

TOWARD A VALUE THEORY OF INNOVATION - A GROUNDED THEORY APPROACH

Abstract

This paper introduces and tests the preliminary results of a new theory about innovation, called Value management, against its own criteria of value, in relation to related theoretical and practical literature. The aim is to show that value management adds value in these situations, for its customers, innovation and customer value scholars, and to explain through this example, what value is, and how value relates to innovation. The theoretical literature is Christensen (1997) in the innovation literature and Zeithaml (1988) in the customer value literature, and the practical literature is the recent Advisory Committee report (2008A) to the US Secretary of Commerce on ‘Measuring Innovation’.

Keywords: Innovation, adoption, consumer value, social construction of technology, grounded theory.

1. Introduction

“We are confronting a universe marked by tremendous fluidity; it won’t and can’t stand still. It is a universe where fragmentation, splintering and disappearance are the mirror images of appearance, emergence and coalescence. This is a universe where nothing is strictly determined. Its phenomena should be partly determinable via naturalistic analysis including the phenomenon of men [and women] participating in the construction of the structures that shape their lives” (Strauss 1978, p.123 in Strauss and Corbin 2003).

In the spirit of the above quote, this research examines how consumers make sense of new technology offerings in a world of endless change. Endless offers compete for our resources, attention, money and patience. This research seeks to link a better understanding of what consumers do with diffusion theory to better understand how consumer technologies spread. This will result in advice to the innovators who present new technology offerings to consumers and to policy makers who seek the economic and employment benefits of technology driven growth.

3G is a new mobile phone technology allowing personal video-conferencing, mobile broadband internet, and is currently undergoing assessment by consumers worldwide. While 3G is in a pre-dominant design phase (Anderson and Tushman 1990), there is significant risk of consumer rejection, and innovation failure. These risks are amplified by the wider context of competing ‘digital convergence’ technologies. I argue delivery technologies, such as 3G, will thrive or die based on their ability to deliver value to consumers. 3G is the site of this current investigation.

The aim of this study is to take a grounded theory approach to understanding how consumers assess the value of new technology. This study draws on technology and innovation management and social construction of technology research as a framework to understand consumer value perceptions. Thus while innovation research has swung towards understanding the process of creating innovation within organisations (Van de

Ven and Rogers 1988), this study aims to shift the focus back towards the consumer and how they develop perceptions of value. In this study, innovation is approached as a dialogue between innovator and consumers to create value.

Recent research outside mainstream innovation and diffusion research emphasises the creation of value for consumers and innovators (Kim and Mauborgne 2005), and the co-construction of value between producers and consumers (Prahalad and Ramaswamy 2004), yet little empirical work explains how consumer value is socially constructed and how consumer value is connected to the innovation and diffusion processes.

Thus the purpose of this study is to link understandings of diffusion of innovation to consumer value. The research question in the study is:

How do consumers understand value in a new technology?

Before turning to the diffusion and value literature, a brief mention of the timely nature of this topic is in order. In December 2006, Hauser, Tellis and Griffin (2006) assessed the agenda for innovation research and found a need for better understanding how consumers are impacted by innovation. Further, the January 2007 *Academy of Management Review* contains four articles on value creation. In introducing the special topic, Lepak, Smith and Taylor (2007) note that value creation is a ‘central concept in management and organization literature’ (p.180), is not well understood, and that there is ‘little consensus on what [it] is or how it can be achieved’ (ibid.). Priem (2007) argues for the importance of consumers in looking at value, suggesting consumers are ‘arbiters of value’ (p.219), and suggests that “scholarly attention to firm-consumer value linkages will likely enhance our understanding of factors leading to sustained high performance” (p.233). My research argues only consumers create value, while firms create value

offerings. Value arises, I argue, when an offering creates net benefit for the consumer.

Without a consumer, I argue no value arises. This argument is supported by some marketing researchers (Vargo and Lusch 2004; Gronroos 2000).

2. Literature & Theory

This thesis is concerned with technology diffusion and takes a consumer value perspective. I argue that consumer value has been under researched in the innovation literature. Moreover, I argue that if the process of consumer value construction is better understood, innovators will better be able to address the needs of consumers and will better understand the processes they need to carry out to identify those needs. Better understanding will accelerate the process of diffusion, and thus provide better returns to innovators. To demonstrate why it is important to understand the process of consumer value construction I will discuss key aspects of the diffusion literature and the consumer value literature.

Static and Dynamic Diffusion

A successful innovation occurs when a new technology diffuses widely in the marketplace. Diffusion theory provides several competing explanations for the successful adoption of an innovation. Historically, innovation studies show a shift from static and mechanistic models to more dynamic explanations of diffusion. These explanations follow the evolving ontologies and epistemologies behind innovation research. The methods include, surveys (Ryan and Gross 1943, Rogers 2003), case studies (Christensen 1993, Bijker 1995, Kim and Mauborgne 2005), retrospective industry mathematical modelling (Bass 1969, Golder and Tellis 1997, Agarwal and Bayus 2002), discourse analysis (Maguire 2003, Munir and Philips 2005), and to a lesser extent other qualitative

methods, such as historical analysis (Lipartito 2003), and grounded theory (Orlikowski 1993).

Rogers and categories of adopters

Rogers (1962, 1971, 1983, 1995, 2003) built on the work of Ryan and Gross (1943), and developed the idea of adopter categories (e.g. early adopters, later adopters), and that people falling into these categories had different characteristics. Early adopters were found to be different to later adopters on a number of variables, and were seen by Rogers (2003, p.282) as “ideal types”.

During the 1960s Bass (1969) took a mathematical modelling approach to diffusion and produced a formula using three variables – the total market potential, the percentage of innovators (p), and the percentage of imitators (q) to predict the number of adoptions over time. A recent review (Meade and Islam 2006) shows some 90 follow up studies that try to model a more complex reality by extending Bass’ model to include advertising, level of income, prices, GDP, and marketing efforts. Yet Meade and Islam (2006) note the limited explanatory power of this approach because “the processes underlying diffusion are far more complex than the models recognise” (p.538).

In a major review of diffusion studies, Rogers (2003, p.44) notes what he sees as a limitation in the literature because of a tendency for surveys and statistical analysis. This, Rogers (2003, p.127) says, raises concerns about bias and methodological rigidity:

“Diffusion research designs consist mainly of correlational analyses of cross-sectional data gathered in one-shot surveys of respondents (usually the adopters and/or potential adopters of an innovation), thus following the methods pioneered by Ryan and Gross (1943)”.

An important point here is that answering questions about why new technology is adopted is difficult because of the range of variables influencing the process and because

of this a range of methods need to be brought to diffusion research. Rogers therefore suggests that:

“When scholars pursue an intellectual paradigm in a research field, it enables them to pursue a coherent set of research directions. The paradigm also imposes and standardizes a set of assumptions and conceptual biases that, once begun, are difficult to recognize and overcome. That is the challenge for the next generation of diffusion scholars” (2003,p.101).

Central to this new research direction, says Rogers (2003, p. xx-xxi), is recognising that diffusion is inherently a negotiated social process in which;

“subjectively perceived information about a new idea is communicated from person to person. The meaning of an innovation is thus gradually worked out through a process of social construction.”

This thesis responds directly to Rogers’ challenge and takes a social constructionist approach (Berger and Luckmann 1966).

Social constructionist approaches to technology began in earnest in the 1980s when historians started to develop alternative explanations of diffusion dynamics (e.g. Hughes 1983). Stimulated by this, the social construction of technology (SCOT) school emerged (Pinch and Bijker 1987, Bijker 1995). It is not only important that this thesis takes a SCOT approach but that it focuses on consumers’ interpretations of the value of technology.

Research based on social construction of technology theory aims to provide a richer and enhanced understanding of the social context in which innovation occurs. In their classic study of the social construction of the bicycle, Pinch and Bjiker (1987) provide a discursive, historical account of an innovation. They identify a range of

social, economic, political and cultural elements influencing the innovation process and chart the many relationships between these elements.

Bijker (1995) describes new technology as presenting itself as a new variation competing for dominance in the market. This is a process of "variation", followed by "selection" and then "stabilisation". Importantly for this thesis, Bijker (1995) also suggests that a period of "interpretive flexibility" (p.269) exists that leads to "closure and stabilisation". This process of interpretive flexibility is one in which consumers decide on the value for an innovation and if it is worth having. This is the process that 3G consumers are working through now.

A new technology is said to work when it is "accepted by relevant social groups" (Bijker 1995, p.270). Thus "an artifact does not suddenly appear as a result of a singular act of heroic invention; instead it is gradually constructed in the social interactions between and within relevant social groups" (Bijker 1995, p.270). Further, "the success of an innovation will depend upon the formation of a new constituency - a set of relevant social groups that adopts the emerging technological frame" (p.278). This view of the diffusion of a technology rejects a linear perspective of technology development, and seeks to provide a richer, more dynamic explanation.

The social construction of technology perspective has been extended by Griffith (1999) and connected with Weick's (1990) work on sensemaking. Griffith recognises Orlikowski's (1992) demand that the importance of how consumers understand technology be taken seriously. Spitz and Hunter (2005) look at the recent legal battles

over Napster as an example of interpretive flexibility in the social construction of technology. They suggest that Napster's technology was a "contested space" (p.178) within which relevant social groups struggled to define its nature. Thus a technology is not simply an object or a process but a negotiation or a relationship between the innovator, consumer and other stakeholders.

What is missing in the SCOT literature is an adequate view of the consumer dealing with an innovator at arms length to make an assessment of value. Let us now touch on the consumer value literature. For this research, an important thread is von Hippel's (1988) work on user driven innovation. In a series of case studies, he found that particular users, which von Hippel called 'lead users', enhanced innovation offerings to suit their particular needs. In follow up work, von Hippel (2005) further emphasised the importance of lead users in tailoring innovations to better suit (and add value) for other consumers.

Also looking at consumers, Christensen's (1993) research about the disk drive industry as it has progressed through a number of generations of technological change established a new connection between technology and consumers. Christensen saw an important distinguishing feature between technology generations, namely the performance of an innovation. This study argues value, as a wider construct, is a better explanation of Christensen's findings.

Payne and Holt (2001) note that the value literature is fragmented and that no widely accepted conceptual framework exists in this area. Woodruff (1997) emphasises the need for richer consumer value theory, and investigation into how consumers form preferences and why those preferences change over time so that organisations can better

predict preference changes. Woodruff notes that value is a perception, and involves a trade off between benefits, utility, costs and quality. Importantly, Woodruff sees value as both a self and socially constructed phenomenon. Flint, Woodruff and Gardial (2002) suggest that "there is simply little empirical research to guide managers who want to better understand changes in what customers' value" (p.102). To help answer this question these researchers undertook a grounded theory study of business to business relationships and found that value assessments changed as circumstances cause stress, and in particular that value is derived through the process of relieving this stress.

Woodruff (1997) suggests a "need for richer customer value theory that delves deeply into the customer's world of product use in their situations ... to help us understand how customers form preferences that reflect desired value" (p.150). Woodruff suggests a need for appropriate research tools to learn about customer value, and to find the nature of the link between customer value strategies and organisational performance.

It is important to discuss the role of price in relation to value because research shows it is easy to over emphasise its role. Agarwal and Bayus (2002), building on work by Bass (1980) and Golder and Tellis (1997), look at takeoff of product innovations. They consider price but reject it as a major factor in takeoff, suggesting non-price factors such as the number of competitors who enter the market are more important. The authors find, after analysing the histories of 30 products, that "new firm entry" is significantly more important than price. The authors put this down to "demand shifts" as the market develops. A value interpretation of these results is that in a new market that the presence of a small number of firms presents as a risk to consumers. More competitors indicate

less risk and a better deal for consumers. Another connection here is with dominant designs theory (Anderson and Tushman 1990).

Gaps in the Diffusion Literature

There is an opportunity to move away from the Rogers diffusion format to more interpretive methods (cf. Sandberg 2000) underpinned by assumptions of a dynamic world of meaning and sense – a socially constructed world – to address how consumers make sense of technology's value through a process of flexible interpretation. Secondly, linking price and pricing strategy to value is an area of diffusion that has not been adequately addressed because while price is static at a point and place in time, pricing strategies are dynamic, and 'one-shot' correlations and statistical models are not always suitable for capturing that reality. I will argue that the consumer understanding of price is part of their assessment of value. The last gap is in understanding individual consumers rather than innovators. This study aims to capture consumers' understanding. Thus, I argue that I can make a contribution to the field of diffusion studies by addressing a contemporary technology using qualitative methods to interview consumers regarding the dynamics of price and pricing strategy and value creation.

Conceptual framework

Miles and Huberman (1994) suggest a conceptual framework assists "focussing and bounding data collection" (p.16). In keeping with grounded theory processes, this study has been narrowed several times in an iterative process (Maxwell 1996) as the literature review, data collection and analysis have proceeded. This research seeks not to understand the objective concept of price, but the parallel, subjectively perceived, socially constructed concept of value. Value as a construct fits well with the social

construction of technology framework, and in particular with theories of the role of interpretive flexibility.

A guiding conceptual framework for this thesis can be considered at micro and macro levels. At the macro level, the consumer interacts with the market. At a micro level, we see more detail, in the form of grounded categories that start to identify and explain how the consumer makes sense of new technology offerings. The diffusion literature tends to focus at the macro level (cf. Rogers 2003; Bass 1969; Ryan and Gross 1943). However, Bijker (1995) considers possible elements of a micro-level “technological frame” that includes consumers’ goals, problem solving strategies and tacit knowledge. Nevertheless, Bijker’s frame elements are not supported by empirical evidence and are only tentatively put forward.

The macro and micro levels relate to the connection between consumer value and diffusion. Value arises at the micro level, and diffusion at the macro level. By connecting value and diffusion conceptually, I argue that diffusion is constructed through value at the micro level, and value impacts diffusion at the macro level.

The focus in this study is the consumer, and the consumer’s understanding of the world around them. Thus the level of analysis, and hence the focus of the data collection, is the individual consumer. Grounded theory is appropriate for accessing and explaining this level of individual understanding.

3. Methodology

This research will use a grounded theory methodology and will focus on how consumers construct an understanding of value in relation to 3G mobile technology.

Rogers (2003) and Hall (2005) suggest there is a need for grounded research in

diffusion research to better understand the choices faced by consumers. Grounded theory is an appropriate method for addressing the research question because it is compatible with the social construction of technology (SCOT) perspective and allows access to understanding an individual's perception of their socially constructed reality. This research is aimed at capturing data about social construction through flexible interpretation of consumer value, which the literature tells us resides in processes of perception (Rogers 2003) and action.

Analytical Process

Grounded theory builds theory through a six step process (Glaser and Strauss 1967, Strauss and Corbin 1990). Firstly, the researcher starts data collection and analysis to explore the data. The sample is not by population, but rather pursues variation in interviewee experience. Second, the researcher codes the data to find categories (open coding), their relations (axial coding) and later, an overarching theme (selective coding). Third, categories are constantly compared with data and revised. Fourth, the outcomes of analysis through identifying categories and comparisons are documented through the use of field 'memos', to reflect and resolve potential researcher bias. Fifth, data collection and analysis continues iteratively, until theoretical saturation is reached, when no new perspectives emerge. Saturation is expected to be reached at around 50 interviews. Sixth, comparison of the produced theory with the literature in the area is done to enrich the theoretical explanation.

Data Collection

Data collection for this study will be done using semi-structured interviews and observation (Glaser and Strauss 1967, Strauss and Corbin 1990). Semi-structured interviews start from general guidelines and then pursue other items of interest as they arise during the interview process. This process allows consumer meaning and structure to arise naturally.

Interviews

After receiving ethical clearance interviews commenced. Current and potential consumers were and will be found using a snowballing technique (Bijker 1995). Interviews last around 30 minutes but vary based on consumers' ability to provide details and explanations of their experience and understanding. After obtaining written consent, interviews were recorded and transcribed. Transcripts are compared to the recordings and any transcription errors amended. Transcripts are provided to respondents in accordance with ethical approval, and respondents are asked to note any inaccuracies that they find. Transcripts are manually coded. Individual interviewees are de-identified in the study to protect their privacy, and allowed to withdraw at any time. No children or marginalised groups are included in this study.

To elicit an answer to the research question, data collection will proceed by exploring consumer's understanding of value within their constructed reality. Thus, information will be pursued around the following questions:

- How did you come to have this technology?
- What has been your experience now that you have had the technology?
- What changes, if any would you make to the technology (and/or related service)?

- What does the technology mean to you?

Observation

Observational data is important in this study. Researchers confirm the need for observation since consumers are not always able to express themselves coherently to explain why they buy. Tidd, Pavitt and Bessant (2005) and Underhill (2000) both note the need for an emphasis on observation to better understand why people buy and how consumers understand new technology. Twelve hours of initial exploratory observations have taken place. Detailed field notes were taken and will be included in analysis.

To date, the 55,000 words of transcript, from eighteen interviews have revealed some 1750 data points which have been coded. These are considered below in the preliminary results. I have argued above that grounded theory is suitable for the research question in this thesis; that it is suitable for accessing the understandings of individuals'; and that it is consistent with the underlying interpretive and constructionist epistemology adopted.

Validity

To improve quality of the results five validity processes are carried out following Flint et al (2002) grounded theory study on business value and Guba and Lincoln (1985).

Credibility is achieved by providing feedback to participants of researcher interpretations of the data. **Transferability** is achieved by continuing to sample until theoretical categories and properties stabilise, and no new disconfirming data is found (Glaser and Strauss 1967), and the concepts explain all data points "from all participants" (p.106). **Dependability** is achieved by asking participants to reflect on past as well as

recent events, ensuring the findings are not limited to recent time and place to seek consistency in the explanation. **Confirmability** is achieved by audit of data analysis by co-researchers, to ensure researcher bias was avoided. **Integrity**, the avoidance of participant evasion, is achieved by interviewing in a professional and non-threatening way, and by ensuring confidentiality.

Grounded theory also requires the emerging theory satisfy four criteria – fit, understanding, control and generality (Glaser and Strauss 1967). To date, the emerging concepts and value fit well with the data, make the actions of the interviewees understandable, and are general enough in conceptual explanation to provide some level of control in future situations. At this stage, there are good early indicators of being on the right track. More data will necessarily enrich interpretations and theory building.

Now, let us turn to a discussion of the preliminary results.

4. Preliminary Results, and Implications

Three aspects of the results shall be considered. The first is an introduction to the eight high level constructs that emerged from the data (of which value is the most important). Secondly, how these eight constructs dynamically relate to one another, and lastly, looking at value in more detail, the twelve dimensions of value that emerged from the data. Consideration of the other high level constructs, particularly value assessment will have to be left to another time.

But first, a little more on the process. To date, eighteen interviews have been analysed and coded, giving rise to 1750 data points (and 1900 codings). While theoretical saturation has not yet been reached, and it does appear close, the results at this stage are preliminary and subject to change from more data. The sample sought variation in age

(18-79), gender, culture, and social demographics, such as income and relationship status. Other variation is still pursued and theoretical saturation when no more may be found. An important question that arose during the analysis is – what is value? Interviewees used around 80 descriptors (value elements) to refer to value, and these were reduced, to twelve value dimensions. Of these value dimensions, four appear universal – mentioned by all interviewees, and the eight others can be split into four social dimensions, and four individual dimensions. All 80 value elements were categorised within one of the value dimensions, except for two, which proved problematic. A list of potential value elements, not found in the data, was made. These value elements were able to be expressed as a combination of the emerging value dimensions.

In total, 222 concepts, properties, consequences, strategies and conditions emerged, following Strauss (1987) coding paradigm, but eight major concepts emerged that explained 98.9% of the data points. The eight major concepts were:

Concept	Data points	% of total
1.Value (V)	1038	56
2.Value assessment (VA)	211	11
3.Innovator strategy (I.strat)	121	6
4.Social Network (soc.net)	120	6
5.Attitudes (Att)	118	6
6.Context	119	6
7.Action	105	5.5
8.Consumer strategy (c.strat)	84	4
Total		100

Table 1: Major emerging concepts from data analysis

A quantitative summary of qualitative data is unusual but provides an overview of the complexity inherent in the innovation and consumer value dataset. In keeping with the value dimension of simplicity, numbers assist the reader to understand more simply before more complexly, but the object here is understanding, not counting. With this in mind, please read these numbers as leading into the complex world of the consumer. Future explanations will be non-numeric. The focus in the current instance is the top level concepts and their dynamics.

Value concepts explained 67% of the total data points. Importantly, 17 value assessment strategies were found – none of which were universal, but two major value assessment approaches were noted. One approach involves four value strategies working together - exploring (mentioned by 67% of interviewees), comparing and contrasting (89%), filtering (56%) and closing (78%). An alternate strategy reflects a consumer's interaction with their social network, and a reliance on social recommendation (72%). Further consideration of value assessment strategies, will remain to be considered at another opportunity.

The analysis highlighted a need to further investigate the connections between the eight major concepts. See figure 1 for the hypothesised relation of the high level concepts. A preliminary review suggested that three feedback loops might be involved. The first loop links innovator strategy, value and action (an individual assessment loop), the second loop links value assessments, value, social network and attitudes (a social assessment loop), and the third loop links value assessment, attitudes and consumer strategy (a consumer learning loop). This model sat well with a dynamic model of value

and innovation interacting, and with feedback and learning by consumers, both individually and in conjunction with their social network.

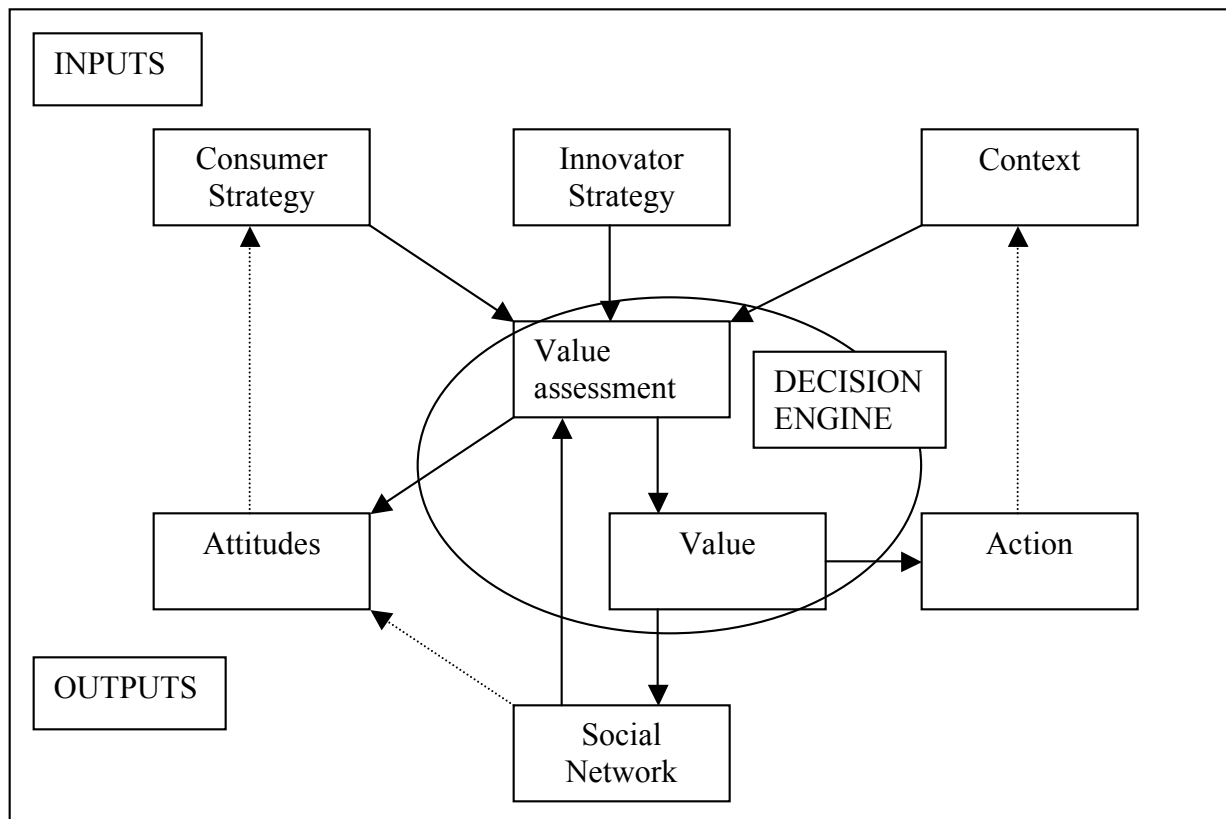


Figure 1 – High level concepts and indicative flows between value concepts (dotted indicates tentative). Actual connections results appear below in Figure 2.

A review of the data particularly for connections between the eight top level constructs proved useful, and identified 600 data points which connected the eight top level concepts. The relationship between the major concepts proved to be more complex, dynamic and contingent than the three feedback loops imagined. Some 100 different types of connections were found, many of them weak. The testing identified a complex and contingent connection between the constructs. The strongest (of the one hundred different types of connections found) linked action and a downward shift in value. Consumers responded most strongly to an assessment of a decrease in value. Positive value assessments showed strong connection with favourable attitude development, and

weaker links to consumer action. The table below shows the major connections found, and their relative strength.

From	To	Strength
I.strat (1)	VA (2)	Strong
VA (2)	Att (3)	“
Att (3)	V (4)	Med
Soc.net (5)	Att (3)	“
Soc.net (5)	Act (6)	“
Soc.net (5)	VA (2)	“
Att (3)	Act (6)	“
I.strat (1)	V (4)	“
V (4)	Act (6)	“
C.strat (7)	VA (2)	“
VA (2)	Act (6)	“
Context (8)	VA (2)	Weak
C.strat (7)	Att (3)	“
I.strat (1)	Att (3)	“
C.strat (7)	Act (6)	“
VA (2)	V (4)	“
Soc.net (5)	V (4)	“

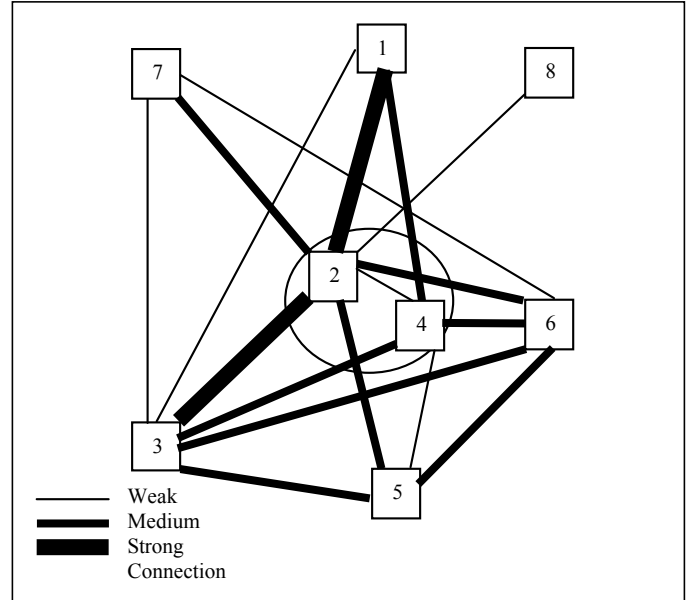


Figure 2 – Shows actual connections between the constructs, based on empirical analysis of 600 connections found in the dataset. Very weak connections ignored.

What does this mean? The connections indicate that a successful adoption by a consumer is not straight-forward for an innovator to achieve. Consumers are tightly tied into their social networks, and their individual value assessment are part of that communication. Attitudes form a strong output of their value assessments also, as temporary stores of value assessments. This model suggests a vibrant dynamic in the innovation adoption process, based on knowledge, communication and learning. This is a rational, and emotional, individual and social, dynamic activity, and leads to further questions about how and why does value change and stabilise. Rogers (2003) linear model of innovation adoption “knowledge, persuasion and action” can be seen as a summary, leaving out the dynamism of a reality, perceivable through grounded theory.

We turn now to a consideration of one aspect of value, which we shall call value dimensions. Value Dimensions often (but not always) include polar opposites, and individuals may prefer one end or the other of the dimension, for instance simplicity and complexity, new or known, community and isolation. The value dimensions were distilled from 80 value elements, that interviewees used to characterise their experience in relation to a new technology. Several higher level categories appeared.

Universal value dimensions were mentioned by (nearly) all interviewees and include price (100%), time/convenience (94% of interviewees), function (100%) and service/reliability (94%).

Social value dimensions include duty (56% of interviewees), power (44%), connection/community (44%) and need (61%).

Individual value dimensions include beauty (33%), emotion (61%), learning (new/known 67%), and simplicity (56%).

Value Dimensions emerging from the dataset

Type	Value Dimensions	%	Opposition	Other value elements
Universal	1. Function	100	Fun Play	Accessories Archive Potential Tool Use
Universal	2. Price	100	Expensive Pay more	Bonus Free Pay later Pay less Something for nothing Tax deduction
Universal	3. Time / Convenience	94	Delay	Convenient Quick Timely
Universal	4. Service / Reliability	94	Problem Trouble	Personalise Solution

Type	Value Dimensions	%	Opposition	Other value elements
				Standard Warranty
Individual	5. Learning / new	67	Known Old Past	Different Interest Important Potential Relevant
Individual	6. Emotion	67	Reason Logic	Exciting Less stress Love Surprise Trust
Social	7. Need	61	Pleasure	Necessity
Individual	8. Simple / complex	56	Complex Doubt Uncertainty	Bundle Certainty Easy Clarity
Social	9. Duty	56	Interest Choice	Commitment Parental
Social	10. Power	44	Powerless Limits	Control Flexible Freedom Mystique Secure Unlimited
Social	11. Connection / community	44	Disconnection Privacy	Brand Status symbol
Individual	12. Beauty / aesthetics	33		Complete Size Style

Table 2 – Value Dimensions emerging from the dataset

Individuals were found to have a variety of combinations of social and individual value elements mentioned in describing their experience with a new technology. These are considered to act like a fingerprint, signifying what is of value, for a particular person, in a particular innovation, in a particular context. This is unlikely to be the same in a range of innovations, for the same person. What was surprising and important was the number of value elements and dimensions that interviewees mentioned, far more than

expected. The interviewees mentioned between eight and 36 value elements, with a median of 21 value elements. This corresponded to between five and 11 value dimensions, but no interviewee mentioned all 12 value dimensions. The number of value elements mentioned indicates the complexity of innovation adoption by consumers, and shows the capacity for taking into account a large number of issues, comparing and balancing them, and reconciling information that may lead them towards alternate actions. Rationality may be of only some little help when dealing with such large numbers of competing value elements. Yet we do. How we do so is for a discussion for a later time, about the 17 value assessment strategies found.

THEORY FEATURES

The emerging value theory of innovation is multi-faceted. It is price sensitive, dynamic, constructionist – including both social and individual perception. It is success, goal and problem neutral. While it follows the grounded theory aims, it attempts to be complex, dense and integrated, and therefore explanatory. Since it is constructionist and assumes a massively interconnected world, where causation is difficult to tease out, it aims to be insightful, not generalisable. It considers innovation strategy, rather than an innovation artifact as a focus. This theory allows for variation in individual value understanding, and adoption processes.

The emerging model has been compared and contrasted with significant theories of innovation as they relate to success with users, that is the spread or diffusion theories, including Rogers (1962, 2003), Ryan and Gross (1943), Bass, (1969), Christensen (1997), and Bijker (1995). Likewise a comparison with some of the important relevant customer value literature, including Flint, Woodruff and Gardial (2002), Woodruff

(1997), Zeithaml (1988) and Holbrook (1996), has been undertaken. While space does not allow for the comparisons to all five theories, a comparison with Christensen (1997), and Zeithaml (1988) is outlined in Section 6 below.

In summary, the value theory of innovation:

- Enriches Christensen's (1997) 'performance' variable;
- Enhances better understanding of qualities of innovation and individual adoption, while sacrificing Bass (1969) predictions;
- Magnifies Bijker's (1995) understanding of group adoption to individual level adoption;
- Extends Bijker's (1995) and Ryan and Gross (1943) historical analysis to a contemporary innovation setting, to access subjective adopters interpretations and understandings.
- Extends Kim and Mauborgne's (2005) value innovation concept, to in-depth understanding of value's connection to innovation.
- Treats adopters as unique individual's rather than Roger's (2003) generalisable, category members, and gives Rogers' linear adoption model, a dynamic and constructionist enhancement, while keeping many key components, such as social process, and adopter process (knowledge/persuasion/decision). The theory also may expand upon Rogers' relative advantage factor in explaining rate of adoption.

Implications of a value understanding of innovation - Value Management

While still in its preliminary stages, this research may have implications for innovation management in terms of developing new processes for consumer value management as part of the innovation and diffusion process. A value management

approach suggests that consumers adopt a new technology when individually they see value in making the decision to consume a new technology. That decision is a personal, individual, unique assessment of costs, benefits and risks, reflecting individual circumstances that lead to the purchase decision, choice or attitude. Assessing value may not lead to a purchase, but it may, for instance, lead to passing positive or negative messages on to the social network of the consumer. Value, therefore, is a moving target. Value moves with new information and experiences: value moves, for example, when one's social network delivers or we encounter information in the media.

Innovators make value offerings, but consumers decide in their individual situation if value exists for that innovation. Thus, innovators need to enter a dialogue with consumers to determine where value is created for the consumer. Customers need to be brought, metaphorically, inside the business to co-create valuable offerings. Greater dialogue needs to be undertaken with the consumer, and consumers need to be able to make a value assessment before they purchase.

These matters lead to a number of more specific innovation process implications in the conclusion, and should be read in conjunction with the limitations, below.

5. Testing the Value Management against innovation and customer value theory

A piece of innovation (Christensen 1997) and customer value (Zeithaml 1988) theory will be used to compare and contrast the emerging model of value and innovation.

Christensen (1997) – The innovators dilemma, Harvard Business School Press (also Bower and Christensen 1995 Harvard Business Review)

Christensen (1997)	Value Mgmt	Similarities	Differences
<ul style="list-style-type: none">Industry dynamics shown	<ul style="list-style-type: none">Value drives purchasingValue is multi-	<ul style="list-style-type: none">Performance as a proxy for value.	<ul style="list-style-type: none">Performance incomplete explanation of

Christensen (1997)	Value Mgmt	Similarities	Differences
<ul style="list-style-type: none"> • Performance over time graphed • Several customer types noted – low level users, high level users, disruptive adopters • Sustaining vs disruptive technology contrasted 	<ul style="list-style-type: none"> • dimensional • Different customers value uniquely • Need to talk to customers to discover value • Value can change with new offerings or technology 	<ul style="list-style-type: none"> • Customer and industry focus • Interviews as source for current meaning of technology, and importance of customer perception • Both models show movement over time • Allows for evolving innovation 	<ul style="list-style-type: none"> • value • Disruption explained as new value dimension • B2B (drives) vs B2C (mobile phones) • Staying close to customers – good or bad • Innovation vs customer focus

Table 3 – Christensen (1997) ‘disruptive technology’ contrasted with value management

Christensen’s model of disruptive technology, explains on a graph of performance against time, the disruption of an old technology by a newer ‘disruptive technology’. The features of a ‘disruptive’ rather than a ‘sustaining’ technology were an inability of market leaders to adopt the technology, both from a demand and supply perspective, and the ‘disruptive technology’ success relied on its potential and ability to improve from a low performance base, incrementally, then to reach the mainstream customer requirements of performance. The ‘disruptive technology’ was initially adopted by a new group of users, who used it for a different purpose. Christensen looked at generations of disk drive producers. A generation was separated, one from the next, by a disruptive technology, and performance was measured in storage capacity or speed, whereas the disruptive aspect was size – a shrinking size from 8” to 5.25” to 3.5” to 2”, over a decade.

Christensen’s model of the disk drive industry, shows a dynamic explanation, by modelling product performance over time, whilst showing different customer requirements of performance speed, capacity, and the disruption of reducing actual size.

Christensen captures two provocative ideas – that market leaders, both producers and suppliers reject disruptive technology, and an alternate market may form who do accept the less performing disruptive technology, that with performance improvements can later encompass the mainstream. Lastly, listening to mainstream customers advice about the disruptive technology – ‘we don’t want it’ sends the wrong signals to mainstream producers.

A value management interpretation allows a new interpretation of Christensen. Performance in Christensen’s model is one dimension of value, and size is another. Price is not considered. Different groups buy according to their own perceptions of value – high performance, low performance, smaller size. Christensen is talking about value, and using performance as a proxy for value. Size is an unexpected and new alternate dimension of value, not valued by mainstream customers. Newness is also not valued, in itself as highly as performance. Listening to mainstream customers is devalued since the wrong message is received. Instead a wider definition of customers and value is required. Different customers demand different dimensions of value, so they have different stories to tell. Listening to customers is not wrong, but listening to one group and using them as a proxy for all customers is. Kim and Mauborgne (2005) use the term non-customers as an important source of value information. If a new customer group is emerging with a new combination of needs, then ignore them at your peril. This is value management in action. Listen, find what customers (non-customers or potential customers) value, then provide their needs to them.

Now, let us turn to the customer value literature, to contrast what marketing scholars make of the world of customer value.

Zeithaml (1988) Consumer perceptions of price, quality and value: a means-end model and synthesis of evidence, Journal of Marketing

Zeithaml 1988	Value Mgmt	Similarities	Differences
<ul style="list-style-type: none"> Value defined as low price, or quality given price, or return for price, or product benefits Value is perceived overall utility, based on ‘what is received and given’ Value derived from quality, attributes, and price Value properties, include ‘highly personal and idiosyncratic’, dynamic, multi – dimensional, estimated not calculated 	<ul style="list-style-type: none"> Value is subjective, dynamic, socially and individually constructed, and not measurable Value assessed and aggregated between impact on value dimensions Value process and value dimensions explored 	<ul style="list-style-type: none"> Value not measured Value includes balancing inputs and outputs Value involves trading off multiple desired attributes Value ephemeral and dynamic Question investigated - what is value Data collection using small numbers of qualitative in depth interviews 	<ul style="list-style-type: none"> Quality largely absent in value management Value dimensions magnify and make explicit multiple competing attributes, beyond quality Theoretical sampling seeks variation in understanding, whereas Zeithaml uses highly similar demographic target – females 25 - 49 with a child under 10

Table 4 - Zeithaml’s (1988) value model compared with value management

Zeithaml (1988) explores “what do consumers mean by quality and value?” (p.2)

Zeithaml reaches several conclusion about value that are the basis of value management, including value is ‘highly personal and idiosyncratic’ (p.13), and thus has a ‘variety of meanings held by consumers’ (p.17), is not ‘carefully calculate[d]’ (p.17), and is dynamic in nature (p.18). Also value can be added in multiple ways, and that similarly price has multiple components, including time, effort, search and psychic costs (p.11)

Value management is based on Zeithaml’s properties of value as building blocks, seeing value as subjective, dynamic, not measured, and containing multiple dimensions. The last property emerged from the data analysis, whereas the other properties, were important in the selection of methodology to capture knowledge about value, given that

its nature was of this type. To capture an understanding of such a construct as value, methods such as surveys and analysis such as mathematical modelling would be highly challenged to deal with such a dynamic construct. Grounded theory, the methodology of value management, is designed to capture understanding of highly dynamic realities, and its analytical techniques thus are well suited to understanding value, at higher resolution. Grounded theory seeks variation in understanding, through theoretical sampling, which seeks the widest possible range in interviewees, to shed the most light in variation of the object under investigation. Thus interviews pursued a range of demographics in age, relationship status, and culture, and in future social class, rural rather than urban, and wealth are further variations to be investigated. Zeithaml in contrast, looks at a highly similar group, of females aged 25 – 49, with a child under 10.

Zeithaml (1988) notes that ‘to date no reported empirical studies have investigated the potential of triggers that lead to perceptions of value’ (p.15). Value management seeks to model this very value process in action.

In conclusion, what value management brings to innovation and customer value scholars is simpler language, some more basic building blocks, and an internal consistency and coherency that helps them to view and analyse a value situation more dynamically, more deeply, and with more understanding. Flint et al model (2002), gives me great confidence that the value management model is on the right track, and has potential to fulfil its early promise. Yet the work is only approaching the end of the beginning. There is much yet to be done.

With this in mind, let us turn to the future.

6. The Future – Measuring and Understanding Innovation

This section will look at the next steps in refining and further understanding the model, and consider the implications of this model, in relation to the recent Advisory Committee report (2008A) to the US Secretary of Commerce on measuring innovation.

In September 2006, the US Secretary of Commerce, established a committee of five academic and nine business leaders to advise the US government, how to measure innovation, and how to improve its measurement in the US economy. Full details and documents are available online at <http://www.innovationmetrics.gov>. The committee includes the CEOs of IBM, Microsoft, 3M and academics from the fields of economics, marketing, management and public policy, (from Harvard, Carnegie Mellon, Minnesota and California) and a committee Chair that researches entrepreneurship, with \$2B funds under management. Reporting in January 2008, following public input including from the Federal Reserve Board, the National Science Foundation, IBM, and Booz Allen Hamilton (April 2007), testimony (August 2007) and consideration, the committee found many challenges to measure and understand innovation. Nevertheless, they defined innovation as (p.i) “the design, invention and/or implementation of new or altered products, services, processes, systems or organisational structures, or business models for the purpose of creating value for customers and financial returns for the firm.” (Advisory Committee Report 2008A)

Innovation is thus widely defined, but has to be something new, that creates customer value and firm financial returns. This brings the themes of measuring and understanding innovation into high contrast. Measuring innovation requires measuring value. While profit is easily measured, value is to be understood rather than measured,

since it is ephemeral, dynamic, personal, subjective and the subject of whim, mood, and context. The committee alludes to this when they recognise the need for “tolerance of qualitative and subjective measures” of innovation (p.i).

Thus the tension is between understanding and measuring innovation. This is an epistemological tension. A tension between input output models (a profit focus) and the ‘complex and evolving nature of innovation’, innovation as ‘gloriously messy and constantly evolving’ (Advisory Committee Report 2008B) (a value focus). The challenge for innovation and customer value scholars is to reconcile these two worlds. To assist the government in their goal to measure innovation, we need to synthesise these scientific and phenomenological worlds. This ongoing dialogue is the aim of a value theory of innovation, and the resulting recommendation – value management.

Value management seeks to address this situation by more closely defining what value is, and emphasising the importance of value in successful innovation. Taking a non-casual approach to ontology, and seeing the world as a complex, dynamic, highly contingent, and massively interconnected, suggests that the world is not easily or effectively described by input output models. Value management is a model that focuses on flow, and meaning rather than facts and proof. Validity is not however abandoned, but new pragmatic tests of validity are used – do the resulting ideas provide useful alternate ways of looking at a situation, with concrete advice for action. See Johnson and Duberley (2000) p.167 -173 for more on such validity.

7. Conclusion

I have argued that consumer value is socially constructed and that if this process is understood innovation and diffusion management can incorporate initiatives that bring consumers into dialogue with innovators in more meaningful ways. I also argue that

particular approaches to pricing (and setting other value signals) and managing the relationship between the consumer and innovator can be developed to improve diffusion success. In research terms, this study will challenge the innovation literature to take more seriously the consumer context and to extend its research beyond the organisational focus that it has been criticised for.

In overall terms, this research, while still in its preliminary stages, is likely to provide important insights in relation to the possibility of better understanding the benefits of dialogue in the relationship between innovator's and consumers in research and management. Lastly, there is potential to inform the policy debate, within which 3G falls, about the adoption of technology, and measuring innovation, as a significant driver of future economic growth.

Specific implications of the research – value management

The early analysis is showing value as a driver of consumer adoption of new technology, and as such has impact on innovators and innovation processes. An implication of value, is value management, which recommends innovators can adopt new processes to better deliver value to consumers, and lessen the risk of innovation failure:

1. **The Value Conversation** – better business processes are needed for getting close to consumers to discover consumer value, and how it changes.
2. **The Value Trajectory** - consumers do not act immediately on their value assessment. They make initial assessments, and as they add more assessment information a threshold may be crossed leading to action, reporting to their social network, and to purchasing or not. This suggests that value needs to be tracked by innovators through close monitoring and conversation with consumers in a cost effective and value enhancing way.

3. Simple or complex pricing. Simple pricing will make it easier for a consumer to adopt a new technology, with a simpler value assessment. Complex pricing reduces risks for innovators, but passes those risks on to consumers. Higher consumer risk makes new technology less attractive. Innovators need to discover a comfortable balance with consumers between simple and complex pricing and between risk taken by the innovator and risk taken by the consumer in a new technology.

8. Limitations

This study proceeds from the technology and innovation management literature and customer value literature and could be extended in reference to research in communication, knowledge management, quality management, consumer behaviour, marketing, new product development, economics, psychology, and gender studies literature. In analytical terms, Discourse Analysis, and Actor Network Theory may extend understanding of consumer value creation processes. Further, in this study only current consumers of 3G are interviewed. Non-consumers could also be researched to provide a wider dataset, pursuing differences between consumers and non-consumers. Variation in the answer to the research question by consumers and non-consumers may explain further why some consumers accept and others reject a new technology. And lastly, this study leads to insights, rather than to generalisations, given its interpretive and constructionist approach

Much further work is required. Further data collection and analysis to reach theoretical saturation is required to ensure no more variation in value dimensions, or related constructs and properties. An extended review of major emerging concepts beyond value, to provide examples, and properties of all the top level concepts is

required. Further testing using case studies to translate the theory into practical benefit is required. Three cases are envisaged currently – and innovative wine merchant, an electric vehicle designer, and data analysis software developer. Lastly, a comparison with B2B innovation, will compare and contrast business and private customers to understand their value differences. There is much work yet to be done.

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