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ORIGINAL EMPIRICAL RESEARCH

Consumer resistance to innovation—a behavioral reasoning perspective

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Abstract Behavioral research shows that reasons for and reasons against adopting innovations differ qualitatively, and they influence consumers' decisions in dissimilar ways. This has important implications for theorists and managers, as overcoming barriers that cause resistance to innovation calls for marketing approaches other than promoting reasons for adoption of new products and services. Consumer behavior frameworks in diffusion of innovation (DOI) studies have largely failed to distinctly account for reasons against adoption. Indeed, no study to date has tested the relative influence of adoption and resistance factors in a single framework. This research aims to address this shortcoming by applying a novel consumer behavior model (i.e., behavioral reasoning theory) to test the relative influence of both reasons for and, importantly, reasons against adoption in consumers' innovation adoption decisions. Based on two empirical studies, one with a product and a second with a service innovation, findings demonstrate that behavioral reasoning theory provides a suitable framework to model the mental processing of innovation adoption. Implications for managers and researchers are discussed.

Keywords Adoption of innovation · Resistance to innovation · Behavioral reasoning theory · Consumer behavior

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Introduction

Understanding whether and why consumers will adopt innovations is critical for firms developing and marketing new products and services. In practice, managers frequently draw on market research of consumers' perceptions of product characteristics or attitudes to predict consumer adoption of innovation. Studies in this field build on diffusion of innovation theory (DOI; Rogers 1962), and widely applied behavioral models include the technology acceptance model (TAM; Davis 1989) or the theory of reasoned action (TRA; Fishbein and Ajzen 1975). However, traditional DOI studies have been widely criticized for neglecting factors that lead to consumer resistance to innovations (e.g., Garcia et al. 2007; Ram and Sheth 1989; Sheth 1981). Given the high failure rate of new products and services, innovation resistance studies have argued that instead of comprehending reasons for adoption, researchers and managers should focus on factors that prevent consumers from adopting innovation (Antioco and Kleijnen 2010). But despite a growing number of studies that have highlighted this, researchers have yet to identify and/or develop behavioral models that account for perceived barriers that lead to rejection of innovations (Kleijnen et al. 2009).

This study contributes to the innovation adoption and innovation resistance literatures by applying behavioral reasoning theory (BRT), which allows innovation researchers and managers to test the relative influence of both *reasons for* and *reasons against* adoption (Westaby 2005). Extensive research shows that people's motives to adopt and reasons to resist innovation differ qualitatively, and they influence people's decisions in different ways (e.g., Antioco and Kleijnen 2010; Garcia et al. 2007; Kleijnen et al. 2009). In other words, reasons for resisting innovations are not necessarily the opposite of reasons for adoption. For example, consumers may see the relative advantage of an innovation like electric vehicles and report positive attitudes toward it. Yet they may still resist

it because of perceived image or cost barriers. Likewise, a person who adopts an electric vehicle may do so because of the environmental advantage, but it is unlikely that people resist electric vehicles because they want to harm the environment (Chazidakis and Lee 2013). This has important implications for the marketing of innovations, since promoting reasons for adoption calls for different approaches other than overcoming barriers that result in resistance (Kleijnen et al. 2009).

Behavioral reasoning theory allows researchers and managers to effectively differentiate between factors for and against adoption, and to evaluate the influence of these conceptually distinct antecedents in a single behavioral decision framework (Westaby 2005). In this way, BRT offers a more complete understanding of consumers' decision making by including context-specific reasons, which serve as important linkages between values, attitudes, and behavioral intentions (Westaby 2005). More importantly, studies have found that behavioral reasoning theory explains variance in people's intentions over and above that of traditional models like the theory of reasoned action (Westaby et al. 2010; Westaby 2005).

The study is structured as follows: First, we review the relevant literature and discuss the factors that lead to adoption and barriers that lead to rejection of innovations. Next, we propose a new theoretical framework and develop hypotheses. We then present the research methodology. Subsequently, we test the hypotheses across two studies in order to estimate the influence of reasons for and, importantly, against innovations in consumers' mental processing of innovation adoption decisions. The article continues with a discussion of the results. Finally, implications, limitations, and directions for future research are provided.

Innovation adoption and resistance

Consumer response to innovation has been identified as a top research priority in marketing science. Marketing scholars have long sought "to describe, explain, and predict how consumers … respond to innovation" (Hauser et al. 2006, p. 688). Consumer response to innovation has traditionally been conceptualized as the adoption decision process, which is often referred to as a hierarchy of effects model (Gatignon and Robertson 1989). Rogers (1962) has described the innovation adoption process as "the process through which an individual or other decision-making unit passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision." The adoption of an innovation can thus be seen as the outcome of a cognitive process, which involves information search and processing on the part of the consumer (Gregan-Paxton and John 1997).

In general, DOI studies can be broadly classified into research around innovation adoption (Rogers 1962) and consumer resistance to innovation (Ram and Sheth 1989). While some researchers have argued that resistance factors are distinct antecedents that differ from influences that lead to adoption (Garcia et al. 2007), others have argued that both factors somewhat overlap (Day and Herbig 1992) and might even constitute mere opposites in consumers' minds. Thus, it is manifestly important to investigate empirically whether or not adoption and resistance factors are distinct constructs, and/or how these factors enter consumers' adoption decisions, providing a clear mandate for further research.

Reasons for innovation adoption

Much DOI research has focused on the evaluation and decision stages, aiming to understand how perceptions of innovation characteristics influence people's likelihood to adopt. In order to do so, innovation researchers have predominately utilized the theory of reasoned action (Fishbein and Ajzen 1975) and the technology acceptance model (Davis 1989). These widely accepted behavioral frameworks have allowed researchers to investigate the influence of perceived product characteristics on consumers' adoption decisions. Generally, TRA predicts that people evaluate innovations in regard to product attributes like relative advantage, compatibility, complexity, trialability, and/or observability, which have a strong influence on their adoption decision (see Table 1). The influence of these attributes on consumers' adoption decisions has been demonstrated across a wide range of innovations, ranging from online grocery shopping (Langerak and Verhoef 2001) to ecological water saving devices (Schwarz and Ernst 2008) and virtual customer integration practices (Bartl et al. 2012).

Davis (1989) adapted the TRA and introduced the technology acceptance model (TAM), which was specifically developed to explain computer usage and adoption of new information technologies. In general, TAM provides the theoretical link between two specific beliefs—perceived usefulness (PU) and perceived ease of use (PEOU)—and potential adopters' attitudes, intentions, and computer usage behavior. Again, the influence of these two motives on consumers' adoption intentions has been demonstrated across a wide range of technological innovation (e.g., Lu et al. 2009; Porter and Donthu 2006; Wu and Wang 2005). Further, TRA and TAM are both rooted in the assumption that consumers' evaluation of product attributes results in the formation of negative or positive attitudes toward an innovation, which ultimately determines the decision whether to adopt or reject a new product or service.

Table 1 Innovation adoption and resistance factors

Adoption factors	Definition	Resistance factors	Definition
Innovation Attributes		*Functional Barriers*	
Relative Advantage	Degree to which an innovation is perceived as being better than the idea/product it supersedes	Usage Barriers	Degree to which an innovation is perceived as requiring changes in consumers' routines (Ram and Sheth 1989)
Compatibility	Degree to which an innovation is perceived as consistent with existing values, past experiences, life styles and needs of potential adopters	Value Barriers	Degree to which an innovations' value-to-price ratio is perceived in relation to other product substitutes (e.g., Molesworth and Suortti 2002)
Complexity	Degree to which an innovation is perceived as relatively difficult to understand and use	Risk Barriers Financial Performance Social	Degree of uncertainty in regard to financial, functional and social consequences of using an innovation (e.g., Posavac et al. 2007)
Trialability	Degree to which an innovation may be experimented with on a limited basis	*Psychological Barriers*	
Observability	Degree to which the results of an innovation are visible to others (Rogers 1962)	Tradition and Norm Barriers	Degree to which an innovation forces consumers to accept cultural changes (Day and Herbig 1992)
Perceived Usefulness	Degree to which using a particular system would enhance job performance	Image Barriers	Degree to which an innovation is perceived as having an unfavorable image (e.g., Ram and Sheth 1989)
Perceived Ease of Use	Degree to which using a particular system would be free from effort (Davis 1989)		

Reasons against innovation adoption

A second, less-established stream in the DOI literature has specifically focused on factors that prevent consumers from adopting new products and services (Garcia et al. 2007; Kleijnen et al. 2009; Ram 1987; Ram and Sheth 1989).

Estimates show that across product categories 40–90 % of innovations never become a commercial success (Gourville 2006). Commonly used examples are Dvorak's keyboard or Sony's BetaMax video tape recorder (VTR). Other products like the dishwasher or screw-tops on wine have languished for years in the chasm between early adopters and mainstream markets before being more widely accepted by consumers (Moore 1999). High failure rates of new products and services should not be surprising, as innovation in its very nature requires consumers to accept changes in price, performance, or design, or it forces people to change habits and routines, or break with entrenched norms and traditions (Berchicci and Bodewes 2005; Garcia et al. 2007). In other words, "innovations mean change to consumers, and resistance to change is a normal consumer response that has to be overcome before adoption may begin" (Laukkanen et al. 2007, p. 420). Consumer resistance to innovation can be seen as a more specific form of people's general resistance to change (Oreg 2003). Ram and Sheth (1989, p. 6) for example have argued that "[i]nnovation resistance is the resistance offered by consumers to an innovation, either because it poses potential changes from a satisfactory status quo or because it conflicts with their belief structure." In general, research suggests that new products and services are rejected because of barriers consumers associate with adopting an innovation (Table 1). Researchers have broadly distinguished between functional and psychological barriers that impede adoption of innovations (Kleijnen et al. 2009).

Functional barriers refer to usage, value, and risk barriers that consumers may associate with a new product or service. Consumers experience usage barriers when an innovation conflicts with existing usage patterns (Ram and Sheth 1989). Consumers tend to have a general preference for status quo solutions, because people generally know how successful current products are in solving their problems (Gourville 2006). One of the reasons why electric vehicles (EVs) have been met with resistance, for example, is the lack of charging stations, which leads to range anxiety, a noted reason for drivers to shun EVs (Zhang et al. 2011).

Likewise, value barriers refer to perceived performance-to-price ratios of innovations, compared with existing product substitutes (Molesworth and Suortti 2002). The influence of value barriers on consumers' adoption decision is well understood, and studies suggest that a low performance-to-price ratio is the most cited obstacle for consumers to adopt innovations (Parasuraman and Grewal 2000).

The third functional barrier causing innovation resistance is perceived uncertainty. Risk is one of the most commonly applied extensions of traditional adoption frameworks like TRA or TAM (Posavac et al. 2007). In the early diffusion stages, consumers have little information about the product. This often results in the postponement of adoption decisions until consumers learn more about it benefits (Dholakia 2001; Ram and Sheth 1989). The literature has discussed several dimensions of risk, including financial, functional (i.e., performance), and social risk (e.g., Stone and Grønhaug 1993).

For example, research shows that consumers are apprehensive about investing in innovative products, even when they can draw on other positive cues (e.g., benefits) to justify their decision (e.g., Agarwal and Teas 2001). Uncertainty in regard to performance often arises when consumers cannot evaluate the functionality or performance of a product, which is particularly prevalent in high-tech innovations. Finally, social risk relates to consumers' worry that an innovation may not be approved by relevant others like friends or family (Stone and Grønhaug 1993).

Psychological barriers, on the other hand, are conflicts consumers may experience when innovations require them to change existing beliefs or break with traditions and norms (Antioco and Kleijnen 2010). The respective literature has focused on two psychological impediments: tradition barriers and image barriers (Kleijnen et al. 2009; Ram and Sheth 1989). Barriers related to tradition and norms may arise when innovations deviate from accepted societal norms, or force consumers to break with entrenched traditions. Consumer behavioral frameworks like TRA have demonstrated how important social norms are in the diffusion of innovation, and how much consumers rely on the opinion of relevant others when making adoption decisions (e.g., Kulviwat et al. 2009). This is particularly apparent in situations in which innovations force consumers to break with deeply embedded traditions, which can result in strong adverse reactions from consumers like negative word-of-mouth or boycotts (John and Klein 2003). Further, image perceptions provide important cues for consumers' adoption decisions. Venkatesh and Brown (2001), for example, showed that one motivation for personal computer adoption and usage at home was status, i.e., peer recognition of owning a personal computer. Low perceived image, for example, can result from unfavorable media coverage, which can result in negative image perceptions that ultimately lead to resistance (Kleijnen et al. 2009). One example is screw-tops on wine, which have traditionally been associated with cheap wine, and they were therefore resisted by large consumer segments (Garcia et al. 2007). Only concerted marketing efforts on the part of the wine industry led to a change in consumers' image perceptions and breaking with traditions and values.

While resistance to innovation has received growing attention in the literature, the vast majority of studies have been of conceptual nature (Kleijnen et al. 2009). More importantly, resistance studies have largely failed to address and/or provide empirical evidence for the notion that pro- and anti-adoption factors have different influences on consumers' adoption decisions.

Reasons for and against adoption—logical opposites?

The majority of DOI studies to date have focused on measuring pro-adoption cognitions rather than anti-adoption influences, "assuming that the latter will simply be the exact opposite of the former" (Chazidakis and Lee 2013). However, scholars have argued that this complementarity assumption holds in the case of (adoption) intentions or attitudes, but not in the case of underlying cognitions such as reasons for and against behaviors (Sutton 2004). For example, when asking people about their attitudes or intentions to adopt an innovation, the statements can be worded positively (i.e., "I like…") or negatively (i.e., "I don't like…"), as they constitute logical opposites. This is not the case with consumers' underlying cognitions (e.g., beliefs or reasons) that explain differences in attitudes or adoption intent. Using a similar example to Chazidakis and Lee (2013, p.3), reasons for adopting an electric vehicle such as favorable cost-benefit ratios or positive image could clearly be logical opposites of reasons against adopting an EV such as a low perceived ratio between costs and benefits or poor image perceptions. But reasons against buying an EV could also include additional considerations, such as range anxiety or a perceived lack of charging stations. These anti-adoption factors are unlikely to be the logical opposite of reasons for adoption, i.e., people are unlikely to adopt an EV because it can go too far or because there are too many charging stations.

The notion that pro-adoption and anti-adoption are not mere opposites is also supported by a growing body of evidence in social psychology (Westaby 2005; Westaby and Fishbein 1996; Westaby et al. 2010). In fact, several psychological models such as decisional balance theory (Janis and Mann 1977), cost-benefit models (Thaler 1999), and reason theory (Westaby and Fishbein 1996; Westaby 2005) suggest that consumers evaluate both reasons for and reasons against when engaging in behaviors such as innovation adoption. These dichotomous forces in consumer decision making have previously been conceptualized as "pros and cons, benefits and costs, and facilitators and constraints/obstacles/barriers" (Westaby 2005, p. 100). Indeed, empirical studies have found strong support for these dichotomous dimensions across a wide array of behavioral settings (Janz and Becker 1984; Prochaska et al. 1994; Venkatesh et al. 2003). Further, experimental studies have shown that consumers not only differentiate between reasons for and against but also evaluate the potential costs of adopting an innovation disproportionately higher than its potential benefits—a phenomenon widely known as "loss aversion" (Gourville 2006; Tversky and Kahneman 1974).

Despite the strong evidence in support of the notion that pro- and anti-adoption factors are not necessarily opposites, commonly applied behavioral intention models such as TRA or TAM do not explicitly account for these distinct influences on consumers' adoption decisions. In this study, we argue that a key problem lies in the conceptualization of adoption factors as broadly construed behavioral beliefs. For example, DOI studies have shown that consumers who believe that an innovation is compatible with their existing values, habits, and past experiences (Tornatzky and Klein 1982) have a higher propensity to adopt. However, the operationalization of this

construct is inconsistent across studies, and Karahanna (2006) identified 15 different definitions of compatibility in the information system adoption literature alone. Likewise, Tornatzky and Klein (1982) have argued that relative advantage can convey almost anything from economic profitability to social benefits or time saved. This confirms "the importance of disaggregating the construct [s] with regard to the specific … issues that might arise (Kleijnen et al. 2009).

One way of addressing this shortcoming is to identify and evaluate the influence of context-specific reasons for and against adoption. Chazidakis and Lee (2013), for example, argue that "focusing on reasons as opposed to related constructs such as beliefs [Ajzen 1991] … offers advantages because they can be measured at a more context-specific level and they can also capture self-justification and defense mechanisms that are otherwise left unaccounted for, in models of buyer behavior [Westaby 2005]."

In order to account for the dichotomous nature of adoption factors, we thus draw on behavioral reasoning theory (Westaby 2005), which allows researchers and managers to effectively differentiate between reasons for and against adoption, and evaluate the influence of these conceptually distinct antecedents in a single behavioral decision framework. In this way, BRT offers a more complete understanding of consumers' decision making by including context-specific reasons, which serve as important linkages between values, attitudes, and behavioral intentions (Westaby 2005). Behavioral reasoning has only recently been applied in the context of innovation adoption, but first results are promising and show that BRT might provide a more complete picture of consumers' mental processing of innovation adoption than traditional DOI models (Claudy et al. 2013). In the following section, we discuss the main premises of behavioral reasoning theory and formulate testable hypotheses in regard to innovation adoption.

Framework and hypotheses

The main premise of behavioral reasoning theory is that reasoning serves a critical role in the mental processing of behavior. Figure 1 summarizes the hypothesized relationships in behavioral reasoning theory (Westaby 2005). In line with behavioral models like TRA, global constructs like attitudes are seen as a key predictor of behavior (H1). However, BRT offers a more complete understanding by including reasons for and against adoption, which influence behavior directly (H3a; H3b) and indirectly via global constructs like attitudes (H2a; H2b). People's personal values are seen as the underlying cognitions, which influence people's reasoning (H4a; H4b) as well as their attitudes (H5). BRT thus allows for distinct psychological processes, or paths in behavioral decision making, which may vary depending on the decision context such as the type of innovation (Westaby 2005, p. 103). In this way, a deeper understanding should emerge about factors that lead to both adoption and resistance of innovations. We develop these hypotheses next.

Attitudes→adoption intentions

In line with related theories, BRT postulates that consumers' behavior (i.e., adoption) can be predicted by their attitudes. According to Eagly and Chaiken (1998, p. 1), attitudes are a "psychological tendency that is expressed by evaluating a particular entity [e.g., innovation] with some degree of favor or disfavor." Attitudes are defined as global motives as they constitute broad substantive factors, which influence behaviors across different domains (Westaby 2005). In marketing, attitudes are seen as key determinants of consumers' purchase decisions, and research suggests that people who hold more positive attitudes toward innovation are more likely to adopt (Bagozzi 1992). We thus postulate that:

H1: Consumers' positive attitudes toward an innovation will influence their adoption intentions.

Reasons→attitudes

However, unlike traditional models, BRT hypothesizes that reasons predict attitudes "because they help individuals justify and defend their actions, which promotes and protects their self-worth" (Westaby 2005, p. 98). As discussed above,

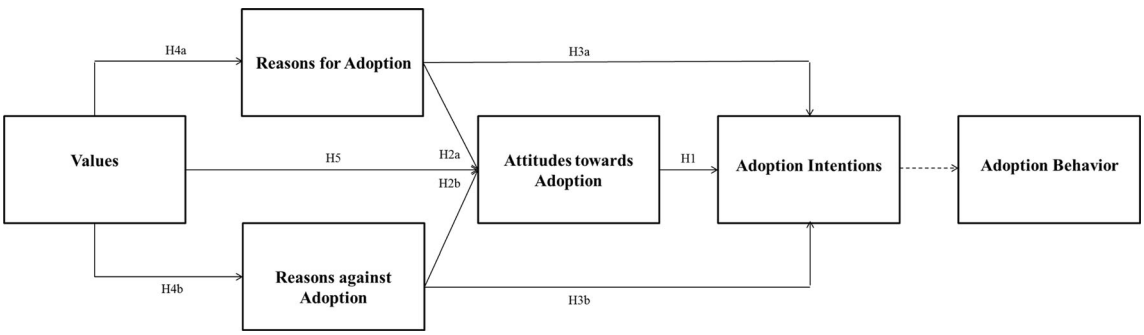

Fig. 1 Theoretical model based on behavioral reasoning theory

reasons are theorized to consist of two distinct dimensions: reasons for and reasons against behavior. The reason concept in BRT relates to several other psychological concepts such as sense making (e.g., Thomas et al. 1993), and psychological coherence (e.g., Nowak et al. 2000). BRT is similar to functional theorizing (e.g., Snyder 1992), which broadly suggest that individuals use reasoning to support the acceptability of decision alternatives, defend and justify their actions and pursue particular goals. More importantly, reasons for and against not only include cost/benefit type explanations, but they can also include broader explanations like facilitating or constraining factors (Westaby 2005, p. 100).

Further, reasons are conceptually different from beliefs. In particular, beliefs and reasons can be "distinguished through the temporal orientation they may take in memory" (Westaby 2005, p. 100). While beliefs can exist prior to an adoption decision, reasons constitute context-specific cognitions that are directly connected to the behavioral explanation. Beliefs have formally been defined as "a person's subjective probability judgment concerning some discriminable aspect of his world" (Fishbein and Ajzen 1975, p. 131). Westaby (2005, p. 100) argues that "while beliefs are broadly construed and can represent many forms of thought, reasons more narrowly focus on the cognitions people use to explain their behavior."

The temporal difference between beliefs and reasons also implies that consumers can have many beliefs about the outcome of adopting an innovation, but beliefs are not necessarily connected to the final adoption decision. For example, a consumer can strongly believe that adopting an electric vehicle would result in significant savings in fuel and carbon emission, and also strongly value these outcomes. However, when making the adoption decision, the consumer might decide against adoption because she has no charging station near her home. "In this example, the reason directly describes the strongest and most central cause in the person's anticipated explanation, whereas the other beliefs and values do not [necessarily] become reasons in the person's explanation" (Westaby 2005, p. 101). In the context of innovation adoption, beliefs would thus reflect people's opinion about the innovation characteristics in general, whereas reasons for/against adoption would constitute specific factors that influence the purchase decision. While DOI studies have traditionally tested the influence of consumer beliefs in regard to an innovation's general attributes, including reason constructs should help to identify the most salient factors in consumers' adoption decisions.

In line with BRT, we expect reasons to influence adoption intentions directly and indirectly via global motives (i.e., attitudes). Regarding the latter, consumers who have strong reasons for (against) adoption will also have positive (negative) attitudes toward it. This is in line with other theories like explanation-based decision making, which postulate that consumers evaluate an innovation favorably when they have strong reasons that support and justify it (Pennington and Hastie 1988). Accordingly, we formulate the following hypothesis in two parts:

H2a: Consumers' reasons for innovation adoption will positively influence their attitudes toward adoption; and
H2b: Consumers' reasons against innovation adoption will negatively influence their attitudes toward adoption.

Reasons→adoption intentions

However, Westaby (2005) also argues that people's reasoning influences their behavioral intentions directly. This direct impact often results from consumers' striving to simplify decision making by using cognitive short cuts or heuristics (Tversky and Kahneman 1974). For example, consumers might see the relative advantage of an innovation, but decide against adoption anyhow because of a critical reason like price. We thus expect that:

H3a: Consumers' reasons for innovation adoption will positively influence their adoption intentions; and
H3b: Consumers' reasons against adoption will negatively influence their adoption intentions.

Values→reasons

Yet, reasoning does not occur in isolation and is expected to be influenced by consumers' deep-rooted values (Westaby 2005, p. 102). Individuals' processing of value information directly affects the reasoning for their anticipated behavior. According to Schwartz (2006), values are motivational constructs, which refer to desirable goals individuals strive to attain. Values thus provide underlying guidance in individuals' selection and/or evaluations of behavioral alternatives. We thus hypothesize:

H4a: Consumers' values will (positively/negatively) influence their reasons for innovation adoption; and
H4b: Consumers' values will (positively/negatively) influence their reasons against innovation adoption.

Values→attitudes

Finally, values can also have a direct, unmediated impact on consumers' attitudes. This is in line with BRT's general assumption that "people use different, distinct, and systematic psychological processes, or paths" in decision making (Westaby 2005, p. 103, quoting Lee et al. 1999, p. 458). For example, consumers might choose a more heuristic or simplified decision making process and decide to adopt an

innovation without fully evaluating its benefits and costs. In other words, in some instances individuals form attitudes without rationally justifying their global motives. We would thus expect that:

H5: Consumers' values will (positively/negatively) influence their attitudes toward innovation adoption.

In summary, BRT should serve as a valuable theoretical framework to better understand the mental processing of innovation adoption and resistance. With knowledge of the thought process for innovation adoption, innovations can be more effectively developed and marketed. In the following section, we outline the respective methods and data analytical steps of the study.

Methodology

In order to test the above outlined hypotheses we conducted two studies. Both studies were undertaken with different sample populations in the Republic of Ireland, and they varied significantly in regard to the object of enquiry (i.e., innovation) and method, thus adding to the validity and reliability of the findings. The data from both studies were analyzed via structural equation modeling in AMOS 18, following Gerbing and Anderson's (1988) two-step approach.

Data collection and sampling

Study 1 was conducted with a sample of $n=254$ house owners in Ireland, who were questioned about their intentions to purchase a renewable energy system, i.e., micro wind turbines. Micro wind turbines can be characterized as high-involvement product innovations, which can be installed on or near residential buildings in order to generate electricity from wind. The data were collected by a professional market research company via computer-assisted telephone interviews (CATI). To ensure an approximation of the overall population a quota sampling approach was applied (Table 2).

Study 2 was conducted with students and staff ($n=379$) at a major Irish university, who were asked about their intention to adopt a high-involvement service innovation: car sharing. Car sharing is an innovative service that provides people in urban areas with short-term access to cars. Consumers who sign up to a car sharing service can locate a nearby car via the internet or an app on their smartphone, open and unlock it via their smartphones, drive it, and later park it at a location of their convenience. The service is paid for via a registered car sharing account, which holds people's credit card information. The price is calculated based on time of usage and distance travelled.

Table 2 Sample statistics

		Study 1 ($n=254$)	Study 2 ($n=379$)
Gender	Female	50 %	60.2 %
Age	<19	2.0 %	11.1 %
	20–25	1.6 %	47.0 %
	26–35	2.0 %	23.5 %
	36–45	23.2 %	7.7 %
	46–55	18.0 %	6.9 %
	56–65	24.4 %	2.9 %
	66+	19.6 %	0.5 %
Household size	1	9.8 %	11.1 %
	2	28.3 %	20.8 %
	3	16.9 %	15.0 %
	4	20.1 %	24.3 %
	5	15.4 %	19.3 %
	6+	9.1 %	9.5 %
Level of education	Primary Certificate	21.3 %	0.3 %
	Leaving Certificate	32.3 %	29.8 %
	Certificate/Diploma	20.1 %	4.5 %
	Degree or Equivalent	26 %	32.5 %
	Master or Equivalent		28.2 %
	Doctorate or Equivalent		4.0 %

The above described innovation contexts were chosen for two reasons. First, both innovations have experienced relatively sluggish uptake by consumers in Ireland, suggesting that individuals have valid reasons against adopting both micro wind turbines and car sharing. This was important, as we wanted to test the relative influence of both reasons for and against adoption. Second, both car sharing and micro wind turbines constitute high-involvement innovations as adoption requires significant information processing on behalf of the consumer. In this way, consumers are more likely to be cognitively engaged and to be able to actively evaluate both reasons for and against adoption.

The data were collected via a web-survey, which was sent to a convenience sample of students and (academic and non-academic) staff via the university's internal server. The statistics for both samples are presented in Table 2. In comparison to the nationally representative sample in Study 1, the second study included a higher proportion of women, younger age groups, and a higher number of people with postgraduate degrees. The descriptive statistics for the individual measures (see Appendix) also show that about 8% of respondents stated that they were likely or very likely to adopt micro wind turbines, while 42% of respondents agreed or strongly agreed that they would adopt car sharing in the future.

Measures

Intention, attitude and values Measures were developed in line with previous BRT studies (Westaby et al. 2010; Westaby 2005) and all items were measured on five-point Likert scales, ranging from strongly agree (1) to strongly disagree (5). Both survey instruments are summarized in the Appendix. In both studies the dependent variable *intention*s as well as the global construct *attitude* were assessed via measures regularly used in behavioral intention frameworks (Fishbein and Ajzen 1975; Westaby et al. 2010). Further, values in Study 1 were operationalized as people's *perceived value compatibility*, which reflects people's beliefs that a new technology is in line with their overall value system (Karahanna 2006). In Study 2, values reflected people's general *openness to change* (e.g., Schwartz 2006). Reasons, on the other hand, are context and innovation specific, and thus they needed to be elicited via exploratory qualitative research, which was conducted prior to the surveys.

Reason elicitation studies Both studies were preceded by exploratory, qualitative research, which aimed to elicit the context-specific reasons for and against adopting micro wind turbines and car sharing, respectively (Westaby et al. 2010). In line with BRT, the qualitative elicitation studies allowed researchers to develop categories representing reasons for and against in the main survey (see below). More importantly, they allowed researchers to formulate items for the main surveys. While the behavior of interest (i.e., adoption of innovation) differed from previously tested behaviors, the wording of the reasons for and against items was adapted from previous studies (Westaby et al. 2010; Westaby 2005).

In order to better understand consumers' reasons for and against adopting micro wind turbines (Study 1), the authors conducted 20 face-to-face interviews with a convenience sample of home owners in Dublin, Ireland (Kvale 1996). The sample consisted of an almost equal number of men and women, and it included different age groups and income categories corresponding to those of Dublin City. During the interviews, respondents were asked to name reasons for and against adopting renewable energies. Like Westaby et al. (2010) we converted the most frequently mentioned reasons for and against adopting micro wind turbines into items (Appendix). During the interviews, the three most commonly mentioned reasons for adopting wind turbines were *energy-cost savings*, *environmental benefits*, as well as being *independent* from conventional sources of energy like oil or gas. Reasons against adopting wind turbines evolved mainly around the high *upfront costs*, perceived *incompatibility* with existing infrastructure, as well as *uncertainty* in regard to the overall performance. All items were measured on five-point Likert scales, ranging from strongly agree (1) to strongly disagree (5). These findings are in line with other studies around eco-innovation (e.g., Nyrud et al. 2008; Schwarz and Ernst 2008) and also match the aforementioned barriers responsible for resistance to innovation (Antioco and Kleijnen 2010). For example, high upfront costs are effectively a value barrier, while perceived incompatibility is essentially a usage barrier. Performance uncertainty on the other hand relates to (performance-) risk barriers, all of which have been widely discussed in the resistance literature (Kleijnen et al. 2009).

Reasons for and against car sharing (Study 2) were elicited via a focus group with 8 students and members of staff at a major Irish university. The group consisted of an equal number of men and women, different age groups, and people with different socio-demographic and cultural backgrounds. Participants were encouraged to discuss the positive and negative aspects of car sharing services. During the focus group it became apparent that the main reasons for utilizing car sharing services were to *save money* and *convenience*. A third reason was that people saw car sharing as a viable substitute for public transport leading to greater *flexibility* in their travel plans. Further, the discussion circled around two main reasons against using car sharing, including problems with *availability*, which is effectively a usage barrier, and *security issues* in regard to personal data and liability in case of an accident, which reflects a specific risk barrier. Like in Study 1, we converted the most commonly mentioned reasons for and against car sharing into items in order to frame the unique context for adoption decisions regarding car sharing. All items were measured on five-point Likert scales, ranging from strongly agree (1) to strongly disagree (5). While reasons for car sharing reflect specific relative advantages, reasons against car sharing seem to correspond with the more broadly construed usage and risk barriers from the resistance to innovation literature. The full list of items and their descriptive statistics are provided in the Appendix.

Results

The above specified hypotheses were tested in the recommended two-step approach (Gerbing and Anderson 1988). In a first step unidimensionality and reliability of the measurement instrument were established, before the hypothesized structural relationships between constructs were tested in a second step.

Confirmatory factor analysis

First, we established the measurement properties (i.e., reliability, discriminant and convergent validity, as well as common method bias) of the all constructs via confirmatory factor analyses in Amos 18 (Table 3 and 4). Results suggest that

Table 3 Confirmatory factor analysis study 1 (micro wind turbines)

	CR	AVE	MSV	ASV	1	2	3	4	5	6	7	8	9
1. Intention	0.88	0.78	0.12	.005	0.89								
2. Attitude	0.86	0.68	0.04	.003	.034	0.82							
3. RF – Financial	0.88	0.70	0.04	0.01	0.31	0.69	0.84						
4. RF – Environmental	0.87	0.77	0.04	0.02	0.16	0.49	0.70	0.88					
5. RF – Independence	0.91	0.77	0.57	0.21	0.24	0.57	0.74	0.75	0.88				
6. RA – Value	0.89	0.74	0.57	0.23	−0.09	0.17	0.18	0.17	0.10	0.86			
7. RA – Risk	0.81	0.59	0.47	0.18	−0.14	−0.02	0.03	0.19	0.10	0.20	0.77		
8. RA – Usage	0.80	0.58	0.31	0.16	−0.19	0.03	0.02	0.06	0.03	0.19	0.06	0.76	
9. Values	0.90	0.75	0.54	0.24	0.26	0.51	0.52	0.56	0.54	0.17	0.11	−0.01	0.87

CFI=0.99; TLI=0.98; RMSEA=0.029; $\chi 2$/df (285.6/236)=1.21

The diagonal shows the square root of the AVE

model 1 (CFI=0.99; TLI=0.98; RMSEA=0.029; $\chi 2$/df (285.6/236)=1.21) and model 2 (CFI=0.99; TLI=0.98; RMSEA=0.032; $\chi 2$/df (149.5/107)=1.40) both provide a good overall fit. All factor loadings were statistically significant and above the cut-off value of 0.5. More importantly, all measures show high reliability and convergent validity, with composite reliabilities (CR) and average variances extracted (AVE) exceeding the recommended standard of 0.7 and 0.5 for all constructs respectively (Bagozzi and Yi 2012).

Results also support the discriminant validity of the measures. First, confidence intervals around the correlation estimates between any two constructs were all significantly different from one (Gerbing and Anderson 1988). Second, the average variance extracted exceeded the squared correlation between all pairs of latent constructs (Fornell and Larcker 1981). The maximum shared variances (MSV) and average shared variances (ASV) are also smaller than the average variance extracted for each construct, providing additional evidence for the discriminant validity of the measures in the model. Finally, we tested for common method variance by comparing both measurement models to one-factor models. In both cases the one-factor model showed significantly inferior fit statistics in comparison to model 1 (CFI=0.54; TLI=0.49; RMSEA=0.16; $\chi 2$/df (2030.6/272)=7.47) and model 2 (CFI=0.46; TLI=0.39; RMSEA=0.18; $\chi 2$/df (1847.3/135)= 13.68). These results suggest that the likelihood of common method variance is low.

Second-order constructs

Westaby (2005, p.105) argues that "individuals are often expected to have considerable variability in how they rate the different reasons explaining behavior" (Westaby 2005, p. 104). This implies that one reason could potentially account for most of the variance in attitudes and/or behavioral intentions. We thus decided against bundling reasons into overall reasons *for* and *reasons against* scales, but instead modelled reasons individually as second-order factor constructs (e.g., Marsh and Hocevar 1985). This way, we could measure the relative influence of specific reasons in consumers' adoption decisions. This approach is also in line with measurement theory, which suggests that second-order models should be applied when lower-order factors correlate with each other (see Table 3 and 4) and when a theoretically justifiable higher

Table 4 Confirmatory factor analysis Study 2 (car sharing)

	CR	AVE	MSV	ASV	1	2	3	4	5	6	7	8
1. Intention	0.94	0.88	0.40	0.14	0.94							
2. Attitude	0.89	0.80	0.54	0.18	0.63	0.90						
3. RF – Financial	0.81	0.68	0.54	0.21	0.53	0.48	0.82					
4. RF – Convenience	0.79	0.57	0.22	0.07	0.64	0.49	0.74	0.75				
5. RF – Flexibility	0.77	0.63	0.27	0.06	0.17	0.23	0.38	0.47	0.80			
6. RA – Usage	0.67	0.51	0.11	0.03	−0.15	−0.15	0.15	0.00	0.21	0.71		
7. RA – Risk	0.83	0.63	0.41	0.18	−0.07	−0.21	0.11	0.17	0.11	0.52	0.79	
8. Values	0.77	0.63	0.27	0.05	0.34	0.17	0.12	0.24	0.09	−0.07	−0.04	0.79

CFI=0.99; TLI=0.98; RMSEA=0.032; $\chi 2$/df (149.5/107)=1.40

The diagonal shows the square root of the AVE

factor (i.e., reasons for and against adoption) exists, which accounts for the relations among the lower order factors (i.e., specific reasons). This way, second-order factor models can provide a more parsimonious and interpretable model (e.g., Chen et al. 2005). The unidimensionality of the second-order models was established via confirmatory factor analyses, summarized in Table 5 and 6. Findings for both Study 1 and Study 2 suggest that the proposed higher-order structure of reasons for and against fits the data well.

Hypothesized relationships

Having established the unidimensionality and reliability of the models, in a next step we estimated the hypothesized relationships between the focal constructs of this study, i.e., adoption intentions, attitudes, reasons, and values. Overall, the findings presented in Table 7 suggest that the hypothesized structural model 1 (χ2/df (328.73/258)=1.27; CFI=0.98; TLI=0.98; RMSEA=0.033) and model 2 (χ2/df (202.99/121)=1.68; CFI=0.97; TLI=0.97; RMSEA=0.042) fit the data well. Further, results support the general pattern of hypothesized linkages between constructs in the model. However, it needs to be noted that the significance of path between model 1 and model 2 differ. This is to be expected and in line with BRT, which allows psychological processes or paths in behavioral decision making to vary, depending on the decision context (Westaby 2005).

In regard to micro wind turbines, results show that previously identified context-specific reasons for and against adoption (second-order constructs) are all salient factors in consumers' decision making (p<0.01). In regard to the hypothesized relationships, findings suggest that values have a positive influence on people's reasons for adoption (H4b: 0.63, p<0.01), which in turn influence consumers' attitudes (H2a: 0.59, p<0.01), which subsequently influence adoption intentions (H1: 0.29, p<0.01). More importantly, results also

Table 6 CFA with second-order factors reasons for and against – Study 2

First-order construct	First-order			Second-order	
	Indicator	Loading	*P*-value	Loading	*P*-value
Reasons for					
Financial benefits	Cost1	0.74	_[a]	0.80	_[a]
	Cost2	0.89	0.001		
Convenience benefits	Con1	0.67	0.001	0.95	0.001
	Con2	0.72	0.001		
	Con3	0.85	_[a]		
Flexibility benefits	Sub1	0.88	_[a]	0.46	0.001
	Sub2	0.70	0.001		
Reason against					
Risk barrier	Saf1	0.76	_[a]	0.86	0.001
	Saf2	0.78	0.001		
	Saf3	0.82	0.001		
Usage barrier	Avail1	0.71	0.001	0.61	_[a]
	Avail2	0.72	_[a]		

CFI=0.98; TLI=0.97; RMSEA=0.039; χ2/df (190.5/120)=1.59

[a] Fixed Parameter

Table 5 CFA with second-order factors reasons for and against – Study 1

First-order construct	First-order			Second-order	
	Indicator	Loading	*P*-value	Loading	*P*-value
Reasons for					
Financial benefits	Econ1	0.86	_[a]	0.87	_[a]
	Econ2	0.84	0.001		
	Econ3	0.81	0.001		
Environmental benefits	Env1	0.90	_[a]	0.84	0.001
	Env2	0.85	0.001		
Independence benefits	Ind1	0.87	_[a]	0.86	0.001
	Ind2	0.90	0.001		
	Ind3	0.87	0.001		
Reasons against					
Value barrier	Cost1	0.83	_[a]	0.53	0.005
	Cost2	0.85	.001		
	Cost3	0.88	.001		
Risk barrier	Risk1	0.75	_[a]	0.36	0.005
	Risk2	0.71	.001		
	Risk3	0.84	.001		
Usage barrier	Com1	0.78	_[a]	0.32	_[a]
	Com2	0.60	.001		
	Com3	0.88	.001		

CFI=0.98; TLI=0.98; RMSEA=0.032; χ2/df (323.8/256)=1.27

[a] Fixed Parameter

Table 7 Structural model results

Study 1: Micro wind turbine			Study 2: Car sharing		
Hypothesized path (first order model)	Std. Estimates	ρ values	Hypothesized path (first order model)	Std. Estimates	ρ values
H1 Attitude→Adoption Intention	0.29	≤ 0.01	H1 Attitude→Adoption Intention	0.31	≤ 0.01
H2a Reasons for Adoption→Attitude	0.59	≤ 0.01	H2a Reasons for Adoption→Attitude	0.62	≤ 0.01
H2b Reasons against Adoption→Attitude	0.03	*ns*	H2b Reasons against Adoption→Attitude	−0.37	≤ 0.01
H3a Reasons for Adoption→Adoption Intention	0.16	*ns*	H3a Reasons for Adoption→Adoption Intention	0.53	≤ 0.01
H3b Reasons against Adoption→Adoption Intention	−0.31	≤ 0.05	H3b Reasons against Adoption→Adoption Intention	−0.22	*ns*
H4a Values→Reasons for Adoption	0.63	≤ 0.01	H4a Values→Reasons for Adoption	0.27	≤ 0.01
H4b Values→Reasons against Adoption	0.22	*ns*	H4b Values→Reasons against Adoption	−0.10	*ns*
H5 Values→Attitude	0.13	*ns*	H5 Values→Attitude	0.00	*ns*
Second order estimated path			Second order estimated path		
Reasons for Adoption→Financial Benefits	0.87	≤ 0.01	Reasons for Adoption→Financial Benefits	0.80	≤ 0.01
Reasons for Adoption→Environmental Benefits	0.83	≤ 0.01	Reasons for Adoption→Convenience Benefits	0.94	≤ 0.01
Reasons for Adoption→Independence Benefits	0.86	≤ 0.01	Reasons for Adoption→Flexibility Benefits	0.46	≤ 0.01
Reasons against Adoption→Value Barrier (Cost)	0.59	≤ 0.01	Reasons against Adoption→Risk Barrier (Safety)	0.63	≤ 0.01
Reasons against Adoption→Risk Barrier (Performance)	0.34	≤ 0.01	Reasons against Adoption→Usage Barrier (Availability)	0.82	≤ 0.01
Reasons against Adoption→Usage Barrier (Incompatibility)	0.33	≤ 0.01	—		

Fit statistics: χ^2/df (328.73/258)=1.27; CFI=0.98; TLI=0.98; RMSEA=0.033

Fit statistics: χ^2/df (202.99/121)=1.68; CFI=0.97; TLI=0.97; RMSEA=0.042

Source: Adapted from Westaby (2005)

show that reasons against adoption have a significant negative influence on adoption intentions directly (H3b: −0.31, $p<0.05$). Reasons for adoption, however, have no direct influence on intentions (H3a: 0.16, *ns*). The negative influence of reasons against has indeed the strongest influence on consumers' adoption intentions. However, people's reasons against adoption appear to be not influenced by values (H4b: 0.22, *ns*) and, more importantly, have no influence on people's attitudes (H2b: 0.03, *ns*).

Findings from Study 2 also suggest that the previously identified context-specific reasons are salient determinants of consumers' adoption intentions ($p<0.01$). However, we find differences in consumers' mental processing of car sharing services, compared to micro wind turbines. Similar to Study 1, we find a strong positive influence of values on reasons for adoption (H4a: 0.27, $p<0.01$), reasons for adoption on attitudes (H2a: 0.62, $p<0.01$), as well as a positive influence of attitudes on adoption intentions (H1: 0.31, $p<.01$). However, unlike with micro wind turbines, results show that consumers' reasons for adopting car sharing have a direct influence on adoption intentions (H3a: 0.53, $p<.01$). Reasons against car sharing, on the other hand, have no direct influence (H3b: −0.22, *ns*). Finally, similar to wind turbines, we find no influence of values on reasons against adoption (H4b: −0.10, *ns*) or attitudes (H5: 0.00, *ns*).

Overall, the findings also support two of BRT's key premises in that (1) reasons for and against adoption are context-specific and are qualitatively different from each other and (2) consumers use different psychological paths when evaluating different types of innovations. The following sections discuss these findings and highlight theoretical and managerial implications of the results.

Discussion of findings

Theoretical implications

The study contributes to the diffusion of innovation literature by applying behavioral reasoning theory (BRT) to test the influence of reasoning constructs in consumers' cognitive processing of innovation adoption decisions. The contribution of this study is threefold.

Firstly, our research focused on reasons against adoption, which have rarely been addressed in empirical adoption of innovation studies (Kleijnen et al. 2009; Venkatesh et al. 2003). As previously discussed, reasons for and against adoption are not just opposites of each other, but they are qualitatively distinct constructs which influence consumers' adoption decisions in different ways. Behavioral reasoning theory allows identifying the salient factors and assessing their *relative* influence on consumers' adoption decisions. While people see the benefits of micro wind turbines like potential cost savings and environmental advantages, people have good reasons not to adopt these technologies, including upfront costs, incompatibility issues, and performance risk. For example, in Study 1, the second-order path coefficients of the reasoning constructs suggest that costs are the greatest barrier (0.59) that prevents consumers from adopting. Likewise, path coefficients of the first-order constructs suggest that reasons against have a stronger (negative) influence on consumers' adoption (−0.31) than reasons for adoption, which influence intentions only indirectly via attitudes (0.29). These findings provide a plausible explanation for the slow diffusion of micro wind turbines in consumer markets. In order to increase consumer intent to adopt micro wind turbines into main stream markets, managers should thus focus on overcoming barriers to adoption, instead of over-emphasizing reasons for adoption.

In Study 2, we also find that people have salient reasons not to adopt car sharing, i.e., security and availability concerns. Again, these are different from consumers' reasons for adoption, which are convenience, flexibility, and cost savings. However, unlike in Study 1, findings of this study suggest that reasons against adoption influence consumers' decisions only indirectly via attitudes. While consumers do evaluate both reasons for and against adoption, path coefficients show that reasons for adoption have a stronger influence on consumers' adoption decisions than reasons against adoption. This finding reflects consumers' behavior in the marketplace. Indeed, car sharing has been adopted by a large consumer base in some regions and is rapidly diffusing in many cities around the globe. However, while many consumers clearly see the benefits of car sharing and choose to adopt this service innovation, our results also indicate that service development and marketing efforts can further improve car sharing by addressing availability and security issues.

Secondly, this study contributes to the DOI literature by testing the influence of context-specific reasons, instead of more broadly construed beliefs. Reasons for and against adoption are likely to vary, depending on the type of innovation and/or the adoption context. This way, reasons differ from more commonly used belief constructs in that they constitute context-specific cognitions, which are directly connected to a behavioral explanation. While consumers can have many beliefs about the attributes of an innovation like its usefulness or relative advantage, beliefs are not necessarily *salient* determinants of consumers' adoption or rejection decisions. Beliefs about innovation characteristics have been widely criticized, and researchers have described them as garbage pail attributes "into which any of a number of innovation characteristics are dumped" (Tornatzky and Klein 1982).

BRT argues that reasons need to be elicited in regard to a specific behavior and context. By doing so researchers and managers are more likely to identify the salient factors that form part of people's decision criteria when deciding whether to adopt or reject an innovation. In order to elicit those context

specific reasons for and against, researchers and managers can employ qualitative methods like interviews, focus groups, or crowdsourcing methods. Indeed, findings presented in this study suggest that consumers have very specific reasons for and against adopting micro wind turbines and car sharing services. Behavioral reasoning theory thus allows researchers and managers to identify salient reasons and to evaluate their relative importance in consumers' adoption decisions. With more accurate knowledge of salient reasons for innovation adoption or rejection, innovations can be more effectively developed and marketed.

Thirdly, a key premise of BRT is that it allows for different psychological paths in consumers' adoption decisions, which may or may not be activated. While many experimental studies have investigated specific psychological processes that consumers activate when evaluating different types of innovation, or when making decisions in different adoption contexts (e.g., Gregan-Paxton and Moreau 2003; Moreau et al. 2001; Wood and Moreau 2006), empirical research often oversimplifies psychological processes in consumers' decision making. On the other hand, models that are comprehensive enough to reflect reality adequately often become empirically untestable. For example, Bagozzi et al.'s (2002) comprehensive model of consumer action is an integrative framework that conceptualizes affective, normative, habitual, and social influences of consumer behavior. Although researchers have argued that it might provide the most elaborate attempt to incorporate a wide range of determinants of consumer behavior into a "single composite theory of consumer action" (Jackson 2005, p. 99), its complexity has so far prohibited any empirical testing. BRT offers a viable alternative to commonly applied models in DOI research, as it allows testing additional cognitive routes in consumers' adoption decisions.

For example, in Study 1 we find evidence for two distinct cognitive routes in consumers' adoption decision. First, people's values positively influence their reasons for adoption, which result in more positive attitudes, and higher purchase intent. In this instance individuals' positive (ecological) values motivate their reasoning, which leads to a higher propensity to adopt. This is in line with findings from the motivated reasoning literature, which has long argued that consumers search for, evaluate, and weigh information, and they form judgments with a self-serving, goal-affirming purpose (Kunda 1990). Without including reasons against constructs this would be just another study reporting the important influence of personal values, attitudes, and positive perceptions of product characteristics on consumers' adoption intentions. However, when including reasons against constructs a different picture emerges, and it becomes apparent that consumers, despite their favorable values and attitudes, are unlikely to adopt because of strong reasons against adoption. The strong negative impact of reasons against constructs can possibly be explained by two effects. First, consumers often strive to simplify decision making by using cognitive shortcuts or elimination heuristics (e.g., categorical exclusion of certain alternatives) in order to reduce the complexity of decisions. In other words, consumers simplify their adoption decisions on the basis of one or more dominant reasons. In the context of Study 1, findings suggest that consumers decide to reject micro wind turbines predominantly on the basis of cost issues. Secondly, perceived losses often have a disproportionately greater influence on people's decisions than potential gains (Gourville 2006; Tversky and Kahneman 1974). Findings in Study 1 seem to confirm this phenomenon, and path coefficients show that reasons against adoption (−0.31) have an almost twice as strong influence on consumers' adoption intentions than reasons for adoption (0.16).

On the contrary, in Study 2 we find that the link between values, reasons, attitudes, and adoption intent consitutues the dominant cognitive path in consumers' adoption decisions. The influence of adoption factors is significantly lower, and only influenced intentions indirectly via attitudes. Thus, by allowing for different cognitive paths BRT is likely to offer managers and researchers a more accurate account of consumers' innovation adoption decisions.

Managerial implications

The findings presented in this study also hold important implications for managers. The traditional focus of DOI research has been on understanding and marketing the positive attributes of innovations' value propositions. In particular, marketers have been advised to focus on communicating the relative advantage of innovations over that of existing products and services. However, as argued in this study, focusing solely on the benefits might be a myopic viewpoint, particularly when innovations require customers to accept changes in product characteristics, or force them to change habits and routines, or break from entrenched norms and traditions (Ram and Sheth 1989). More importantly, we have demonstrated that anti-adoption factors are distinct constructs that do not constitute mere opposites of reasons for adoption (i.e., relative advantage), and that consumers often weigh anti-adoption factors disproportionately higher than potential benefits (Gourville 2006). Further, we have argued that consumers' beliefs about innovation characteristics are not necessarily salient factors in their adoption decisions, and that managers should focus instead on context-specific reasons for and, importantly, against adopting innovations.

Behavioral reasoning theory offers managers a framework to effectively identify and differentiate between pro- and anti-adoption factors, and to assess the relative influence of these dichotomous forces in consumers' adoption decisions. Through (qualitative) consumer research managers should first identify key reasons that impact on consumers' attitudes and adoption intent. In a second step, managers should further validate this information via quantitative approaches like consumer surveys,

and estimate the relative influence of reasons for and against in consumers' adoption decisions. In increasingly digital contexts and social networks, it has never before been so convenient for innovation managers to gather and act on such information about their anticipated target population.

The advanced understanding of the underlying cognitions of consumers' adoption decisions should help managers to develop more effective strategies to market their new products and services. In particular, managers should tailor their marketing mix to strengthen consumers' reasons for adoption and, importantly, address context-specific reasons against adoption. A prime example are the Australian and New Zealand wineries, which successfully managed to diffuse screw-cap wine closures into mainstream markets by effectively addressing consumers' anti-adoption reasons (Garcia et al. 2007). Behavioral reasoning theory should thus prove an important framework for managers to arrive at more accurate consumer insight and, more importantly, inform marketing decisions that ultimately help innovations to cross the chasm into mainstream markets.

Limitations and further research

Our primary interest was to test a new behavioral model (i.e., behavioral reasoning theory), in order to demonstrate the influence of reasoning constructs in consumers' mental processing of innovation adoption. While this study contributes to the diffusion of innovation literature, it has limitations that remain to be addressed by future research. First of all, both studies presented in this article measure the influence of reasons on adoption intentions. While intentions are one of the most commonly used proxies for adoption behavior in DOI studies, they still remain an imperfect substitution for actual behavior (e.g., Arts et al. 2011). Future studies could apply behavioral reasoning theory to identify determinants of actual adoption behavior, in contexts where observing adoption behavior is more feasible.

Given the different nature of the two samples, direct comparisons and generalizations about the mediating/moderation influence of contextual variables or consumer traits were not possible, and these provide opportunities for future research. This research can thus be taken forward theoretically by, for example, investigating the link between reasoning and innate consumer traits such as innovativeness (Im et al. 2007), variety seeking (McAlister and Pessemier 1982), or general resistance to change (Oreg 2003). Exploring how personality traits influence the relationship between reasoning and behavioral responses to innovation could be a fruitful avenue for further research.

Finally, little DOI research has been conducted in the context of service innovation, and most studies report findings from product innovations. Services provide an increasingly large proportion of post-industrialized economies, yet little is understood about how service are adopted by consumers (Reinders et al. 2008). As such, investigating differences in consumers' mental procession of service and product innovation might provide an important avenue for further research.

Appendix

Table 8 Measurement instrument: Study 1 (micro wind turbines)

Construct	Items	Mean	Std. dev.	Skewness	Kurtosis
Adoption Intention	I will install micro wind turbines on my house in the next 12 months. I intend to install micro wind turbines on my house in the next 12 months.	1.52 1.55	1.051 1.072	2.049 1.961	3.27 2.848
Attitude	Installing micro wind turbines on your house in the next 12 months would be very good. Installing micro wind turbines on your house in the next 12 months would offer a lot of advantages. Installing micro wind turbines on your house in the next 12 months would add a lot of value.	3.31 3.19 3.12	1.404 1.371 1.364	-.308-.223–.065	−1.141–1.073–1.123
RF – Financial	Because installing micro wind turbines on my house would reduce my monthly energy bill significantly. Because installing micro wind turbines on my house would allow me to spend more money on other things in life other than energy. Because by installing micro wind turbines on my house, they would eventually pay off and make a profit.	3.59 3.26 3.54	1.342 1.382 1.335	-.587–.266–.555	-.820–1.089–.828
RF – Environmental	Because by installing micro wind turbines on my house I would help to significantly reduce greenhouse gases. Because by installing micro wind turbines on my house I would help to improve my local environment.	4.00 3.93	1.215 1.317	−1.101–1.026	.262–0.191

Table 8 (continued)

Construct	Items	Mean	Std. dev.	Skewness	Kurtosis
RF – Independence	Because installing micro wind turbines on my house would make me independent from national energy providers. Because installing micro wind turbines on my house would make me self-sufficient. Because installing micro wind turbines on my house would reduce my dependence on oil or gas.	3.54 3.65 3.89	1.387 1.346 1.298	−0.529–0.696–0.938	–0.987–0.687–0.278
RA – Cost	Because I do not have the money to install micro wind turbines on my house. Because I would find it a financial strain to install micro wind turbines on my house. Because the initial cost of installing micro wind turbines on my house would be too high for me.	3.48 3.45 3.48	1.474 1.424 1.356	−0.451–0.421–0.439	−1.182–1.098–0.917
RA – Risk	Because I worry about how dependable and reliable micro wind turbines would be Because I worry about how much ongoing maintenance micro wind turbines would require Because I am concerned that micro wind turbines would not provide the level of benefits I would be expecting	3.22 3.26 3.26	1.284 1.253 1.211	−0.231–0.292–0.250	−0.949–0.844–0.644
RA – Incompatibility	Because micro wind turbines do not fit with the existing infrastructure of my house. Because micro wind turbines could only be installed on my house with major additional work. Because in order to install micro wind turbines on my house, I'd have to undertake some serious renovation.	2.66 2.74 2.57	1.464 1.379 1.391	0.378 0.295 0.440	−1.207–1.075–1.013
Values Compatibility	Using micro wind turbines would be in line with my own personal values. Using micro wind turbines fits the way I view the world. Using micro wind turbines would be consistent with the way I think I should live my life.	3.76 3.50 3.56	1.327 1.374 1.393	−0.767–0.576–0.645	−0.495–0.806–0.792

Table 9 Measurement instrument: Study 2 (car sharing)

Construct	Items	Mean	Std. dev	Skewness	Kurtosis
Adoption Intention	I will use car sharing in the future. I can see myself using car sharing in the future.	2.92 3.15	1.095 1.211	0.170–0.147	–0.475–0.902
Attitude	Generally speaking, car sharing services are a great idea. Car sharing services offer a lot of benefits.	3.98 4.02	0.897 0.805	–0.800–0.717	0.657 0.934
RF – Financial	Because I do not want to spend money on a car. Because of the low running costs.	3.28 3.75	1.278 1.009	–0.408–0.878	–0.953 0.304
RF – Convenience	Because it is more convenient than owning a car. Because it gives me greater flexibility. Because it makes my life easier.	2.77 3.52 3.29	1.256 1.220 1.182	0.194–0.512–0.385	–1.044–0.699–0.754
RF – Flexibility	Because public transportation facilities are not convenient. Because I have limited access to public transportation.	3.20 2.78	1.250 1.305	–.172 0.172	–1.030–1.088
RA – Safety	Because I am worried about the safety of the car. Because I am worried about the security of my personal data. Because I am worried about liability in case of an accident.	3.20 3.07 3.47	1.224 1.253 1.171	–0.188–0.059–0.483	–0.947–1.023–0.604
RA – Availability	Because I would be worried that no car is available when I actually need one. Because I cannot make a reservation upfront.	4.03 3.43	1.023 1.357	–0.979–0.341	0.411–0.717
Values – Openness to Change	I like surprises and I am always looking for new things to do. I look for adventures and like to take risks.	3.82 3.55	0.858 1.111	–0.642–0.238	0.286–0.644

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