because they are bigger institutions does not come in - There doesn't seem to be a correlation that the bigger question has all of their stuff together.

[00:29:51] They do not necessarily have - they have the same internal communications problems. They have the same, you know, multitude of systems very little systems connect with each other. They don't have formal policies or process in place. In fact for most of the systems that are relating to CRM, anything that's outside of the collection of the typical museum environment, that's where you start to have kind of all across the board different things where people have maybe experimented, but not anything formal. And so that's one of the things I'm trying to get at with the digital maturity grid and being able to formalize that feedback. And then also use this in combination with some scenario planning tools that

they could use this to help take those next steps. What do you need to grow? You don't necessarily need to have all the bells and whistles.

Nina S.: [00:30:53] Sure.

Lauren V: [00:30:53] You know to be able to take advantage of smaller sets of data or processes that could better give you quality information - right? So, that's what I'm trying to get at.

Nina S.: [00:31:04] Yeah that makes sense. One you know one of the things that the Irvine Foundation funded for us which was extraordinary was when we were doing our theory of change work. I mean they funded all of that and it was all tied with this data driven decision making goal. And we actually hired this consultant Ian and David Moss both to help us with the change, but also to train a few of our staff including myself on data driven decision making. We - it was like taking a little class. We read this book. We use this textbook called, *How to Measure Anything*, and, you know, did a lot that taught us about how to work with really small sets of data. How do you make better predictions based on data.

[00:31:42] And I think that we're continuing to work on building a people and culture of comfort around data, but also just prototyping. And also there's this idea of the iterative loop of pilot something, learn from it, and try something else. You know keep it moving. And I think that I'm always surprised having an engineering background how unfamiliar to me those things are kind of baked into who I am and how I approach the world.

[00:32:15] And I think that's because of the education type I've had and it's hard for me to remember that that is not typical in the arts and I think that you know some of the things you hear in here related to change management and a lot of that is encouraged by that kind of approach.

Lauren V: [00:32:35] Excellent. Any other thoughts?

Nina S.: [00:32:38] I think information security was interesting one because just like we don't we don't really think about that at all except for when our Web site was getting hacked and then suddenly you know we cared a lot about it, but we still like didn't we just like call that our guy was just like what do we do.

[00:32:52] And then the other one - oh you know one thing we are trying to do better at, but we're just - I mean and Salesforce will help, but where Jonathon's really pushing on this is it just - it's embarrassing that like we did not have a way that we are tracking our membership retention percentage. Like I could not have told you last year what percentage of our members renew. And now - and when he came in he was just like, how can we not know that we - you know, that's absolutely like the thing we most need to know. And and just thinking about as I've spent time more with people outside museums in theater world or others - I spend some time with some people who work in sports, and just the - their use of data around dynamic pricing and things like that is really impressive. I will say that that's another kind of culture friction that we're really working on is, how do we as people who are very community oriented many of whom politically are very anti-capitalist - how do we

get psyched about let's make some money so that this can all work you know and let's track that and let's figure out how to upsell people and stuff like that.

[00:34:03] And it's actually been extremely valuable that the person who has been just like shooting star with this stuff in just last few months in a role change is somebody who's also one of the most outspoken activists on our staff. So that's been nice because it kind of bridges that gap. But I do think that when we talk even about using data to decide what our admissions price should be or you know really pushing to get people to renew. I think there's still a cultural discomfort around some of that I see many others in the industry not having that discomfort. Now I also, you know, I don't know if disdain is the right word, but discomfort when I go to a conference and hear somebody talk about well you know here's the price the market will bear for this museum and it's \$28 or so I am just like how could this be you know. On the other hand I've really learned from the Monterey Bay Aquarium down the road that, you know it's - they're one of the leaders in this state in really inviting the diverse people of California to their space and they do it by having a very high sticker price. And then by having these very targeted promotional discounts. And so when we've been talking a lot about we're considering whether to go free right now. And I'm talking a lot about these different models of the modern aquarian model, sort of like the private college model where it's like super high sticker price.

[00:35:36] But then that gives you the ability for different people to pay different amounts frankly that the museum can't model is you know this is our first year doing this approach with Museum campus it's been very successful. But there's a lot of evidence, there's a lot of data, to show that model works best for promoting equitable access. But there is a political and a conceptual connection to the idea of free. That is really hard to shake. And I think this is going to be an interesting one for us to decide how do our values - when we see data that we should be thrilled reflects our values but it doesn't feel like it does. How are we going to make that decision?

Lauren V: [00:36:18] How do you reconcile that?

Nina S.: [00:36:18] Yeah exactly. So that's been one that's kind of been on my mind. And so it's interesting thinking about like when you talk about sales analytics like how do we get to a place where we are comfortable and unapologetic about like yeah here's how we used to do this around earned income basically.

Lauren V: [00:36:38] OK. Excellent. I think that's a perfect way to end.

Appendix 3: PEM Transcript

Interview date: 27 October 2016

Interviewed: Ed Rodley, Associate Director of Integrated Media of the Peabody Essex Museum; Claire Blechman, Digital Asset Manager; Jim Olson, Director of Integrated Media; Sean Pyburn, Information Systems Manager; Alyssa Langlais, Registrar for the Collection; Gregor Smith, Interim Director of Phillips Library

The following is a transcript of the interview segments used to support the case study analysis:

Ed R.: [00:07:40] Well the one thing I would say also is when I think hacker there is also a technical capacity there. Like hackers know enough to make something. Or they know that they don't know enough then they go figure out. Just exactly the right amount to sort of get it to work. That's one place where I would say we are sort of behind the curve in our technical capabilities. We are very resourced constrained.

Male: [00:09:14] I think if you can loosen up the term hacker I think most of the people in the room now have been resourceful in ways of understanding what the systems that are in place and finding artful and dodgeful ways of working around those that get things done.

Female: [00:09:50] I think when you work with a proprietary database of any kind you have to learn the work arounds and I'm constantly coming up with solutions for not having money to change that database and just whether it's data solutions or you know working out different ways to spend you know three thousand dollars to get this big result that we need just you know in image delivery or whatever it is. I mean you kind of have to figure out how to make those little those small work around. To me it's I think it's an adaptation of the word. I don't think it's really you know hacking per se but it is being adaptive and having to think outside of that box that the technology that you've purchased.

Ed R.: [00:10:32] Not to trade one buzz word for another but I wonder if what we talk about is more makery than hackery. Because for me at least the maker movement occupies that sort of that next level down of lack of technical know-now. But. Yes. Desire. Stuff laying around. You go a certain distance with existing things without actually ripping them apart and have them do things they were supposedly not designed to do and creating new things pretty much out of whole parts. And in that sense I would say that we would fit that bill. We're not rewriting core parts of MuseumPlus to make it do what we want or decide that MuseumPlus is going to control the lights which would be sort of classic hacker mentality.

Female 2: [[00:17:22] So I think yeah when the rubber meets the road there there is hesitation to take a risk on something that is really outside the box rather than just oh we're going to - We're going to invite somebody with a name to speak. Like you're still you're not

actually thinking outside the box you're doing something very within the box that has some kind of flavor trapping like you added some artificial grape and you are like whoa.

Ed R.: [00:21:36] This is one place where being in Salem versus being in Boston is a huge deal. Because. Just getting anyone to come here you don't. It's a big ask for the amount of money that museums are willing to pay as well become an even bigger where we are. If we were situated right in downtown then it becomes different situation. But convincing people to come out here who can make three or four times as much money doing something infinitely more boring but within walking distance of their house is kind of a hard sell.

Ed R.: [00:23:45] I mean we just this year hired our first person who has the title evaluation. Evaluator in their title. They are only a part time evaluator only working on exhibitions.

L Vargas: [00:25:17] Is it manual or digital?

Ed R.: [00:25:17] It is manual.

Female 2: [00:25:20] It is hours and hours. Man hours and then what happens?

Male: [00:25:25] You get a heatmap and the heatmap is useless because it doesn't have a goal attached to it. That's changing. I've already had conversations with the folks who are managing that and we want to go in with say three specific goals that people watching could try to prove that are either successful or.

Ed R.: [00:29:34] I think there is some dream of moving to Tessitura. Inserting itself into all those processes. So all those audiences can be looked at in the aggregate and picked apart in interesting ways but we aren't there yet.

Female 2: [00:30:55] So we definitely think about those different audiences and use that as sort of our rationale for moving in one direction or another to get a portion of our collection in our database or to get things scanned.

Ed R.: [00:36:09] That said though Membership incessantly tracks every single thing they do. Development even more incessantly than membership.

Male: [00:45:29] Yeah. And having sat on the floor as an evaluator I think one thing it does build as I suppose a creative that is trying to create in-gallery experiences is you develop a certain sense of empathy for the visitors experience. You look at them struggling and it makes you really want to make them not struggle so it inspires you to go build it differently next time and that's really kind of like a fire lit under the seat of your pants. Which has been helpful.

Ed R.: [00:48:58] When you walk around the galleries now and one of the things the director touts frequently is the notion that the museums is a collection of people and making it apparent that people make the things that visitors see in museums is a big deal for

him and the deputy director / chief curator. So the fact that you know the introductory texts in exhibitions are written in what they would consider a very chatty conversational tone and there's a signature at the end as opposed to just the person's name they now input pictures of all the teams that have worked on show at the entrance so you know you'll see the collections people who were involved who the marketing people who were involved and who the curatorial team are. In terms of our social media strategy this year has been all about trying to encourage individuals to basically be brand ambassadors rather than relying on the official PEM accounts to carry that water. So when getting all of our curators on the Instagram and providing staff with enough professional development to be able to do it without getting themselves in trouble has become sort of a huge deal.

Male: [00:50:11] So the institution becomes - it wasn't advocating for an individual voice but that the institution is using a group of multiple voices. The question then becomes do you have enough leash to be able to use that voice.

Female 2: [00:50:51] Because I see when I worked with the V&A on these exhibitions and they have like a five page document about how their logo has to be on the page and it's just stifling. So I'm happy that we don't have documents about what we can and can't do on social media.

Male: [00:56:36] Annual. So we're actually that was something the infrastructure involved in building it internally was beyond - we had a short timeframe because the system we had for our point-of-sale transactions was reaching end-of-life. But it's something we had known it was coming. We have been advocating for it for years.

Female 2: [01:01:07] And now that we are starting the expansion too...It's just. Again we're going to be firehosing our way to 2019.

Female 2: [01:01:46] We did a lean training that the CFO initiated and I saw a lot of hostility too.

Male: [01:05:28] I think in part it's because if there's one thing the executive leadership team is hung on right now in a good way is storytelling and content creation and managing those assets is not happening now. And you are providing collections that take care of all that and they see that as a positive step forward. Everyone's. Game. Right. Yeah.

Female: [01:08:03] Training is a challenge. It seems like no matter how much you train people to use things they still complain that they don't know how to use it and they say can we get somebody else to train us. Even though they're really not going to be able to provide anything different that's already provided. And they actually just to spend the time in front of it to learn how to use it.

Female: [01:10:04] Yeah. And despite the 160 page manual that I wrote and no one seems actually read that and I want to understand why it was hard to do that.

Ed R.: [01:12:34] So it's a very it's a very fragmented collaborative workspace. So very there is Basecamp for exhibition projects there are network drives where lots of information

is shared. We're backwards. We still do things like host Excel documents on network shares that people have to collaborate on. We pass documents around in Office formats or we are a Googleapps institution so if you share on Google apps or use drives or Dropbox. And then there are other edge cases in every team.

Ed R.: [01:13:12] Is there any system under that is popular that at least on PEM person isn't using and want to use for.

Appendix 4: Mia Transcript

Interview date: 30 November 2016

Interviewed: Douglas Hegley, Chief Digital Officer of the Minneapolis Institute of Art

The following is a full transcript of the interview:

L Vargas: [00:00:00] So I sent the interview questions. I have three research areas that I'm looking to tackle. One is just the nature in which transformation or change occurs - whether that is through a change agent and if that change sticks whether that person leaves the organisation and kind of hinting at what makes a culture transformation tick. The second area is if the museum is sharing data with the community it serves or obtaining data from the community to better understand or deliver upon its mission. And the third area is really on just the the general data collection use the governance the tools the methodology the processes that wrap around the technology itself. The real aim of my research is not to look at the maturity of the digital the overall digital ecosystem but to really get into detail about the data collection and use and how that can be scaled or matured in all size institutions. So I've interviewed four other institutions of various sizes and of various types of change agents. And your name came up in several of those interviews as somebody that they looked to for inspiration in the US. And Ed was one of - Ed Rodley of PEM was one of the people the teams that I interviewed and he mentioned your name as well and suggested that I reach out to you. I have read your paper from museums and the web conference - the agile museum - and seen some of the other work that you have posted online. So I think you're a great candidate for this research. So first I'd like to know more about your role within the organisation how you view yourself or do you view yourself as a change agent?

[00:02:32] What empowers you to do the type of transformation work that you have been sharing with the broader museum community? And if there are other people other institutions that you look to for inspiration either here in the U.S. or abroad?

DH: [00:02:49] That is more than one question?

L Vargas: [00:02:50] Yes.

[00:02:52] So yes I do consider myself a change agent and in fact I believe I was hired for that purpose.

[00:03:01] And technically I had to come in and find a way to reinvigorate and repair what was a very broken technology operation. I definitely understand better about myself now that I'm a pretty good agent of change and I'm less skilled and interested in maintenance. So I'm better at coming in and stirring things up and driving change in ways that are effective and inclusive and transparent. But once things are fixed I'm more likely going on to the next broken place that I am sitting back and resting on my laurels. So it's probably just my nature I think as a person probably my training my formal training is in psychology. It's not in technology. I'm interested in people before products. I'm interested in process before end

result. So it's I like to be in the thick of it making change. It's written into my job description so it is the expectation of me to be driving all these things.

[00:04:18] I am on the executive leadership team so I'm - I report directly to the president and director of the museum. That's one person by the way. And part of my role as it has evolved have been here just over five years has been to be a mentor to the entire executive team in terms of modern working methods also particularly in particular part hire - how to find the right kind of people with the right kind of mindset and get them into an organisation because you can try as you might from top down to create real innovation. My perspective is it doesn't really work. And so it's really a ground up approach.

L Vargas: [00:05:05] And as you're hiring these people are you looking - what skill set, what mindset are you looking for so that that change or the changes that you've put in motion stick once you've moved on to the next opportunity?

DH: [00:05:25] Right. So skill sets to my perspective are prerequisites. So we obviously need people to come on board with particular skills in order to do the core work of any job. What skills are relatively easily taught what's not easily taught is an attitude or in a broader term values. So when I'm hiring what I'm looking - I actually have all of the candidates screened by others for their technical acumen and their skill sets. My job at the end once I've brought a set of finalists from from those evaluations is to really look at what makes someone tick, what is their work character set what values do they bring into the workplace, what do they expect of themselves. Very specifically for us is how do they play with other people? How do they play in a very open transparent collaborative environment? We apply a lot of the practices of an open organisation meaning there's not a lot of hierarchy here and everyone's opinion matters. But it also means that most of those opinions won't actually win the day. And we have to hire people who are comfortable collaborating, changing, working iteratively. People who are able to come up to what they think is a really brilliant idea have it shot down and maintain their optimism and keep working together on the team - that can be somewhat unique. And as we've been transforming, initially my division I started with 12 staff and now have 20. But in that 20 only four of them were from the original 12. The other 8 primarily less of their own volition because this style of working was driving them crazy. They wanted to be seen as experts. They want their work to be respected - never questioned in an open organisation - everything is questioned all the time. Things are iterated upon, things are created and then torn down rapidly.

[00:07:34] We need people with a kind of mindset. You know you may have read some work from the author - I can't remember the last name I think is Dweck in which she talks about a fixed versus growth mindset.

L Vargas: [00:07:49] Yes.

DH: [00:07:50] So for me it's very important to hire people with a growth mindset and the capability of working on very dynamic teams and the capability of being decisive. I don't like making decisions for people. I'm happy weigh in and offer advice and ask lots of questions but I really look to the staff I hire to be making decisions or at the very least

making the recommendation before I sign off on anything. So people who work here they're very empowered and they're very autonomous. They need to be able to work in that kind of environment. That is also one of the reasons that we - that I believe firmly that this - the changes that I help instigate will stick because the entire staff they have hired are fully capable of driving on these kinds of changes. They already own the changes themselves. It's really not up to me. I'm sort of fertilizing the ground and they're the ones doing the planting and the harvesting. Recently we were asked by our board of trustees to write a succession plan and you know give them that kind of structure that we have here in my division succession plan looks very different than it would in the military right. Well first it's a general and then it is the I don't know the colonels, the majors and all the lieutenant and like it's just not the way we work. Our structure is much flatter that way. For me if I depart or something were to happen to me this team can work absolutely fine for in my estimation up to a year while they do another search and find someone else to come in and be the leader for the group. The group itself there are people on this team who are much more valuable than I am because of their domain knowledge or their experience or the number of projects that they're driving forward. The risk to the organisation of losing my staff is greater than of losing me. Does that makes sense?

L Vargas: [00:09:40] It does. And who do you look to for inspiration?

DH: [00:09:46] That's a good question. So there's some more sort of closer personal professional that works. And then there's some sort of secondary places I look to. So on the personal professional side I've been friends with Seb Chan for a long time. He's now at acmi in Australia. He's an innovator. He tends to do things that are a little bit less capable of being maintained over time.

[00:10:17] But he's really great at breaking through the walls of resistance and jumping over barriers. So Seb I talk as frequently as we can. I'm always inspired by his work. I've been friends and colleagues with Rich Cherry for a long time. He's currently deputy director of The Broad Museum in Los Angeles.

[00:10:35] I believe he just announced his resignation that he's going to go work on another museum's building project. He's really good at really starting from ground zero and making a strong operation quickly. It's very impressive how he gets those things done. And the other close colleague who I talk to quite a bit is Nick Honeysett.

[00:10:53] He's currently the CEO at Balboa Park online collaborative out in San Diego formerly of the Getty. Nick and I talk as frequently as we can. I often seek out his advice when I get into really sticky situations or when I'm being recruited to go into some other place because he has good insights in that. And my boss Feldman is actually terrific. I don't know if you've ever come across her. She is inspiring. She's a lifelong learner. She's an extremely curious person. She makes lots of connections outside of our industry. And then she's very happy to connects us with those people. She's a very exciting person to work with.

L Vargas: [00:11:35] Excellent.

DH: [00:11:36] On a sort of secondary front I've been - Interestingly enough I've been able to meet some authors of books I've read that I thought really interesting I think The Open Organisation by I think the author's name was Whitehurst from red hat. They're a Phoenix shop - it is a really intense book and I get a chance to shake his hand once and chat with him briefly and it was kind of cool. The people who run Zingerman's I think are really interesting. They have a very open organisation they actually practice open book finance. It's worth looking into what they write about. It's worth visiting their deli in Ann Arbor if you're over there it's it's a tiny operation but the way that they respect their employees the way they empower and sort of - people who work there love it from the busboys to the waitstaff to the cooks.

[00:12:28] They're in love with the place. There's inspired every day and I think that's a take a lot of motivation from remembering that and thinking about Ari and Paul who runs Zingerman's and the kind of ways that they respect their staff that kind of energy they bring to the job every day. It's just that I aspire to that.

L Vargas: [00:12:48] They have great customer service. Excellent. So let's move to the second phase of the questions and really focusing on community. And what I'm trying to do with my research is re-imagine the data ecosystem both the digital and physical place of the museum and thinking through what we know or what we can learn and share with the communities that we serve. So does your organisation define various voices? Do you do segmentation? Personas? To better understand your community?

DH: [00:13:32] We do. And it's evolved over the years. We based - recently about three years ago we went through a very intensive review of everyone with whom we had any kind of contact information and some - brought in some external market researchers from General Mills their headquartered here in the Twin Cities and looked at applying the John Falk model of identities of museum visitor experience to our population and made some really interesting strides forward. So we could see that those segments really did apply in the pool of known people and started to apply them to a General Mills database which was you know numbered in the tens of millions as opposed to ours which numbered just under a million. And looking at opportunities within those segments and really seeing that we could focus on experience seekers and facilitating socializers as growth opportunities whereas we were doing really well with the other Falk segments. That really helped focus our work in our previous strategic plan that expired last June 30th. That plan was really based on audience engagement and we shifted our perspective completely from being collection based to being audience based and it was really effective. The most effective strategic plan I've ever been involved in and was - it helped really align the staff to think about audience first. Now we're in a new strategic plan and at the core of that plan is true enterprise level CRM. So we've ported all of our data over to Salesforce and we are now methodically rolling out new improvements, better more direct and more transparent ways both of collecting data and then reflecting that data back out to our audiences.

[00:15:26] The ideal situation at the end of this strategic plan which is now what - 3 - 3 1/2 years away will be that we move from segmentation to personalization. Of course segments will always exist because people do naturally fall into different kinds of groupings. You know if there's a if there are 40000 people in the database who are fans of contemporary art

they're going to get some information about contemporary art but personalization really is recognizing each individual - there is a sort of catch phrase right as you to market to each instead of to all. So we'll stop with our 400000 e-mail address blasts and we'll be doing things that are much more filtered much more responding not just to people's stated preferences and click rates but also to their social media posts, their you know sentiment analysis, their own networks if they'll share that with us, their behaviors in the museum their frequency of visit, their duration visit their movement through space, their spending of money whether it's through transactions with their donations - all of this will be tracked together and in the Salesforce database and we'll be able to start reflecting that back.

L Vargas: [00:16:46] Are you using both the Salesforce - are using all three clouds the sales service and marketing clouds or one or more connectors?

DH: [00:16:58] Marketing Cloud. Yes. Sales Cloud. Yes. No connector between marketing and sales clouds because they're natively built upon each other. Ticketing is the problem. There's no native ticketing platform to Salesforce to integrate sirius ware and that didn't go so well. And now we're shopping for another ticketing interface. That's a real hurdle that we've been struggling with.

L Vargas: [00:17:22] And for marketing cloud are you using the full range or are you using social studio as well as journey builder, you know some of the newer attributes to the marketing cloud suite?

DH: [00:17:36] I hope to. We are not currently using those things. We've had a shift in staffing and we just hired a new person to come in and he's coming with experience in the commercial sector. He starts the week after next. It will be his job to really on marketing cloud and take us beyond that we're doing with it now which is really just the basics.

L Vargas: [00:17:59] Excellent. And can you expand just very briefly I know you did give one example of personalization but there's a spectrum of what personalization can entail. What does personalization mean to you? How would you define that?

DH: [00:18:14] For our organisation it means that each time you visit the museum you could have a unique experience. So (a) we need to offer a lot of different channels of content, a lot of different potential experiences, a lot of different doorways into that content everything from person to person to digital technologies to traditional print. We want all of those things working. We want them to be better aligned so our content production work flows much better now. There's there's more of a sense of voice tone and all of this coming together in that way. You come in and you take part in the museum you can then make your own independent choices do as you wish.

[00:18:57] You can also begin to contribute to the content. And while we're in the early stages of that that will be a very important part of this strategic plan. If you say that you're embracing your community and then all you do is talk at them. That's hardly - That's hardly embracing. So some of what we need to do now is figure out more effective ways of reflecting a community's voice - first inviting it and second welcoming it, and then third

reflecting it back out. This is an unresolved at the moment. It's a strategic direction without a lot of specific tasks yet.

L Vargas: [00:19:33] And are you taking the the data that you're capturing and the insights that are perhaps derived from that data, are you sharing that back with various communities? Or are you obtaining any data from the communities themselves and integrating it into your first party data?

DH: [00:19:55] Yes to both. Early days. So in terms of reflecting it back we'll do that on the individual level. So you would have an account you would be able to come to our website log into your personal profile page like you would in any other sort of social media interface, update your preferences, express things see your current levels of participation dates, opportunities, things like that. Then when it comes to communities it becomes very interesting is how we how do we define community. It's a very dangerous thing for the organisation or institutions to proclaim that a group of people is a community. These should really be self identified.

[00:20:36] So I think for us as we look to welcome this and the Twin Cities is an interesting place it's nestled up here you know in the Switzerland of Minnesota and yet it is one of the most racially segregated cities in the country.

[00:20:53] And it's not without conflict. We also have the largest contingent of Somali immigrants in outside of Somalia. We've got a large Hmong population the fastest growing minority group in Minnesota is hispanic and most organisations doing nothing about this. We are trying desperately to find the best method for leaning into this in a better way.

[00:21:20] I don't know again we - to some degree we're at the strategic stage with acknowledging this is our challenge and inviting in some outside experts, beginning to make some forays and experiments into how to do this, expecting that we will do it wrong a few times, trying not to be a classic museum and panic the first time it's not perfect.

L Vargas: [00:21:43] Excellent. So let's move to the third part of the questioning and it's really focusing on the data collection and use. So you've already mentioned Salesforce. Are you using any other technology any other systems to capture data? And if so you know what what are you currently using?

DH: [00:22:11] There are a few other systems that are not CRM systems because we can't connect the data to individuals. So there's the classic survey methodology. We do significant size sample surveys - entrance and exit surveys as well as online surveys.

[00:22:28] Again that's anonymised so there's no way of me knowing if it's you who answered those questions or attaching that to your account. We of course have sensors around the museum that give us timing and tracking and also give us visitor account and to some degree movement through space.

[00:22:47] Once again I can't connect that to an individual so that's aggregate. And then you know you sort of make assumptions based on the data that you collect in those in those

ways. Online of course there's plenty of Google Analytics that we're using again currently not attached to individual accounts as we bring that functionality online. The other thing we'll be implementing summer of 17 is a points and rewards program. We worked with the Dallas Museum of Art in the final throes of their friends project. We've taken all of that software and we've written that to be more robust and more scalable and we'll launch that software integrated with Salesforce in the spring. Hopefully go live in the summer and then we can begin to incentivize individuals opting in to share certain kinds of data with us. Some of them might be able to come from the sensors that we have in the museum. Some of that - So allowing people to connect their movement to the space to their account so that we can recognize it with points that could then be redeemed later for rewards.

L Vargas: [00:24:01] And are you using what you're learning from the data to influence your collections - the exhibitions?

DH: [00:24:10] That's a really good question and it's a it's an interesting hurdle I think especially in the art museum. So yes to the degree that we are thinking much more about representation of globalism and multiculturalism in our especially in our sort of secondary exhibition planning and that data right now is our aggregate and survey data as well as demographic information that you can access for free or or purchase from our region. We do know from survey data that most - the vast majority of our visitors are within driving distance of this location. Minnesota - Minneapolis is really not much of a tourist destination. So we are primarily serving a regional audience. We will thrive when people visit multiple times per year. Understanding what we have out there in creating offerings that embrace and celebrate diversity will help us drive home that message and will help drive a shift that will help the museum thrive.

DH: [00:25:12] When it comes to the major first tier exhibitions you know the timeline for planning those can sometimes be up to 10 years meaning we have an exhibition coming online in about a year and a half that's the planning started eight years ago. That has nothing to do with data. That's a curator's vision of putting together a show of fascinating portraiture. How we market that show, how we interpret the works in the show will definitely be based on some of the data that we collect and hopefully as we move into the future we will be doing more and more of inviting community voices in. An example right now we have a Martin Luther show up in our primary special exhibition gallery. All of the objects came from Germany. Ninety eight percent of them have never left Germany before. Maybe the only opportunity for people see them here in the U.S. It's a blockbuster.

[00:26:09] Buses are coming from all over the Midwest full of Protestants who want to see these talismanic objects. On the other hand Luther's writings are anti-Semitic. They're anti-Muslim. There are very intense. There's a lot of intense caricature of different ethnic groups that was done by German Protestants - of that information, those objects, those drawings, and prints that are on display, we brought in an interfaith panel of local religious leaders from multiple different perspectives and had them work with our curatorial staff, add their own layer of interpretation over the show so that we can walk up directly and honestly to the fact that Luther wrote these things that these things are in today's world incendiary but we prefer to display an honest representation of historical fact and then work with

contemporary interpretation bringing in multiple voices to help make it relevant and resonate better with today's audiences.

L Vargas: [00:27:16] Would you consider your organisation is more data informed than data driven or do you see a difference between the two?

DH: [00:27:25] I see a huge difference. And we are moving toward data informed. Data driven for us we'll probably never be a 100 percent data driven organisation because of curatorial practice. And I think we're fine with that. I do think what we'll be driven when it comes to a lot of different communication channels. You know in this day and age there will be primarily an email I'm sure that will change that modality will change over time. But you can be very data driven when it comes to sort of automated you know seats and acknowledgments and thank you notes and surveys and the points and reward system - all those things we can just be simply data driven data. But for data informed that is more for looking at content to relevant content strategies. We want to take that data into account as data. We actually have on staff a full time statistician. I think we may be the only art museum in the world where that's true. So that we can look at data and analyze it for statistical significance instead of combing through it with a confirmation bias.

L Vargas: [00:28:33] And so you are light years ahead of many museums when it comes to having that data informed thinking or just you know frankly in the use of the data itself collecting the data, using the data. Do you have - and if you do I'm sure you do, how long has it been in existence? But what type of governance, what type of formal process do you have wrapping around your data collection and use?

DH: [00:29:10] Now those are really good questions. I think it's not formal enough from my perspective. It's a work in progress. We do have a commitment to privacy and confidentiality and we are 100 percent committed to any of the U.S. statutes that are out there so we don't collect it if they're children or would share it ever. We're completely PCI compliant. All the sort of regulatory requirements we meet 100 percent. So there is the creepiness factor in this kind of data - this sense that people are being tracked or that their movement that they're not making assumptions about their preferences based on their behavior can get to the really really creepy. So those two things we're committed to that one. It's 100 percent opt in. So we will never automatically put people into a dataset that isn't made clear to people where they have the opportunity to be in or out.

[00:30:06] Secondly we are as transparent as is possible about why we're collecting data what we do with the data how we anonymize it how we protect it and how we don't collect - We really don't collect a lot of PII. We really don't store any credit cards. We don't store anyone's financial data. We don't we don't do that right. What we're talking about is sort of preferences and onsite behaviours and online behaviours that are we always do are - the ones that we believe we can interpret to come up with some kind of a meaningful personalized response to someone. There's no reason in tracking something that's there's no point in knowing that data and we are again we're forming this team this kind of deep dive data team with a statistician with an insights analyst with email marketing expert and with a Salesforce admin. That's a cross-divisional team that is really looking at all of this.

Formally declaring all of these things in a clearly documented fashion we haven't achieved yet.

[00:31:18] All right. So based on and thank you again for completing the maturity grade so quickly. Based on what you answered in the grid were there any outstanding questions or any areas that you wanted to add additional information or clarity?

[00:31:38] That's a good question. I was going through the grid and I had a couple I had to read a couple of times because that I think my responses probably seemed a little odd here and there in terms of what's red and what's yellow. Sorry I am just.

[00:32:09] Where was it? It wasn't the IT part...

[00:32:14] It was - was it the metrics? I guess you know it's more of a general now that I'm looking at again I think is more of a general thing.

[00:32:26] I'm trying to answer this in terms of current state and we are changing. So some of the things that are marked in red and yellow in column four I believe will change in the next 18 to 36 months fairly significantly. So this is - but I want to give you a snapshot in time. A lot of this is work in-progress and a lot of it is incomplete which is why you see green and then yellow and green again like we've got some of it nailed down with other parts of it we're still working on. So there's a kind of inconsistency in a way. And as I look at it overall in how I'm replying but I hope it makes general sense. We're a moving target right now. There's a strategic commitment to moving to that sort of optimized column. And while I don't necessarily agree with all of the line items in the way you've described I can see the natural progression to a more enterprise level and intentional way of thinking about how you produce content how you collect and reflect data back. I see all of that in the Matrix. So I'm sorry I didn't answer that very specifically, did I?

L Vargas: [00:33:43] No no that's great. And I would like - so next steps, I will obviously you know transcribe this interview and start to write the case study in the next one to three months. And when I complete the case study I will give it back to you for your review. So if there are areas that have changed either after the case study is written and then I will have checkpoints with you until the dissertation is published. We can go back and describe this evolution of the different steps of your journey. And that can definitely be a talking piece and something that we can flesh out over the next several months.

DH: [00:34:34] Yes. Good.

L Vargas: [00:34:35] So I'll make sure that that's captured. And when I transcribe the interview I'll set some perhaps milestones or dates that I can check in with you and see if there are any major developments or changes since we last spoke.

DH: [00:34:51] Right. I have found a couple of specific things that left me head-scratching. I'm looking at line 19 in the spreadsheet - it is under standards and policy and it is strategy development. And in the third column it talks about a formal program management office

headed by Chief process officer. From our perspective that would be a huge step backward. So we never do that.

[00:35:19] We would never centralize this in that way that that would actually be it would undermine our strategic approach to empowering staff across the entire organisation. We have a process owners that are not only across divisions but also hierarchical up and down because it depends on the effort. So we do have a process is definitely working directly with customers suppliers, colleagues, even in our Board of Trustees even if these are junior people who are not going to the management. But moving into some kind of central PMO is something that we would resist. We would see that as a more primitive command and control approach to move to implementing strategy.

L Vargas: [00:36:04] So let me clarify and thank you. Thank you for pointing that out.

[00:36:12] Would you - I guess the way that I was thinking of it was maybe a bit differently even though the processes are dispersed, would you say though that the direction though is and maybe some of the policy that enables the process that's centralized or governed by a certain body or no?

DH: [00:36:41] Ultimately the executive team is responsible for maintaining eyes on goal. Right. So the strategic plan is our north star. We have a mission we have a vision that guides us in terms of our values and approach the strategic plan tells us what we're supposed to be working on. And those two three things better be together make sense together or it's a miss because the staff is confused right.

L Vargas: [00:37:05] Right.

DH: [00:37:05] Well I think we've been really good at years of past five years of having those things in super tight alignment and that the staff completely understands that we can have anybody on this staff at least paraphrase for you our mission our vision and our current strategic direction. That's made a huge difference but ultimately it is the responsibility of the executive team to sign off and you know to write the final version of that strategic plan and to sign off on it as it is created as a massive collaborative work that involves all 250 people on staff through the process of building a strategic plan. But it is ultimately our responsibility to finish it off and deliver.

L Vargas: [00:37:49] Excellent point of clarification. Thank you. Any other areas that you wanted to flesh out?

DH: [00:37:57] I don't think from the current spreadsheet. I think it will be fascinating to see how your writing evolves and how you and your perspective on putting this together. And I like the idea that we can go back and forth a bit because I think (a) we'll learn a little bit more in the next three months (b) I may I've been unclear in the way I communicate some of these things that when you reflected back and get my view I may say Oh actually that's not what I meant so that that's good.

L Vargas: [00:38:21] Excellent. So I'm going to stop the recording here. Thank you very much for your time. I greatly appreciate it.

Appendix 5.1: MAH digital data maturity – Governance

Level B	Capability	0-Nonexistent	1-Initial	2-Infrastructure	3-Integrated	4-Managed	5-Optimizing
Standards / Policy	Select		There is a process in place to define the selection of any digital asset (or asset with digital components).	The selection of a digital asset is dependant on the number of intraetion points with other existing or legacy sysems or platforms.	The priority of any asset selection is based on a key gap or opportunity to integrate with or supplant a vital on-point solution or platform.	The selection of any asset is made by not any one individual, but a team representing the variuos diciplines, communities, and digital opportunities of the institution.	Aggregated capacity planning is taken into account in policy and process development.
	Operate		There is little to no documeted operation of the digital asset.	There is documented maintenance of the digital asset.	There is documented onboarding training covering guidelines and best practices for use of digital asset.	Digital assets are reviewed quarterly to dertermine if the use is still valid, any known circumstances or best practices to make the use or process more efficient, and document future uses on a business objective roadmap.	
	Integrate		Digital assets are not chosen for potential integration - any integration is happenstance.	System integrators or API integrators are known prior to the selection of any asset.	There is documentation of all process of how and why systems are integrated with each other.	Digital assets are reviewed quarterly to dertermine if the integration is still valid, any known circumstances or best practices to make the integrationmore efficient, and document future integrations on a business objective roadmap.	
	Adopt		The main user(s) of any digital asset is the bearer of primary digital asset knowledge.	How users will operate the digital asset, point solution, or platform is documented in shared adoption guidelines.	Training is developed documented and required annually for all digital assets.	Training for any new digital assets is created during on-boarding and updated quarterly for knowledge sharing.	
	Adapt		There is little-to-no shared knowledge how digital assets will be used or discarded based on new or growing uses of the institution.	There is a digital asset roadmap depicting all point solutions that need to gradually move to suite or platform solutions.	Digital assets are reviewed quarterly to determine if there is an opprtunity to integrate with any other point solution suite or platform.	A committee reviews existing digital assets to determine if the longevity of the suite or platform in relation to the institution's intended time and use.	
	Consistent		Digital assets are selected at or past time of need and implementation.	Digital assets are identified with overall gaps and opportunities within the overall visitor journey.	An intake form, requirments, and business case are required before any digital asset is reviewed or selected.	Digital assets require a defined onboarding and mainanance process that is documented alongside hands-on and on-demand training.	

Appendix 5.2: MAH digital data maturity – Tools

Level B	Capability	0-Nonexistent	1-Initial	2-Infrastructure	3-Integrated	4-Managed	5-Optimizing
Databases	PoS		Launch stand-alone, silo external point solution. Informational only.	Visitor centered architecture with light integration with other systems across the institution.	Use of digital to grow revenue and sales intelligence to provide lead reports to frontline representatives.	Integrated systems tied to cross-channel goals, integrated with customer databases, measuring successes, revenue, and loss.	IT / Digital is a partner in defining business strategy.
	Fundraising		Launch stand-alone, silo external point solution. Informational only.	Visitor centered architecture with light integration with other systems across the institution.	Use of digital to grow revenue and sales intelligence to provide lead reports to frontline representatives.	Integrated systems tied to cross-channel goals, integrated with customer databases, measuring successes, revenue, and loss.	
	Collections		Launch stand-alone, silo external point solution. Informational only.	Visitor centered architecture with light integration with other systems across the institution.	Understanding the visitor behavior of online and offline collections through profiling exhibition flow and engagement and development of visitor personas.	Integrated systems tied to cross-channel goals, integrated with customer databases, measuring successes, revenue, and loss.	
	Events		Launch stand-alone, silo external point solution. Informational only.	Visitor centered architecture with light integration with other systems across the institution.	Use of digital to grow revenue and sales intelligence to provide lead reports to frontline representatives.	Integrated systems tied to cross-channel goals, integrated with customer databases, measuring successes, revenue, and loss.	
Collaboration			Interdepartment and/or agency communication during asset creation is efficient and consolidated.	There is sufficient resources to analyze and create the online and offline content necessary to meet the institution's needs.	There is a searchable central repository for digital asset management that catalogues current and historical assets.	There is a defined marketing group who owns and develops the marketing and communications technology strategy and defined technology road map, using assistance from IT/IS as needed.	

Appendix 5.2: MAH digital data maturity – Tools (cont.)

Level B	Capability	0-Nonexistent	1-Initial	2-Infrastructure	3-Integrated	4-Managed	5-Optimizing
Digital Assets	Marketing / Communications		All digital (including mobile) interactions are monitored.	Visitor centric processes of engagement and content marketing are tied to the chosen assets.	Digital assets are fully integrated with all end-to-end processes and platforms.	There is a strategic plan for providing contextual and relevant experiences for visitors.	Business strategy and funding for digital / interactive platforms and tools are a percentage of operating fund.
	Social Media		External communities and participation is identified and engagement is scattered, not consistent.	All social activities are listened to, tracked, and reacted to in real-time.	Geo-location, demographic, and other third-party data sets, are integrated with analytics data and used as traits in the visitor profile. Social media training is part of onboarding process for all paid employees and volunteers, and includes flexible and dynamic engagement responses.	KPIs of institution include those based on visitor sentiment.	
	Content Management		Able to capture, store, and analyze all touch points in the visitor journey. There are sufficient resources to manage content necessary to meet the institution's needs.	Targeted content is delivered to mobile users whether in-app or on mobile web site. Social content publishing is scheduled and coordinated across the various social networks and performance is included in our web analytics data.	Visitor experiences are consistent and contextual (personalized) across channels, including onsite and offsite. A/B testing is completed.	Digital content is targeted and optimized based on channel and customer interaction touch point. An agile, test-and-learn process in the design, execution, and analysis of all create assets is consistently deployed.	
Information Security	Networks		A local area network (LAN) allows the computers within the institution to communicate and share information between each other, printers, and Internet.	The institution is connected to the internet via ISDN, DSL, Cable, dedicated lease lines, fiber-optic networks, or cellular networks.	The institution has a virtual private network (VPN) offering greater flexibility to remote workers, more stringent security controls, and scalable systems.	A network has been selected based on security and bandwidth needs, the sophistication of setup, and projected growth.	
	Data Security		Data is entered from a variety of sources. There are little to no clear definitions of data needs or how data is collected (from what sources and defined procedures).	Some of the institution's data needs and uses have been clearly defined, but not uniformly documented.	The institution has defined and documented its data needs and uses (data entry procedures and accuracy standards) for each area of service.	The institution has standardized and documented data needs, use, and collection for all levels of service, including a board of directors.	

Appendix 5.3: MAH digital data maturity – Community

Level A	Level B	Capability	0-Nonexistent	1-Initial	2-Infrastructure	3-Integrated	4-Managed	5-Optimizing
Community	Culture	Change Management		There is growing acceptance in the institution about the need to make modest change.	Employees are prepared for significant change in how work is performed.	Employees are ready for major multidimensional change.	Employees recognize change as inevitable and embrace it as a regular phenomenon.	The institution is transformed as a center of creation (online and offline).
		Talent		Performers can name the process they execute and identify the metrics of its performance.	Performers can describe the process's overall flow; how their work affects visitors, other employees in the process, and the process's performance; and the required and actual performance levels.	Performers are familiar both with fundamental business concepts with the drivers of enterprise performance and can describe how their work affects other processes and the institution's performance.	Performers are familiar with the enterprise's industry and its trends and can describe how their work affects interinstitution's performance.	
		Leadership		The institution's senior executive team recognizes the need to improve operational performance but has only a limited understanding of the power of business processes.	At least one senior executive deeply understands the business process concept, how the institution can use it to improve performance, and what is involved in implementing it.	The senior executive views the institution in process terms and has developed a vision of the institution and its processes.	The senior executive team sees its own work in process terms and perceives process management not as a project but as a way of managing the institution.	
	Diversity / Inclusion	Soft Power		The institution demonstrates tolerance and diversity through inconsistent programming.	The institution documents diversity and inclusion action items in mission and within all documented material (online and direct).	The institution supports and demonstrates consistent talent, tolerance, and technology diversity and inclusion across all employment and programming.	The institute defines itself and operates as "the third sector" - a social commons where people generate "the goodwill that allows society to cohere as a cultural entity."	
	Active Listening	Engagement		The senior executive team has started shifting from a top-down, hierarchal style to an open, collaborative style.	The senior executive team leading the process program is passionate about the need to change and about process as the key tool for change.	The senior executive team has delegated control and authority to process owners and process performers.	The senior executive team exercises leadership through vision and influence rather than command and control.	

Appendix 5.4: MAH digital data maturity – Management

Level B	Capability	0-Nonexistent	1-Initial	2-Infrastructure	3-Integrated	4-Managed	5-Optimizing
Leadership			The leadership of the process program lies in the middle management ranks.	A senior executive has taken leadership of, and responsibility for, the process program.	There is a strong alignment in the senior executive team regarding the process program. There is also a network of people throughout the enterprise helping to promote the process program.	Employees and volunteers throughout the institution exhibit enthusiasm for process management and play leadership roles in process efforts.	
Strategy Development			One or more groups advocate and support possibly distinct operational improvement techniques.	An informal coordinating body provides needed program management while a steering committee allocates resources for process redesign projects.	A formal program management office, headed by a chief process officer, coordinates and integrates all process projects, and a process council manages interprocesses integration issues. The institution manages and deploys a; process improvement techniques and tool in an integrated manner.	Process owners work with their counterparts in customer and supplier enterprises to drive interinstitution process integration.	
Organizational Support			Functional managers are responsible for performance, project managers for improvement projects.	Process owners have accountability for individual processes, and a steering committee is responsible for the institution's overall progress with processes.	Process owners share accountability for the enterprise's performance.	A process council operates as the seniormost management body, performers share accountability for institution performance, and the institution has established steering committees with visitors and community members to drive interinstitution process change.	
Communications			The team has the necessary skillsets to analyze and create visitor segments used for targeting.	There are clearly defined and accepted visitor segments based on attributes and behaviors.	Analytics data is used to refine and adjust visitor segment definitions.	There is a strategic plan for communicating and interacting with customers across physical or digital channels and or/or devices in real-time.	

Appendix 5.5: MAH digital data maturity – Metrics

Level A	Level B	Capability	0-Nonexistent	1-Initial	2-Infrastructure	3-Integrated	4-Managed	5-Optimizing
Metrics	Definition / Uses	Customer / Visitor Analytics		The process has some basic cost and quality metrics. Managers use the process's metrics to track its performance, identify root causes of faulty performance, and drive functional improvements.	The process has end-to-end process metrics derived from visitor requirements. Managers use the process's metrics to compare its performance to benchmark, best-in-class performance, and visitor needs and set performance targets.	The process's metrics as cross-process metrics have been derived from the institution's strategic goals. Managers present the metrics to process performers for awareness and motivation. They use dashboards based on metrics for day-to-day management of process.	The process's metrics have been derived from institution's goals. Managers regularly review and refresh the process's metrics and targets and use them in strategic planning. Established and using lifetime value and loyalty calculations, response and purchase propensity modeling, and micro segmentation. Includes surveys/questionnaires, visitor experience research, and customer satisfaction/advocacy modeling.	Business metrics (of value) are created and readily available throughout the institution.
		Sales Analytics		Focused on collection-centric strategies.	Diligently mines visitor data to create programming and other services that delight their most valuable visitor/visiting groups.	Systems and processes are in place to automate reporting and data distribution. Reports are based on complete and integrated data systems. Identifies and continuously awards best members / visitors / visiting groups.	Exercises pricing elasticity modeling, assortment planning, and sales territory design. Reporting requirements for funders, government agencies, and internal management are met by mining data from the institution's information systems.	
		Marketing Analytics		Secondary demographic information is used for decision making.	The institution has identified areas across the customer/visitor journey to capture primary information at the time of activity and/or touchpoint. The analytics staff is sufficiently trained and has the necessary skillset for analytics and reporting needs.	Use analytics to understand how well they generate demand and the quality of visitor experience they provide and steer value-adding activities for a single view of the visitor.	Creates demand forecasting, marketing attribution models, and market mix modeling and media budget optimization.	
		Digital Analytics		Mastering the use of point solutions with little to no investment of platform solutions.	An established analytics team using systems integrators to assist in the integration and synthesis of data towards a 360-degree view of visitors across physical and digital properties and platforms.	Integrating customer data from all operations to anchor a fundamental shift from a collections-centric to a customer-centric entity.	Maximizing email campaigns, testing content, and analyzing digital pathways for improved web site use and experience.	

Appendix 5.6: MAH digital data maturity – Processes

Level A	Level B	Capability	0-Nonexistent	1-Initial	2-Infrastructure	3-Integrated	4-Managed	5-Optimizing
Processes		IT Alignment		Fragmented legacy IT systems support processes.	An IT system constructed from functional components supports the process.	An integrated IT system, designed with the process in mind and adhering to enterprise standards, supports the process.	An IT system with a modular architecture that adheres to industry standards for interenterprise communication, supports the process.	Real-time infrastructure is established and maintained.
		Planning / Prioritization		The institution has identified some business processes.	The institution has developed a complete enterprise process model, and the senior executive team has accepted it.	The institution process model has been communicated throughout the institution, is used to drive project prioritization, and is linked to enterprise-level technologies and data architectures.	The institution has extended its process model to connect with those customers and suppliers. It also uses the model in strategy development.	

Appendix 6.1: PEM digital data maturity – Governance

Level B	Capability	0-Nonexistent	1-Initial	2-Infrastructure	3-Integrated	4-Managed	5-Optimizing
Standards / Policy	Select		There is a process in place to define the selection of any digital asset (or asset with digital components).	The selection of a digital asset is dependant on the number of intrageton points with other existing or legacy sysems or platforms.	The priority of any asset selection is based on a key gap or opportunity to integrate with or supplant a vital on-point solution or platform.	The selection of any asset is made by not any one individual, but a team representing the variuos diciplines, communities, and digital opportunities of the institution.	Aggregated capacity planning is taken into account in policy and process development.
	Operate		There is little to no documeted operation of the digital asset.	There is documented maintenance of the digital asset.	There is documented onboarding training covering guidelines and best practices for use of digital asset.	Digital assets are reviewed quarterly to dertermine if the use is still valid, any known circumstances or best practices to make the use or process more efficient, and document future uses on a business objective roadmap.	
	Integrate		Digital assets are not chosen for potential integration - any integration is happenstance.	System integrators or API integrators are known prior to the selection of any asset.	There is documentation of all process of how and why systems are integrated with each other.	Digital assets are reviewed quarterly to dertermine if the integration is still valid, any known circumstances or best practices to make the integrationmore efficient, and document future integrations on a business objective roadmap.	
	Adopt		The main user(s) of any digital asset is the bearer of primary digital asset knowledge.	How users will operate the digital asset, point solution, or platform is documented in shared adoption guidelines.	Training is developed documented and required annually for all digital assets.	Training for any new digital assets is created during on-boarding and updated quarterly for knowledge sharing.	
	Adapt		There is little-to-no shared knowledge how digital assets will be used or discarded based on new or growing uses of the institution.	There is a digital asset roadmap depicting all point solutions that need to gradually move to suite or platform solutions.	Digital assets are reviewed quarterly to determine if there is an opprtunity to integrate with any other point solution suite or platform.	A committee reviews existing digital assets to determine if the longevity of the suite or platform in relation to the institution's intended time and use.	
	Consistent		Digital assets are selected at or past time of need and implementation.	Digital assets are identified with overall gaps and opportunities within the overall visitor journey.	An intake form, requirments, and business case are required before any digital asset is reviewed or selected.	Digital assets require a defined onboarding and maintainance process that is documented alongside hands-on and on-demand training.	

Appendix 6.2: PEM digital data maturity – Tools

Level B	Capability	0-Nonexistent	1-Initial	2-Infrastructure	3-Integrated	4-Managed	5-Optimizing
Databases	Fundraising		Launch stand-alone, silo external point solution. Informational only.	Visitor centered architecture with light integration with other systems across the institution.	Use of digital to grow revenue and sales intelligence to provide lead reports to frontline representatives.	Integrated systems tied to cross-channel goals, integrated with customer databases, measuring successes, revenue, and loss.	IT / Digital is a partner in defining business strategy.
	Collections		Launch stand-alone, silo external point solution. Informational only.	Visitor centered architecture with light integration with other systems across the institution.	Understanding the visitor behavior of online and offline collections through profiling exhibition flow and engagement and development of visitor personas.	Integrated systems tied to cross-channel goals, integrated with customer databases, measuring successes, revenue, and loss.	
	Events		Launch stand-alone, silo external point solution. Informational only.	Visitor centered architecture with light integration with other systems across the institution.	Use of digital to grow revenue and sales intelligence to provide lead reports to frontline representatives.	Integrated systems tied to cross-channel goals, integrated with customer databases, measuring successes, revenue, and loss.	
Collaboration			Interdepartment and/or agency communication during asset creation is efficient and consolidated.	There is sufficient resources to analyze and create the online and offline content necessary to meet the institution's needs.	There is a searchable central repository for digital asset management that catalogues current and historical assets.	There is a defined marketing group who owns and develops the marketing and communications technology strategy and defined technology road map, using assistance from IT/IS as needed.	

Appendix 6.2: PEM digital data maturity – Tools (cont.)

Level B	Capability	0-Nonexistent	1-Initial	2-Infrastructure	3-Integrated	4-Managed	5-Optimizing
Digital Assets	Marketing / Communications		All digital (including mobile) interactions are monitored.	Visitor centric processes of engagement and content marketing are tied to the chosen assets.	Digital assets are fully integrated with all end-to-end processes and platforms.	There is a strategic plan for providing contextual and relevant experiences for visitors.	and funding for digital / interactive platforms and tools are a percentage of operating fund.
	Social Media		External communities and participation is identified and engagement is scattered, not consistent.	All social activities are listened to, tracked, and reacted to in real-time.	Geo-location, demographic, and other third-party data sets, are integrated with analytics data and used as traits in the visitor profile. Social media training is part of on-boarding process for all paid employees and volunteers, and includes flexible and dynamic engagement responses.	KPIs of institution include those based on visitor sentiment.	
	Content Management		Able to capture, store, and analyze all touch points in the visitor journey. There are sufficient resources to manage content necessary to meet the institution's needs.	Targeted content is delivered to mobile users whether in-app or on mobile web site. Social content publishing is scheduled and coordinated across the various social networks and performance is included in our web analytics data.	Visitor experiences are consistent and contextual (personalized) across channels, including onsite and offsite. A/B testing is completed.	Digital content is targeted and optimized based on channel and customer interaction touch point. An agile, test-and-learn process in the design, execution, and analysis of all create assets is consistently deployed.	
Information Security	Networks		A local area network (LAN) allows the computers within the institution to communicate and share information between each other, printers, and Internet.	The institution is connected to the internet via ISDN, DSL, Cable, dedicated lease lines, fiber-optic networks, or cellular networks.	The institution has a virtual private network (VPN) offering greater flexibility to remote workers, more stringent security controls, and scalable systems.	A network has been selected based on security and bandwidth needs, the sophistication of setup, and projected growth.	
	Data Security		Data is entered from a variety of sources. There are little to no clear definitions of data needs or how data is collected (from what sources and defined procedures).	Some of the institution's data needs and uses have been clearly defined, but not uniformly documented.	The institution has defined and documented its data needs and uses (data entry procedures and accuracy standards) for each area of service.	The institution has standardized and documented data needs, use, and collection for all levels of service, including a board of directors.	

Appendix 6.3: PEM digital data maturity – Community

Level A	Level B	Capability	0-Nonexistent	1-Initial	2-Infrastructure	3-Integrated	4-Managed	5-Optimizing
Community	Culture	Change Management		There is growing acceptance in the institution about the need to make modest change.	Employees are prepared for significant change in how work is performed.	Employees are ready for major multidimensional change.	Employees recognize change as inevitable and embrace it as a regular phenomenon.	The institution is transformed as a center of creation (online and offline).
		Talent		Performers can name the process they execute and identify the metrics of its performance.	Performers can describe the process's overall flow; how their work affects visitors, other employees in the process, and the process's performance; and the required and actual performance levels.	Performers are familiar both with fundamental business concepts with the drivers of enterprise performance and can describe how their work affects other processes and the institution's performance.	Performers are familiar with the enterprise's industry and its trends and can describe how their work affects interinstitution's performance.	
		Leadership		The institution's senior executive team recognizes the need to improve operational performance but has only a limited understanding of the power of business processes.	At least one senior executive deeply understands the business process concept, how the institution can use it to improve performance, and what is involved in implementing it.	The senior executive views the institution in process terms and has developed a vision of the institution and its processes.	The senior executive team sees its own work in process terms and perceives process management not as a project but as a way of managing the institution.	
	Diversity / Inclusion	Soft Power		The institution demonstrates tolerance and diversity through inconsistent programming.	The institution documents diversity and inclusion action items in mission and within all documented material (online and direct).	The institution supports and demonstrates consistent talent, tolerance, and technology diversity and inclusion across all employment and programming.	The institute defines itself and operates as "the third sector" - a social commons where people generate "the goodwill that allows society to cohere as a cultural entity."	
	Active Listening	Engagement		The senior executive team has started shifting from a top-down, hierarchal style to an open, collaborative style.	The senior executive team leading the process program is passionate about the need to change and about process as the key tool for change.	The senior executive team has delegated control and authority to process owners and process performers.	The senior executive team exercises leadership through vision and influence rather than command and control.	

Appendix 6.4: PEM digital data maturity – Management

Level B	Capability	0-Nonexistent	1-Initial	2-Infrastructure	3-Integrated	4-Managed	5-Optimizing
Leadership			The leadership of the process program lies in the middle management ranks.	A senior executive has taken leadership of, and responsibility for, the process program.	There is a strong alignment in the senior executive team regarding the process program. There is also a network of people throughout the enterprise helping to promote the process program.	Employees and volunteers throughout the institution exhibit enthusiasm for process management and play leadership roles in process efforts.	
Strategy Development			One or more groups advocate and support possibly distinct operational improvement techniques.	An informal coordinating body provides needed program management while a steering committee allocates resources for process redesign projects.	A formal program management office, headed by a chief process officer, coordinates and integrates all process projects, and a process council manages interprocesses integration issues. The institution manages and deploys a; process improvement techniques and tool in an integrated manner.	Process owners work with their counterparts in customer and supplier enterprises to drive interinstitution process integration.	
Organizational Support			Functional managers are responsible for performance, project managers for improvement projects.	Process owners have accountability for individual processes, and a steering committee is responsible for the institution's overall progress with processes.	Process owners share accountability for the enterprise's performance.	A process council operates as the seniormost management body, performers share accountability for institution performance, and the institution has established steering committees with visitors and community members to drive interinstitution process change.	
Communications			The team has the necessary skillsets to analyze and create visitor segments used for targeting.	There are clearly defined and accepted visitor segments based on attributes and behaviors.	Analytics data is used to refine and adjust visitor segment definitions.	There is a strategic plan for communicating and interacting with customers across physical or digital channels and or/or devices in real-time.	

Appendix 6.5: PEM digital data maturity – Metrics

Level A	Level B	Capability	0-Nonexistent	1-Initial	2-Infrastructure	3-Integrated	4-Managed	5-Optimizing
Metrics	Definition / Uses	Customer / Visitor Analytics		The process has some basic cost and quality metrics. Managers use the process's metrics to track its performance, identify root causes of faulty performance, and drive functional improvements.	The process has end-to-end process metrics derived from visitor requirements. Managers use the process's metrics to compare its performance to benchmark, best-in-class performance, and visitor needs and set performance targets.	The process's metrics as cross-process metrics have been derived from the institution's strategic goals. Managers present the metrics to process performers for awareness and motivation. They use dashboards based on metrics for day-to-day management of process.	The process's metrics have been derived from institution's goals. Managers regularly review and refresh the process's metrics and targets and use them in strategic planning. Established and using lifetime value and loyalty calculations, response and purchase propensity modeling, and micro segmentation. Includes surveys/questionnaires, visitor experience research, and customer satisfaction/advocacy modeling.	Business metrics (of value) are created and readily available throughout the institution.
		Sales Analytics		Focused on collection-centric strategies.	Diligently mines visitor data to create programming and other services that delight their most valuable visitor/visiting groups.	Systems and processes are in place to automate reporting and data distribution. Reports are based on complete and integrated data systems. Identifies and continuously awards best members / visitors / visiting groups.	Exercises pricing elasticity modeling, assortment planning, and sales territory design. Reporting requirements for funders, government agencies, and internal management are met by mining data from the institution's information systems.	
		Marketing Analytics		Secondary demographic information is used for decision making.	The institution has identified areas across the customer/visitor journey to capture primary information at the time of activity and/or touchpoint. The analytics staff is sufficiently trained and has the necessary skillset for analytics and reporting needs.	Use analytics to understand how well they generate demand and the quality of visitor experience they provide and steer value-adding activities for a single view of the visitor.	Creates demand forecasting, marketing attribution models, and market mix modeling and media budget optimization.	
		Digital Analytics		Mastering the use of point solutions with little to no investment of platform solutions.	An established analytics team using systems integrators to assist in the integration and synthesis of data towards a 360-degree view of visitors across physical and digital properties and platforms.	Integrating customer data from all operations to anchor a fundamental shift from a collections-centric to a customer-centric entity.	Maximizing email campaigns, testing content, and analyzing digital pathways for improved web site use and experience.	

Appendix 6.6: PEM digital data maturity – Processes

Level A	Level B	Capability	0-Nonexistent	1-Initial	2-Infrastructure	3-Integrated	4-Managed	5-Optimizing
Processes		IT Alignment		Fragmented legacy IT systems support processes.	An IT system constructed from functional components supports the process.	An integrated IT system, designed with the process in mind and adhering to enterprise standards, supports the process.	An IT system with a modular architecture that adheres to industry standards for interenterprise communication, supports the process.	Real-time infrastructure is established and maintained.
		Planning / Prioritization		The institution has identified some business processes.	The institution has developed a complete enterprise process model, and the senior executive team has accepted it.	The institution process model has been communicated throughout the institution, is used to drive project prioritization, and is linked to enterprise-level technologies and data architectures.	The institution has extended its process model to connect with those customers and suppliers. It also uses the model in strategy development.	

Appendix 7.1: Mia digital data maturity – Governance

Level B	Capability	0-Nonexistent	1-Initial	2-Infrastructure	3-Integrated	4-Managed	5-Optimizing
Standards / Policy	Select		There is a process in place to define the selection of any digital asset (or asset with digital components).	The selection of a digital asset is dependant on the number of intraetion points with other existing or legacy sysems or platforms.	The priority of any asset selection is based on a key gap or opportunity to integrate with or supplant a vital on-point solution or platform.	The selection of any asset is made by not any one individual, but a team representing the variuos diciplines, communities, and digital opportunities of the institution.	Aggregated capacity planning is taken into account in policy and process development.
	Operate		There is little to no documeted operation of the digital asset.	There is documented maintenance of the digital asset.	There is documented onboarding training covering guidelines and best practices for use of digital asset.	Digital assets are reviewed quarterly to dertermine if the use is still valid, any known circumstances or best practices to make the use or process more efficient, and document future uses on a business objective roadmap.	
	Integrate		Digital assets are not chosen for potential integration - any integration is happenstance.	System integrators or API integrators are known prior to the selection of any asset.	There is documentation of all process of how and why systems are integrated with each other.	Digital assets are reviewed quarterly to dertermine if the integration is still valid, any known circumstances or best practices to make the integrationmore efficient, and document future integrations on a business objective roadmap.	
	Adopt		The main user(s) of any digital asset is the bearer of primary digital asset knowledge.	How users will operate the digital asset, point solution, or platform is documented in shared adoption guidelines.	Training is developed documented and required annually for all digital assets.	Training for any new digital assets is created during on-boarding and updated quarterly for knowledge sharing.	
	Adapt		There is little-to-no shared knowledge how digital assets will be used or discarded based on new or growing uses of the institution.	There is a digital asset roadmap depicting all point solutions that need to gradually move to suite or platform solutions.	Digital assets are reviewed quarterly to determine if there is an opprtunity to integrate with any other point solution suite or platform.	A committee reviews existing digital assets to determine if the longevity of the suite or platform in relation to the institution's intended time and use.	
	Consistent		Digital assets are selected at or past time of need and implementation.	Digital assets are identified with overall gaps and opportunities within the overall visitor journey.	An intake form, requirments, and business case are required before any digital asset is reviewed or selected.	Digital assets require a defined onboarding and maintanance process that is documented alongside hands-on and on-demand training.	

Appendix 7.2: Mia digital data maturity – Tools

Level B	Capability	0-Nonexistent	1-Initial	2-Infrastructure	3-Integrated	4-Managed	5-Optimizing
Databases	PoS		Launch stand-alone, silo external point solution. Informational only.	Visitor centered architecture with light integration with other systems across the institution.	Use of digital to grow revenue and sales intelligence to provide lead reports to frontline representatives.	Integrated systems tied to cross-channel goals, integrated with customer databases, measuring successes, revenue, and loss.	
	Fundraising		Launch stand-alone, silo external point solution. Informational only.	Visitor centered architecture with light integration with other systems across the institution.	Use of digital to grow revenue and sales intelligence to provide lead reports to frontline representatives.	Integrated systems tied to cross-channel goals, integrated with customer databases, measuring successes, revenue, and loss.	
	Collections		Launch stand-alone, silo external point solution. Informational only.	Visitor centered architecture with light integration with other systems across the institution.	Understanding the visitor behavior of online and offline collections through profiling exhibition flow and engagement and development of visitor personas.	Integrated systems tied to cross-channel goals, integrated with customer databases, measuring successes, revenue, and loss.	
	Events		Launch stand-alone, silo external point solution. Informational only.	Visitor centered architecture with light integration with other systems across the institution.	Use of digital to grow revenue and sales intelligence to provide lead reports to frontline representatives.	Integrated systems tied to cross-channel goals, integrated with customer databases, measuring successes, revenue, and loss.	
Collaboration			Interdepartment and/or agency communication during asset creation is efficient and consolidated.	There is sufficient resources to analyze and create the online and offline content necessary to meet the institution's needs.	There is a searchable central repository for digital asset management that catalogues current and historical assets.	There is a defined marketing group who owns and develops the marketing and communications technology strategy and defined technology road map, using assistance from IT/IS as needed.	IT / Digital is a partner in defining business strategy

Appendix 7.2: Mia digital data maturity – Tools (cont.)

Level B	Capability	0-Nonexistent	1-Initial	2-Infrastructure	3-Integrated	4-Managed	5-Optimizing
Digital Assets	Marketing / Communications		All digital (including mobile) interactions are monitored.	Visitor centric processes of engagement and content marketing are tied to the chosen assets.	Digital assets are fully integrated with all end-to-end processes and platforms.	There is a strategic plan for providing contextual and relevant experiences for visitors.	and funding for digital / interactive platforms and tools are a percentage of operating fund.
	Social Media		External communities and participation is identified and engagement is scattered, not consistent.	All social activities are listened to, tracked, and reacted to in real-time.	Geo-location, demographic, and other third-party data sets, are integrated with analytics data and used as traits in the visitor profile. Social media training is part of on-boarding process for all paid employees and volunteers, and includes flexible and dynamic engagement responses.	KPIs of institution include those based on visitor sentiment.	
	Content Management		Able to capture, store, and analyze all touch points in the visitor journey. There are sufficient resources to manage content necessary to meet the institution's needs.	Targeted content is delivered to mobile users whether in-app or on mobile web site. Social content publishing is scheduled and coordinated across the various social networks and performance is included in our web analytics data.	Visitor experiences are consistent and contextual (personalized) across channels, including onsite and offsite. A/B testing is completed.	Digital content is targeted and optimized based on channel and customer interaction touch point. An agile, test-and-learn process in the design, execution, and analysis of all create assets is consistently deployed.	
Information Security	Networks		A local area network (LAN) allows the computers within the institution to communicate and share information between each other, printers, and Internet.	The institution is connected to the internet via ISDN, DSL, Cable, dedicated lease lines, fiber-optic networks, or cellular networks.	The institution has a virtual private network (VPN) offering greater flexibility to remote workers, more stringent security controls, and scalable systems.	A network has been selected based on security and bandwidth needs, the sophistication of setup, and projected growth.	
	Data Security		Data is entered from a variety of sources. There are little to no clear definitions of data needs or how data is collected (from what sources and defined procedures).	Some of the institution's data needs and uses have been clearly defined, but not uniformly documented.	The institution has defined and documented its data needs and uses (data entry procedures and accuracy standards) for each area of service.	The institution has standardized and documented data needs, use, and collection for all levels of service, including a board of directors.	

Appendix 7.3: Mia digital data maturity – Community

Level A	Level B	Capability	0-Nonexistent	1-Initial	2-Infrastructure	3-Integrated	4-Managed	5-Optimizing
Community	Culture	Change Management		There is growing acceptance in the institution about the need to make modest change.	Employees are prepared for significant change in how work is performed.	Employees are ready for major multidimensional change.	Employees recognize change as inevitable and embrace it as a regular phenomenon.	The institution is transformed as a center of creation (online and offline).
		Talent		Performers can name the process they execute and identify the metrics of its performance.	Performers can describe the process's overall flow; how their work affects visitors, other employees in the process, and the process's performance; and the required and actual performance levels.	Performers are familiar both with fundamental business concepts with the drivers of enterprise performance and can describe how their work affects other processes and the institution's performance.	Performers are familiar with the enterprise's industry and its trends and can describe how their work affects interinstitution's performance.	
		Leadership		The institution's senior executive team recognizes the need to improve operational performance but has only a limited understanding of the power of business processes.	At least one senior executive deeply understands the business process concept, how the institution can use it to improve performance, and what is involved in implementing it.	The senior executive views the institution in process terms and has developed a vision of the institution and its processes.	The senior executive team sees its own work in process terms and perceives process management not as a project but as a way of managing the institution.	
	Diversity / Inclusion	Soft Power		The institution demonstrates tolerance and diversity through inconsistent programming.	The institution documents diversity and inclusion action items in mission and within all documented material (online and direct).	The institution supports and demonstrates consistent talent, tolerance, and technology diversity and inclusion across all employment and programming.	The institute defines itself and operates as "the third sector" - a social commons where people generate "the goodwill that allows society to cohere as a cultural entity."	
	Active Listening	Engagement		The senior executive team has started shifting from a top-down, hierarchal style to an open, collaborative style.	The senior executive team leading the process program is passionate about the need to change and about process as the key tool for change.	The senior executive team has delegated control and authority to process owners and process performers.	The senior executive team exercises leadership through vision and influence rather than command and control.	

Appendix 7.4: Mia digital data maturity – Management

Level B	Capability	0-Nonexistent	1-Initial	2-Infrastructure	3-Integrated	4-Managed	5-Optimizing
Leadership			The leadership of the process program lies in the middle management ranks.	A senior executive has taken leadership of, and responsibility for, the process program.	There is a strong alignment in the senior executive team regarding the process program. There is also a network of people throughout the enterprise helping to promote the process program.	Employees and volunteers throughout the institution exhibit enthusiasm for process management and play leadership roles in process efforts.	
Strategy Development			One or more groups advocate and support possibly distinct operational improvement techniques.	An informal coordinating body provides needed program management while a steering committee allocates resources for process redesign projects.	A formal program management office, headed by a chief process officer, coordinates and integrates all process projects, and a process council manages interprocesses integration issues. The institution manages and deploys a; process improvement techniques and tool in an integrated manner.	Process owners work with their counterparts in customer and supplier enterprises to drive interinstitution process integration.	
Organizational Support			Functional managers are responsible for performance, project managers for improvement projects.	Process owners have accountability for individual processes, and a steering committee is responsible for the institution's overall progress with processes.	Process owners share accountability for the enterprise's performance.	A process council operates as the seniormost management body, performers share accountability for institution performance, and the institution has established steering committees with visitors and community members to drive interinstitution process change.	
Communications			The team has the necessary skillsets to analyze and create visitor segments used for targeting.	There are clearly defined and accepted visitor segments based on attributes and behaviors.	Analytics data is used to refine and adjust visitor segment definitions.	There is a strategic plan for communicating and interacting with customers across physical or digital channels and or/or devices in real-time.	

Appendix 7.5: Mia digital data maturity – Metrics

Level A	Level B	Capability	0-Nonexistent	1-Initial	2-Infrastructure	3-Integrated	4-Managed	5-Optimizing
Metrics	Definition / Uses	Customer / Visitor Analytics		The process has some basic cost and quality metrics. Managers use the process's metrics to track its performance, identify root causes of faulty performance, and drive functional improvements.	The process has end-to-end process metrics derived from visitor requirements. Managers use the process's metrics to compare its performance to benchmark, best-in-class performance, and visitor needs and set performance targets.	The process's metrics as cross-process metrics have been derived from the institution's strategic goals. Managers present the metrics to process performers for awareness and motivation. They use dashboards based on metrics for day-to-day management of process.	The process's metrics have been derived from institution's goals. Managers regularly review and refresh the process's metrics and targets and use them in strategic planning. Established and using lifetime value and loyalty calculations, response and purchase propensity modeling, and micro segmentation. Includes surveys/questionnaires, visitor experience research, and customer satisfaction/advocacy modeling.	Business metrics (of value) are created and readily available throughout the institution.
		Sales Analytics		Focused on collection-centric strategies.	Diligently mines visitor data to create programming and other services that delight their most valuable visitor/visiting groups.	Systems and processes are in place to automate reporting and data distribution. Reports are based on complete and integrated data systems. Identifies and continuously awards best members / visitors / visiting groups.	Exercises pricing elasticity modeling, assortment planning, and sales territory design. Reporting requirements for funders, government agencies, and internal management are met by mining data from the institution's information systems.	
		Marketing Analytics		Secondary demographic information is used for decision making.	The institution has identified areas across the customer/visitor journey to capture primary information at the time of activity and/or touchpoint. The analytics staff is sufficiently trained and has the necessary skillset for analytics and reporting needs.	Use analytics to understand how well they generate demand and the quality of visitor experience they provide and steer value-adding activities for a single view of the visitor.	Creates demand forecasting, marketing attribution models, and market mix modeling and media budget optimization.	
		Digital Analytics		Mastering the use of point solutions with little to no investment of platform solutions.	An established analytics team using systems integrators to assist in the integration and synthesis of data towards a 360-degree view of visitors across physical and digital properties and platforms.	Integrating customer data from all operations to anchor a fundamental shift from a collections-centric to a customer-centric entity.	Maximizing email campaigns, testing content, and analyzing digital pathways for improved web site use and experience.	

Appendix 7.6: Mia digital data maturity – Processes

Level A	Level B	Capability	0-Nonexistent	1-Initial	2-Infrastructure	3-Integrated	4-Managed	5-Optimizing
Processes		IT Alignment		Fragmented legacy IT systems support processes.	An IT system constructed from functional components supports the process.	An integrated IT system, designed with the process in mind and adhering to enterprise standards, supports the process.	An IT system with a modular architecture that adheres to industry standards for interenterprise communication, supports the process.	Real-time infrastructure is established and maintained.
		Planning / Prioritization		The institution has identified some business processes.	The institution has developed a complete enterprise process model, and the senior executive team has accepted it.	The institution process model has been communicated throughout the institution, is used to drive project prioritization, and is linked to enterprise-level technologies and data architectures.	The institution has extended its process model to connect with those customers and suppliers. It also uses the model in strategy development.	

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