RESEARCH PAPER

Adopting and consuming innovations

Ritsuko Ozaki^a* and Mark Dodgson^b

^aImperial College Business School, Imperial College, London, UK; ^bUQ School of Business, University of Queensland, Brisbane, Australia

This paper aims to improve understanding of how innovations are diffused through combining perspectives on the adoption and consumption of innovation. The literature on the adoption of innovation mainly examines issues such as technical functionalities, utility and personality factors. In contrast, research on the consumption of innovation is concerned with the context and meaning of consumer decisions and the values that underlie them. The paper is conceptual and uses Weber's categories of meaning in action to argue the value of combining the primarily 'rational' innovation adoption literature with the more 'emotive' consumption literature. By reference to the consumption of hybrid cars, we show how the innovation adoption literature can be valuably supplemented by an understanding of what consumers of innovation do, why they do it and what doing it means to them. We argue that this combination provides a more holistic understanding of how innovations diffuse and has implications for those delivering, using and researching innovation.

Introduction

Consumption is the sole end and purpose of all production; and the interest of the producer ought to be attended to, only so far as it may be necessary for promoting that of the consumer. (Smith, 1776, p.660)

The diffusion of innovation is the poor relative in the field of innovation studies. Far greater emphasis is placed on studying the evidently more glamorous processes of producing innovation by transforming science and technology through engineering, design and creativity. Only one of the 22 chapters in *The Oxford Handbook of Innovation*, for example, addresses diffusion (Fagerberg *et al.*, 2005). A search of scholarly articles on ABI/Inform Global Database shows 33,704 articles on innovation, but only 1747 on innovation and diffusion.¹ *Prometheus* has published nine articles with diffusion in their titles since 1984, the last being in 2002, and has never published an article with consumption in the title. The literature on the diffusion of innovation is further impoverished by a limited appreciation of the motivations behind consumers' decisions to adopt innovation. The focus tends to be on personal and technical characteristics, ignoring or failing to give sufficient attention to the context and meaning of consumption. Although the ABI/Inform Global Database reveals 1859 papers on innovation and adoption, there are only 413 on innovation and consumption.

^{*}Corresponding author. Email: r.ozaki@imperial.ac.uk

Innovations - new ideas that have been successfully applied - provide social benefit and widespread economic and competitive advantage only once they are diffused. The major technological transformations that have occurred throughout history bring about economic and social progress only once the technologies are widely diffused (Freeman and Perez, 1988). Innovations diffuse when numerous individual decisions are made to adopt them, and appreciating why consumers choose to make their choices is therefore essential to understanding how innovations become widely used and successful. Diffusion results from aggregate adoption behaviours which in turn depend on consumption decisions. To understand diffusion we have to understand consumption. This has broad implications for innovation studies. The economics and management of technological change have not given sufficient attention to this centrally important aspect of innovation. Consumers are increasingly involved, and demanding to be engaged, in the process of creating innovation (von Hippel, 2005), and lifestyle choices on issues such as sustainability and wellbeing are becoming more important. For example, concerns for a sustainable lifestyle influence the choice of a hybrid car (Heffner et al., 2007a) and morality and protectiveness towards future generations associated with using renewable energy affect the adoption of energyefficiency and renewable-energy technologies, such as solar water heating and compact fluorescent lamps (Caird and Roy, 2008). It is therefore crucial for innovation studies to recognize the significance of the act of consumption.

This paper argues that existing studies of the adoption of innovation can be valuably supplemented by research into the consumption of innovation, a field of study that draws on sociology, anthropology and social psychology. This connection is rarely made in the literature. The paper is conceptual, interdisciplinary and synthetical. Our discussion is primarily concerned with consumption by individuals. It does not discuss business-to-business consumption, although the paper will claim that the individual aspects of consumption discussed will have some influence upon it. The next section presents an integrating Weberian framework for analysing the totality of meanings in action related to innovation. The subsequent section reviews some of the major approaches to the study of the adoption of innovation, identifying its core assumptions and foci, followed by a review of some of the major approaches to the study of the consumption of innovation, illustrating how it complements the adoption literature. The paper then highlights the benefits of this combined perspective by means of an illustrative case study of hybrid cars, showing how it improves understanding of the processes that led to the diffusion of this innovation. The final section concludes the paper with consideration of its contributions and shortcomings, and suggests a future research agenda.

A Weberian integrative framework

Rindova and Petkova (2007) identify a gap between the 'intended value' of an innovation, expected by its producers and reflective of their ambitions, and 'perceived value', expected by consumers. As long as this gap exists, innovation diffusion is restricted. To create a bridge, it is necessary to understand how consumers perceive a particular innovation and what motivates them to adopt.

Max Weber's *Verstehen* (Weber, 1978, first published in English in 1968) is an approach that considers, through understanding subjective meaning in action, the processes by which human action acquires motivations. It is an interpretation of action that explains why the action is conducted by looking at the mechanism by which

meaning is attached to the act. For example, why does a person buy a particular make of car? The reason has to be considered from the consumer's rather than the producer's viewpoint. The automotive engineer and salesperson may identify the intended value delivered by purchase cost, fuel-efficiency, styling, or ease-of-payment as being the critical factors in the decision; but the consumer's perceived value may lie in the way the consumer knows it will make friends delightfully envious, or in the way the consumer simply loves the colour or the comfort derived from always buying that make of car.

Weber distinguishes human actions on a scale of rationality and irrationality. The most rational is *goal-instrumental action*, which is a planned and calculated action based on the consideration of its consequences and means to achieve it. *Homo econo-mus* – 'economic man' – is the prime manifestation of this rationality, where consumers adopt an innovation for economic advantage and when their costs are lower than benefits (assuming, of course, that these factors are quantifiable and such information is available). *Value-rational action* is taken to achieve a 'valued goal' with no or little consideration of its consequences and the appropriateness of the means chosen. It is rational in the sense that the actors consciously direct their actions towards their ultimate values. For example, if a person's goal is environmental protection, s/he may choose to adopt pro-environmental innovations, such as solar hot water collectors and photovoltaic panels. *Affectional action* is led by emotional factors, or sentiment, and is clearly less rational. Finally, *traditional action* is routinized and is appropriate because it has always been done. With this typology, Weber emphasizes the multifaceted and rich nature of human conduct and motivation (Gerth *et al.*, 1991).

The implication of this approach is that it is important to understand the meaning and significance of different actions. This provides us with essential insights into the adoption and consumption of innovation. Economic goals (goal-instrumental action) alone cannot determine innovation adoption decisions. There are usually other motivational factors underlying adoption decisions, such as what people believe (value-rational action), meanings they attribute to them (affectional action), or the way they have always done things (traditional action; traditional action might be considered counter to innovation, but in some cases people consume the latest innovations because they are intrinsically attracted to new technology and have habitually consumed it). People choose to adopt iPods, for example, rather than other MP3 players that are technologically similar and often substantially cheaper, for a variety of reasons that cannot be explained by rational economic choice. Consumption is determined not only by reference to the technical functions and utility of the product, but also by consumers' circumstances and ideas that relate to their adoption decisions (e.g. 'my friends think it is cool', and 'it gets me into their music sharing community'). As we shall argue when we discuss innovation consumption, the value of using a Verstehen approach is that it not only identifies different motivations, but also shows it is necessary to explain why they differ.

Adopting innovations

The classic study of innovation diffusion remains Everett Rogers' *Diffusion of Innovations* (2003), first published in 1962. In this section we shall review Rogers' framework, show how other approaches complement it, and argue that these approaches have some limitations in explanatory power. On the first page of the book, Rogers states: 'getting a new idea adopted, even though it has obvious advantages, is often

very difficult. Many innovations require a lengthy period, often of many years, from the time they become available to the time they are widely adopted'. Decisions on whether to take up an innovation are not instantaneous, but a process that occurs over time, consisting of a series of different actions. As a result, Rogers argues that diffusion research should focus more on the consumer of innovations and that the degree to which people adopt new ideas (i.e. overt behavioural change, or action, rather than cognitive change, or intent) should become the main dependent variable in diffusion research.

Rogers identifies five sequential stages in innovation adoption. An individual: (1) gains knowledge of an innovation (the knowledge stage); (2) forms an attitude towards it (the persuasion stage); (3) decides to adopt or reject it (the decision stage); (4) implements it (the implementation stage); and (5) confirms the decision (the confirmation stage). A range of prior conditions brings consumers into the process in the first place, including their previous experiences, existing needs and problems, norms of their social systems (e.g. their social groups) and general 'innovativeness' (the relative time of adoption).

Innovation adoption is therefore strongly bounded by the social context in which it occurs. For Rogers, the innovation-decision is a social and psychological process as much as an economic one. Indeed, this is widely understood in the innovation adoption literature. One of the best-known case studies of the diffusion of innovation, Morison's (2004, first published in 1966) study of gunfire at sea, shows that despite obvious intrinsic benefits, much depends upon the social context in which innovations are introduced and attitudes towards their source.

Others argue that social influences, such as network effects (Bikhchandani *et al.*, 1992), herd behaviour (Banerjee, 1992) and social interaction and learning (Bandura, 1986), play a significant role in accelerating adoption. According to Rogers (2003), once 10–25% of the population adopt an innovation, there is relatively rapid adoption by the remaining population, forming an S-shaped adoption curve. This resonates with similar models in innovation studies, such as Abernathy and Utterback (1978) and Foster (1986), but Rogers places particular emphasis on the importance of the social network of the potential adopter, and the influence of opinion leaders and peer groups.

It is in Rogers' persuasion stage where a general attitude towards and perception of the innovation develops. An individual becomes more psychologically involved with it and actively seeks, interprets, and assesses the credibility of information about the innovation. The most important factors at this stage are perceptions of the innovation's characteristics or attributes. He argues that most of the variance in adoption rate is explained by five perceived attributes: relative advantage (e.g. economy and status), compatibility (e.g. values, norms and practices), complexity (difficulty in understanding and use), trialability (the degree to which an innovation can be experimented with) and observability (the degree to which effects of adoption are visible). Rogers regards the first two attributes as the most important.

It is the perception of these attributes that affects the individual's decision whether to adopt an innovation. Ostlund (1974) showed in his study of innovation attributes that perceptual variables (consumer perceptions of products) are better predictors of adoption than the adopter's personal characteristics and demographics. Given that innovations can involve an element of uncertainty, Ostlund, and other researchers, have added perceived risk to Rogers' five innovation attributes as an expected probability of economic or social loss resulting from innovation (Ostlund, 1974; Labay and Kinnear, 1981). Lunsford and Burnett's (1992) study of barriers to innovation adoption for the elderly, for example, identifies that it is perceived relative advantage, product usage (complexity), compatibility with values and risk together that influence adoption decisions. This indicates that an analysis of innovation attributes provides more depth to understanding than that provided by demographic and psychographic analysis alone.

Another widely used approach to innovation adoption, the Technology Acceptance Model (TAM), focuses on the utility and usability aspects of innovations to explain how consumers choose to adopt a particular technology. TAM argues that the most important factors influencing decisions on if and how to use technology are: perceived usefulness and perceived ease of use (Davis *et al.*, 1989; Bagozzi *et al.*, 1992). These factors are defined as the degree to which a person believes that using a particular technology would 'enhance his or her performance' and 'be free from effort' (Davis, 1989, p.320). TAM's emphasis on utility and usability corresponds to the relative advantage (usefulness) and complexity (ease of use) attributes of Rogers' framework. Venkatesh and Davis (2000) later developed the Technology Acceptance Model 2 (TAM2), which incorporates social influences, such as subjective norms. According to TAM2, an individual's innovation adoption can be predicted by: (a) their belief about the consequence of adopting a new technology; and (b) how they imagine other people would think of them if they adopt.

TAM is an adaptation of intention models from social psychology that study the processes by which consumers' beliefs form attitudes towards certain behaviour ('intention to behave') and then lead to the performance of the behaviour (Davis *et al.*, 1989), specifically of Ajzen and Fishbein's (1980) Theory of Reasoned Action (TRA). TRA assumes that human behaviour is *rationally* selected by practitioners and that decisions are made *intentionally* based on a particular goal.

This focus on the influence of social environments, usefulness and usability is in line with Rogers' framework (in particular, the effect of social networks, compatibility with norms, and relative advantage and complexity of the innovation). TAM and TAM2 present a rational relationship between consumers' perception of an innovation and their adoption decisions, highlighting the process by which evaluation of information about an innovation forms attitudes towards the innovation and leads to adoption decisions.

However, these rational and cognitive approaches provide rather limited perspectives for understanding consumer adoption behaviour, compared with Rogers' framework. This is because the adoption and diffusion of innovation is a social process (Rogers, 2003) and, beyond cognitive assessment and rational choice, there are nonrational influences and cultural issues that impinge on consumers' adoption behaviour (see Faiers et al., 2007). Indeed, potential adopters react to innovation in many different ways, and a consumer's decision to adopt is informed by a wide range of internal and external factors. In his theory of interpersonal behaviour, Triandis (1977), like TAM and TRA, considers both the effect of attitudes and social norms to be the antecedents to intentions to behave, but he also includes the influence of 'affect', such as unconscious, intrinsic responses to a particular behaviour, and the role of habits, as mediators of actual behaviour. Similarly, Fitzmaurice (2005) argues that people's purchasing behaviour can be hedonistic, self-expressive and identity-congruent, and that these elements should be incorporated into TRA. Why some people choose an iPod over technically equivalent and cheaper competitors can be convincingly explained in terms of Weber's affective and traditional actions.

In the light of Weber's tradition of *Verstehen*, more dynamic, contextual and emotive pictures of behaviour need to be considered in understanding consumer adoption behaviour. We need to go beyond the remit of the rational and cognitive approach when exploring what an innovation means to the consumer in everyday contexts and how this motivates adoption. Of these approaches to innovation adoption, Rogers' (2003) framework is most comprehensive and suitable for understanding where consumers' evaluations of innovations come from and how motivations to adopt innovations are formed. Although Rogers' theory does touch upon such matters as values, practices and status, these are, nevertheless, better explained in the sociological, anthropological and social-psychological approaches of consumption studies. To complement Rogers' diffusion theory, the paper turns to the consumption of innovation literature in an attempt to broaden current understanding of innovation adoption.

Consuming innovation

The decision to adopt an innovation is an act of consumption: to decide to purchase a new computer or to put a solar panel on the roof is to consume, as well as adopt, an innovation. In a number of social science disciplines, such as sociology, anthropology and social psychology in the 1980s and 1990s, consumption came to be seen not as a mere appendage of economic production, but as an important social issue (Featherstone, 1991). From a sociological perspective, Warde (2005, p.137) defines consumption as: 'a process whereby agents engage in appropriation and appreciation ... over which the agent has some degree of discretion'. Thus it is that 'consumption cannot be reduced to demand' (Warde, 2005, p.137). This perspective has much relevance to innovation adoption studies in that it indicates the importance of the context in which adopters make decisions.

At this point we should distinguish between our approach to innovation consumption and that taken in the traditional marketing literature. Much existing empirical research on the consumption of innovation undertaken from a marketing perspective has not fully utilized the insights consumption theories offer. Mainstream consumer adoption research in marketing is predominantly quantitative, examining differences between consumer groups, although qualitative research in consumption exists (e.g. Alvesson, 1994; Belk, 1995; Thompson, 1997). This latter literature, however, does not focus on innovation adoption. There is a long tradition of studying consumers' willingness to adopt new products and technologies through behavioural constructs such as novelty-seeking and risk-taking (Midgley and Dowling, 1978; Goldsmith and Hofacker, 1991), and creativity and previous experiences (Dickerson and Gentry, 1983). Psychographic descriptions of consumers (activities, interests and opinions; e.g. 'fashion conscious', 'disliking housekeeping', 'sports spectator' and 'dieter' (Wells and Tigert, 1971)) have been used to examine differences between adopters and non-adopters (e.g. Dickerson and Gentry, 1983). Some use time spent on a particular consumption activity, and attitudes towards a particular product experience, as the independent variables (e.g. Dickerson and Gentry, 1983). Others look at the effect of demographic attributes, such as age, marital status, occupation, income, home-ownership, household composition and geographic region on innovation adoption behaviour (Manning et al., 1995; Steenkamp et al., 1999; Ironmonger et al., 2000; Im et al., 2003). These analyses presume that consumers' lifestyles are anistorical and relatively stable, treating them as behavioural expressions of personality (Holt, 1997). Important as they are, these studies offer rather static pictures of consumers and do not explain what a particular innovation *means* to consumers.

What is missing in the existing approaches to innovation adoption (and in much of the marketing literature on the consumption of innovation) is understanding of the depth to which adoption is embedded in social practices and therefore has a sociocultural and non-rational dimension to it. Rogers (2003) recognizes that the incompatibility of an innovation with socio-cultural norms can block its adoption. He also regards status-conferring as part of relative advantage and observability attributes, the consequence of which, for example, is seen in some people's adoption of a particular mobile phone to convey desired status and image. The consumer context in which adoption behaviour arises is an important element in understanding the adoption of innovation. Adoption research in marketing provides a basis for understanding 'who' wants 'what'. But, as Holt (1997) argues, this approach provides rather non-contextual information, and innovators need to uncover 'why' people prefer certain things if they want their innovations to be adopted and eventually diffused. The adoption of an innovation has to be explained by understanding and interpreting (*Verstehen*) the act of adopting it.

The consumption literature helps in this regard, and complements Rogers' diffusion theory. Consumption of innovations, such as iPods and hybrid vehicles, carries meanings for the consumer, such as the expression of images, identity and cultural references; and the communicative aspects and symbolic capacity of innovation consumption can be considered to mediate social relations (see Southerton, 2001). In post-modern perspectives, consumption is seen as an expression of self beyond the existing social order determined by class, gender, age and ethnicity. It stresses the individual's ability, and need, to reflect on, maintain and construct identity (Giddens, 1991). As Lash and Urry (1994, p.57) put it, 'inasmuch as consumption has taken on heightened significance in contemporary identity-building, choice here should not be understood in a simply utilitarian sense'. For example, the consumption of a hybrid car relates not only to reducing petrol usage, but also to being part of a green community (Kahn, 2007, 2008).

Consuming innovations can therefore be used to communicate values, identities and memberships (Slater, 1997). This is also 'conspicuous consumption' (Veblen, 1994) showing off wealth and status. The anthropological study of material culture sees that people relate to each other through acquired goods, and thus goods are considered to constitute social processes (Miller, 1987). Using social psychological theories, Timmor and Katz-Navon (2008) discuss how people adopt new products on the basis of the need for assimilation and differentiation, depending on the degree of the need to be distinct from others (or similar to a social group), and on the perceived group size. A good example of this is the iPod; the reason one acquires an iPod when one already has an alternative device can be differentiation or membership. Similarly, within sociology, the purchase of new goods is considered to represent both personal and social meanings, because aspiring consumers 'adopt a learning mode towards consumption and the cultivation of a lifestyle' (Featherstone, 1991, p.19). What McCracken (1988) terms the 'Diderot Effect' explains how the process of consumption is exploited by an individual for symbolic purpose. That is, an individual adopts a new thing, such as an iPod, which encourages the individual to maintain a 'cultural consistency' in a complement of goods, such as a MacBook, an iPhone and an iPad.

Lifestyles, or patterns of consumption (Chaney, 1996), thus significantly differ from mere expenditure patterns of time and money, which is the way they tend to be seen in the traditional economics literature of consumption (e.g. Weber and Perrels, 2000). Psychological profiles and quantitative differences in *a priori* values among consumer groups used for marketing segmentation (e.g. Wells and Tigert, 1971; Kamakura and Novak, 1992) continue to be widely used. This literature fails to explain how consumption is used as a tool to symbolize values and social and personal identity, including status, memories and relationships (e.g. Csikszentmihalyi and Rochberg-Halton, 1981; Dittmar, 1992). Conversely, as Hirschman (1982) notes, symbolism is a source of generating innovations: an innovation generated primarily through symbolic change communicates a different social meaning. Such symbolic innovation can be adopted when consumers find an innovation is compatible with their self-identity and image. An innovative water-saving shower, for example, may be less attractive when its meaning is limited to savings on water bills, compared with when it is consumed in the guise of a personal commitment to preserving a precious environmental resource.

Meanings are not immutable, however, and innovation can change them. For example, du Guy et al. (1997) describe how the Sony Walkman became part of our cultural practices and institutions, creating images and social norms, as a result of being avidly consumed. Similarly, Shove (2003) shows how domestic technologies (e.g. a shower and a washing machine) and norms of cleanliness and comfort coevolved historically. These suggest an interdependence between social norms and innovations, indicating that linear models of innovation adoption have limited power to explain why consumers take up innovations. Indeed, the recently developed theory of practices within the sociology of consumption (e.g. Shove, 2003; Warde, 2005) looks at how an innovation, user practices, and values and norms develop together. Practice theory concerns cultural shifts of expectations and practices, rather than individual actions and desires, and suggests the importance of socio-cultural contexts of diffusion. Shove and Pantzar's (2005) study, for example, highlights how innovations are reproduced and diffused in different contexts through reflecting culturally specific concepts and projecting images and meanings, demonstrating the importance of culture for innovation adoption.

The social constructionist perspective is also relevant to understanding the meaning behind consumption. Its basic view of the relativity of knowledge and reality to the social circumstances and environment under which they arise emphasizes the social origins of knowledge, rejecting the universal determinism of social cognition. People perceive the world the way they do because they participate in socially-shared practices, and meaning systems are transmitted, reproduced and transformed through direct and symbolic social interchanges. Their knowledge and conceptual repertoire form the basis for how they understand their world (Berger and Luckman, 1966; Dittmar, 1992), which is a social product and is different across time and culture (Gergen, 1985). This perspective is used by science and technology studies (STS), which argues that the way a technology is used has to be understood within the social context in which it is embedded (Oudshoorn and Pinch, 2005), and the reasons for acceptance and rejection of a technology should be understood according to how and by whom acceptance criteria are defined (Bijker et al., 1987). Sony's robot dog, AIBO, did not sell well in the US because the entertainment robot concept was not conveyed to American consumers, who generally thought of a robot in human shape (Rindova and Petkova, 2007). The consumption of innovation, therefore, has to be perceived and understood in a highly contextualized and nuanced way.

Essentially, the consumption of innovation literature explains the significance of consumers' socio-cultural and personal contexts for motivating innovation adoption behaviour. People's wishes to adopt and consume an innovation are closely related to

their everyday contexts, including institutional configurations, such as routines, traditions, customs and conventions, which are often tacit and embedded in everyday life, and their exposure to external forces, such as the media and the images presented by it. This explanation of consumer context adds additional explanatory richness to the understanding of the way innovations are acquired and used.

Combining the adoption and consumption of innovation approaches

A more complete understanding of how consumers form attitudes towards an innovation and eventually adopt it, benefits from merged insights from the two literatures on adoption and consumption discussed above (see Figure 1). We illustrate this with the example of the adoption of hybrid vehicles (together with a few other cases to support the discussion), within Max Weber's framework on human action.²

Goal-instrumental and value-rational action

Innovation adoption research shows how consumer perceptions impact attitudes towards innovation. Innovation consumption research shows how consumer values and norms are reflected in the act of adoption, and thus how their contexts and practices should be taken into consideration in understanding the formation of perceptions. Financial benefits, environmental values and beliefs, and social norms, for example, all play an important role in the adoption of hybrid vehicles. The choice to purchase a hybrid car is a response by some to increasing petrol prices and government incentives, and is seen as a way to reduce energy consumption and improve energy security (Gallagher and Muehlegger, 2008). These are goal-instrumental in Weber's sense. Consumers are keen to improve fuel-efficiency and save money on petrol (Heffner *et al.*, 2007a,b; Klein, 2007). They replace larger cars with middle-sized hybrid cars in a bid to reduce overall costs (de Haan *et al.*, 2006; Klein, 2007). The



Figure 1. Weber's categories of meaning in action and the adoption and consumption of innovation

opportunity to drive in carpool lanes and avoid traffic congestion charges is seen as an additional advantage (Klein, 2007).

There are also value-rational elements in consumer decision-making. Recent research shows that some consumers who have adopted a hybrid car pay little attention to their vehicles' fuel consumption and that their adoption decision is based only on environmental values (Turrentine and Kurani, 2007; Turrentine et al., 2007). Some explicitly express and communicate their 'greenness' (Heffner et al., 2007a,b) and want to show their greenness through the purchase of a recognizable brand, preferring the Toyota Prius to the less well-known Honda Insight (Gallagher and Muehlegger, 2008). A study of the adoption of green electricity also shows that adoption is driven by consumers' strong environmental values and beliefs; unlike hybrid cars, the adoption of green tariffs does not have tangible benefits, as it usually requires a payment of premiums and the environmental benefits from adopting them are not visible (Ozaki, forthcoming). Similarly, compliance with the norms of the community is significant. Green consumers tend to be clustered geographically, forming green communities; this, in turn, creates a community ideology of which hybrid car ownership is a reflection (Kahn, 2007, 2008). These are value-rational actions in Weber's framework.

Affective and traditional action

Adoption decisions are more complex than can be explained by goal-instrumental and value-rational action. The reason why consumers decide to adopt a certain innovation can be affectional and traditional in Weber's sense. The literature on innovation consumption suggests it can be a tool of outward communication, expressing and managing consumer self-image, as well as identity, wealth, values and so on.

For example, a hybrid car is self-evidently a functional possession, but it is also laden with cultural meanings and images (see Dittmar, 1992). This is affectional in Weber's framework. Some people want to look different or stylish with their hybrid car and enjoy the fact that other people look at it as if it were an Italian sports car (Ozaki and Sevastyanova, forthcoming). This adds motivations to more rational (e.g. costs) and function- and utility-oriented (e.g. power and engine sizes) consumer demands. The literature on the consumption of innovation shows how symbolic meaning is attached to an innovation and the consumption of the innovation is an enactment of the meaning. This understanding complements the argument of diffusion theory, in particular on perceived relative advantage, compatibility and observability. This contextual and motivational understanding bridges the gap between providers' intended value of an innovation and consumers' perceived value. These affective aspects of an innovation can also be seen as 'value added', contributing to consumers' adoption decisions.

The images that innovations offer are important. A study of hybrid car adoption (Heffner *et al.*, 2007b) demonstrates that most hybrid owners did not buy a new technology, but bought new self-identity or new image of themselves as people who behave responsibly towards the ecosystem, or make smart decisions, or improve national energy security (Ozaki and Sevastyanova, forthcoming). This argument is illustrated by the early adoption of hybrid cars by Hollywood celebrities. Conversely, if an innovation provides a dissonant image to its consumers, adoption does not happen. As Lunsford and Burnett (1992) show, elderly consumers do not like innovative products that convey images of the elderly: some have a cognitive age younger

than their chronological age, with a self-image of being younger and healthier than they actually are. So, for consumers to adopt an innovation, the innovation has to be able to offer consumers a new image or reflect their desired image. If the innovation fails to do this, adoption will not occur even if the innovation itself is a good idea.

Secondly, some consumers are intrinsically attracted to new technology, especially the most advanced technology. This is also conducive to the adoption of hybrid vehicles (Heffner *et al.*, 2007a, 2007b; Turrentine and Kurani, 2007) as traditional action in Weber's framework. As the Diderot effect (McCracken, 1988) shows, consumers seek cultural consistency in their possessions; and this implies that those who enjoy the latest products are more likely to adopt products that are new on the market to maintain their image of being fast adopters of new products, and that those who are attracted to advanced technologies are more inclined to adopt new technologies. These examples suggest the importance of non-rational aspects in decision-making, which implies the significance of understanding consumers' innovation adoption contexts.

Finally, the way people actually behave (i.e. adopt innovation) may be inconsistent with their perceptions of an innovation: there may be cognitive-behavioural gaps. For example, a person might perceive a hybrid car positively with its financial benefits and compatibility with personal environmental beliefs, but still not purchase one. In Rogers' framework, perceived risk and uncertainty play an important role in adoption behaviour. Indeed, uncertainties can hinder adoption (e.g. Lunsford and Burnett, 1992; Ozaki, forthcoming) and uncertainties include not only financial and technical, but also social elements. In the case of social uncertainty, it is useful to consider affectional and traditional elements. The unique design of the Toyota Prius can be a selling point for some, but can also be perceived as ugly by others, overcoming their appreciation of the financial benefits and environmental performance that adoption will bring. This is affectional action holding back adoption. The Sony AIBO, mentioned above, is another example. American consumers did not accept an entertainment robot in a dog's shape, revealing traditional action hindering adoption.

Conclusions

Individual consumer decisions about what innovations to adopt are affected by much more than dispassionate instrumental evaluations of utility and technical qualities. Consumers make decisions to adopt innovations for a variety of reasons that can be socially influenced or personal. Today's consumers are becoming ever more unpredictable, eccentric and complex (see Gabriel and Lang, 1995; Kotler and Caslioni, 2009), making the study of innovation increasingly challenging.

Understanding how innovations are consumed is therefore vital for the study of innovation diffusion. Marketing research can usefully distinguish quantitative differences between groups in their personal and demographic characteristics in relation to the adoption of innovations. However, successful adoption and diffusion depends on how well consumer contexts and motivations are understood, and there is a need for the innovation studies literature to research the way these factors affect innovation adoption decisions. The perspectives of innovation consumption studies offer a broader contextual and emotive picture of consumers that includes not only demographic and personality traits affecting customer requirements, which is the focus of marketing research, but also the dynamic contexts where consumers form their opinions and their underlying values govern their actions. The ways motivations are formed, and the meaning ascribed to consumption, need to be incorporated into our understanding of innovation adoption. By combining two traditions – innovation adoption and consumption studies – existing understanding of the demand side in innovation is broadened. The richness of Weber's *Verstehen* derives from the capacity to understand the broad range of meanings in action around innovation adoption and consumption, and highlights the poverty of the limited explanations that currently exist in the innovation literature.

There remain many interesting research questions to explore in the relationships between the adoption and consumption of innovation. Three will be proposed here. First, there would be value in greater understanding of the sequence and priority of motivations in innovation adoption and consumption. The consumption literature shows us, for example, how norms and the influence of social networks (e.g. pressure from peer groups or opinion leaders) can play a big part in the decision to adopt an innovation, such as the purchase of a hybrid car. The questions are whether, how and when these social dimensions assume greater significance than such factors as cost and utility. The key to understanding the process of innovation adoption involves exploring more completely the combinations of and relationships between emotive and instrumental motivations.

Second, in a similar vein, Rogers' theory argues that relative advantage and observability confers social status. Consumption studies provide deep insights into the status-conferring nature of innovation, such as the way the expression of self plays an important part in the process by which meaning is attached to objects and consumption activities. Taking the same example, owning a hybrid car can help a person believe a higher status in society has been achieved. By exploring the process of gaining such meaning from both adoption and consumption perspectives, the way consumers come to adopt a hybrid car will be better understood. This will help scholars to understand and innovation providers to market and position their products better.

Third, *initial* perception of the complexity of an innovation, or ease of use, influences the adoption decision. However, a technical object has a central role to play in a practice: it enables the practice to be performed. Technical objects always demand users have appropriate skills, and when new skills are learned, they help users develop emotional attachment to (the practice of) using the object (Ilmonen, 2004). This is explored in the work of Dant (2004) and Urry (2004) among others, and also applies in the case of hybrid car driving, which requires certain negotiation between the driver and car to achieve environmental benefits (Ozaki *et al.*, 2010). This two-way relationship between technical objects and skills might be explored in longitudinal studies looking at the development of consumer understanding of new technologies in relation to daily routines. Such contextual information about relationships between the innovators to improve their products.

The normative implications for the management of innovation are clear. The most important decision made during the innovation process is that made by the consumer. Markets are created, profits produced and innovative firms survive and grow only when individuals and organizations decide to adopt innovations. Firms that wish to improve their innovation performance have to address the 'supply-side' inputs to their innovation processes, such as market and technological knowledge, product development and R&D investments. But it is also essential for them to understand the 'demand-side' consumption of innovation and how adopters influence the innovation process. The identification of determinants of consumer adoption behaviours allows firms to measure and forecast the economic effects of innovations, which then helps them to improve positioning of their innovations. Understanding the distinctive characteristics and motivations of consumers helps to explain why one product gets chosen over another one of the same price, function and utility. This requires study of the *meaning* that is attached to the product, the *context* in which the adoption decision is made, and the *practices* of which the product can be part. Few of today's organizations can prosper without understanding the motivations and actions of consumers towards their innovative products and services.

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Notes

- 1. Search conducted on 16 March 2010, looking for selected terms in journal citation or abstract.
- 2. One of the authors has been researching the consumption of hybrid cars since 2007, conducting a questionnaire survey, which yielded approximately 1500 responses from hybrid car purchasers (Ozaki and Sevastyanova, forthcoming) and 38 interviews with hybrid car owners (Ozaki *et al.*, 2010).

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