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## **eCommerce B2C Research in Context: Policy Capturing, Channel Choice and Customer Value**

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### **Abstract**

*Central in this paper is the question what choices customers make for specific channels (physical channel, mobile or Internet) in an eCommerce transaction processes and by what variables their choice is influenced. We are especially interested in the use of channels to collect specific information, initiate transactions, conclude actual fulfilment and offer after sales services. We argue that channel choice in the transaction process depends on a set of variables related to the availability of the technology to the user, his or her context (mobile or not), the type of product he or she wants to buy (information good, service or product; fast moving or durable), the degree to which the quality of the product can be assessed in advance (experience), the degree of personalization and the level of trust. To test these assumptions we used policy capturing as research methodology. Data was collected among a homogenous group of students knowledgeable and experienced with new mobile and Internet technologies and then analysed using logistic regression. Results show that respondents switch between channels, making use of the Internet in the information phase but for the initiation of transactions, as well as the fulfilment and after-sales stages, physical channels are preferred by a majority. Mobile channels appear to play hardly any role in eCommerce transaction processes. Only the mobile context has a clear relation to the choice in favour of mobile channels.*

### **1. Introduction**

Mobile services and the Internet are for most firms increasingly not just information channels through which customers are approached, but also channels that can be used in all the phases of a transaction process. Customers are expected to use the Internet and

mobile services to select information on firms, goods, prices, but also to initiate transactions by making appointments with sales representatives, or order goods, services or digital information products, or use the Internet to obtain additional information in after sales phases. Although the number of eCommerce transactions is increasing, there is still little understanding of the factors that influence channel choice in the various phases of a transaction process. Central in this paper is the question what choices customers make for specific channels (physical channel, mobile or Internet) in the transaction process and which variables influence their choice. We are specifically interested in the use of existing and emerging new channels for collecting information, initiating transactions<sup>1</sup>, actual fulfilment and after sales services.

This paper deals with the demand side analysis of a large research project addressing the synergy between physical Internet and mobile channels, with a special emphasis on customer relations. In the Place<sup>2</sup> (<http://place.telin.nl>) research project nineteen cases were extensively analysed in the period 1999-2002. Results show that a combined channel approach enables firms to offer new types of services that enhance customer value. More than thirty examples of synergy between channels were found. These synergies can be grouped on the basis of the question whether or not they focus on combinations of physical and virtual channels in the pre-purchase/information phase, the purchase phase, or the post-purchase phase of transactions (Steinfeld, Bouwman & Adelaar, 2002).

In the second phase we used these statements in a survey among a sample of firms in four major cities in the Netherlands. These firms allow consumers to initiate or to execute transactions through physical and virtual channels (Smit, Fiel, Bouwman, 2002). We found that over 80% of the companies want to make it as easy as possible for their customers to buy products, for example through selling products via the Internet (83%) and showing the product assortment of their physical shop on the web (72%). Furthermore, 53% of the companies indicate that they offer extensive product information on the web and 44% consider online customer support a crucial element in their eCommerce approach. Only 13% stimulate buyers to try out product in the physical shop and thus generate in-store traffic. Also, in the typical after-sales activities, organizations fail to realize the strengths of a combined approach. 71% and 79% respectively of the organizations do not offer additional product information or services after an offline sale, 84% indicated that it is impossible for customers to get insight into the delivery process and 90% do not provide online account information. Based on these results it becomes clear that organizations do not use the synergy approach to its full potential. The Internet is still predominantly used in the pre-sales phase to provide information.

In the third and final phase of the Place project, presented in this paper, we were interested in the question whether consumers are actually switching between channels in different phases of the transaction process. We are interested in the variables that

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<sup>1</sup> We include the initiating phase separately, not only because it is included in the definition of eCommerce used in the Netherlands by the National Statistical Office and the Ministry of Economic Affairs, but also because in our case study it was mentioned explicitly by some of the companies as an important phase in that part of the transaction process where they make use of the Internet.

<sup>2</sup> Place stands for Physical Presence and Location Aspects of Electronic Commerce Environments project. In the PLACE project the Telematica Institute co-operated with Michigan State University, Delft Institute for Information Technology in Service Engineering (DITSE) of the Delft University of Technology and KPN Research. We are grateful for the efforts of colleagues who worked on the project, including Erwin Fiel and Alko Smit of the Telematica Instituut, Luuk Simons of KPN Research and Charles Steinfield and Thomas Adelaar of Michigan University.

The Place project and its objectives are documented at the Telematica Institute Web site: <http://place.telin.nl> At the same websites pdf files of papers discussing the results of the Place project can also be found.

influence the choice of channel to collect information in the pre-sales phase, to initiate and/or execute the transaction, as well as its use in the after-sales phases.

## **2. Theoretical Framework**

### **2.1 Prior Research into the Use of Ecommerce**

Dahlén (1999) analyses the adoption of online shopping in relation to existing purchasing behaviour, risk perception, innovativeness and experience with the Internet in general. Liao & Cheung (2001) confirm Dahlén's findings. Internet buying depends on the perception of the safety of transactions, experience with online shopping, perception of quality of products offered via the Internet, and prior experience with the Internet. Eastin (2002) finds that prior use of telephony for the same activity, perceived risk, self-efficacy, Internet use and perceived financial benefits play a role in the adoption of online shopping, banking, investing and electronic payment of Internet services. Koufaris (2002) found that shopping enjoyment and perceived usefulness have an effect on the willingness of online consumers to make unplanned purchases via the Internet. Individual beliefs and attitudes toward eCommerce services, such as perceived usefulness, attitudes towards the Internet and perceived risk are determinants of the adoption decision. However, little attention has been paid to the role of the context in which users decide whether or not to use a specific eCommerce service, more specifically the choice of channel (medium), or to the characteristics of the information products, services or goods being offered. Furthermore, issues such as personalization and trust play an important role in relation to the choice in favour of a specific channel, at least that is what we assume. We will discuss these issues briefly.

### **2.2 Prior Research in Channel Choice**

The Social Presence concept (Short, Williams and Christie, 1976), Media Richness (Daft and Lengel, 1986), the Social Influence Model (Fulk, Schmitz and Steinfield, 1990), the Dual Capacity Model (Sitkin, Sutcliffe and Barrios-Choplin, 1992), and Media Appropriateness (Rice, 1993) offer comparable starting points for the analysis of media (channel) choice. The basic assumption is that a good task/medium fit is essential for effective communication. Media richness theory approaches this assumption from a rational perspective, whereas the social influence model states that task and media perceptions are subjective and socially constructed (Fulk et al., 1990). Sitkin et al. (1992) stress the symbolic meaning of the medium. The Media Appropriateness Model (Rice, 1993) emphasizes the multidimensional character of both media and tasks. A good fit between media and task means that a lean medium is chosen for an unequivocal message and a rich medium for a more complex one. If the wrong medium is chosen to get the message across, a mismatch occurs (Daft et al., 1987). According to Hollingshead and Contractor (2002) media choice may be rendered less relevant today by developments in technologies, i.e. convergence between channels. Even though technological capabilities are converging, we expect that specific attributes of channel play a subtle differentiating roll within a given context. In the following sections we will elaborate on the various factors that may influence channel choice.

### **2.3 Context and Personalization**

The concept of context is receiving more and more attention, especially due to the possibility to develop context-aware or location-based services in the mCommerce domain (Van der Kar & Bouwman, 2002). Hitherto, the concept of context has been rather ambiguous. Schilit, Adams & Want (1994) divide context into three categories: computing context, user context and physical context. Chen & Kotz (2002) add time as a fourth category. Pedersen and Ling (2002) distinguish between the modalities of mobility, work and leisure, specific demographical groups as proxies for distinctions between end-users contexts, between public and private context and dynamic context, discussing the various roles and identities that users assume in different contexts. In our current research we limit ourselves to the physical context, assuming that this is partly related to the time context. We make a distinction between home (leisure time), work, i.e. university context (daytime) and the mobile context.

One of the promises of eCommerce is that the user context can be taken into account and the services can be adapted to individual preferences. Personalization is a key issue with regard to repeat business. According to Keen & MacIntosh (2001) this is one of the essential elements of relationship building. There are several possibilities for personalization, e.g. personal characteristics and preferences, the terminal used and service profiles. In our research we will look at how personalization affects the choice for a specific channel.

### **2.4 Trust**

One of the basic problems with regard to personalization concerns the question whether the consumer has sufficient trust to provide personal information to a service. Trust has been given a lot of attention in business literature (Nooteboom, 1996). Central to the discussion on trust is the reduction of uncertainty in the transaction process. Zucker (1986) proposes a distinction between characteristic-, process- and institution-based trust. The first type of trust is based on the characteristics of business entities, i.e. companies, persons or systems. Characteristic-based trust services are based on presumed knowledge rather than known past behaviour. One example of uncertainty reduction in this context is the link to or inclusion of a statement on privacy policy and warranty conditions. Whenever trust is based on known past behaviour, Zucker uses the concept of process-based trust service. This experience may be based on one's own experience with the business partner or on the experience of third parties. The third form of trust is based on institution-based trust services. In this case trust is based on formal social structures such as certifications and formalized codes of conduct. Examples are the seal marks used by some companies (Buuren, Faber & Strating, 2002). A fourth form of trust we want to mention is that which is based on technical systems, such as encryption systems (PKI, digital signatures), and Trusted Third Parties and authorization mechanisms (Users IDs and passwords), etcetera (Ratnasingam, Pavlou & Tan, 2002). In our research we will look into characteristic-based trust (mentioning of privacy statement and or warranty conditions), process-based trust (own experience or experience of friends), institution-based trust services (certification by a third party) and trust based on technical systems.

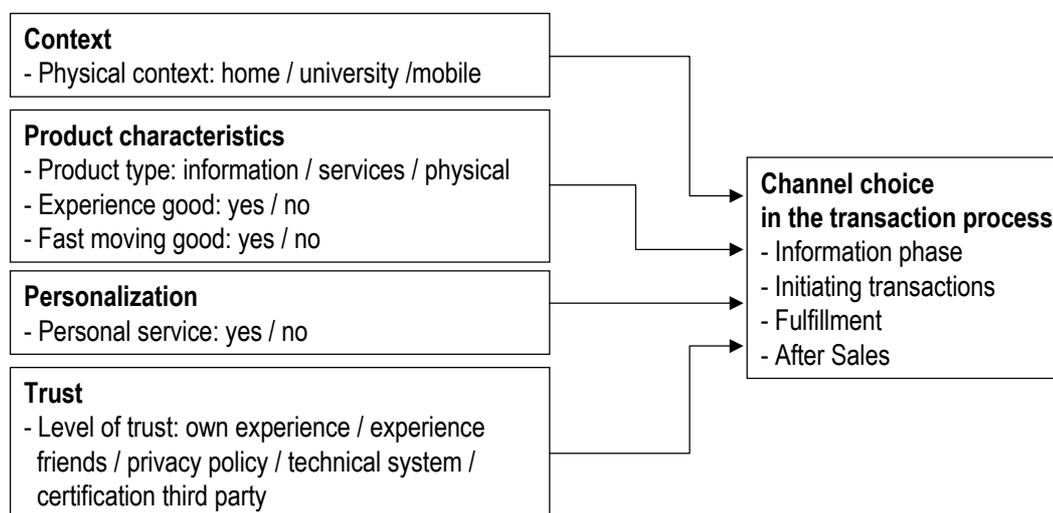
### **2.5 Product Characteristics**

Product characteristics play an important role in the transaction process. Some products, for instance information, are assumed to be more likely to be traded through virtual channels than others, for instance groceries. Although products can be characterized on

the bases of a number of different criteria, we will only examine differences between information (newspaper articles, mp3-files, software), services (employment agency, mobile services) and physical products (groceries, DVD-player). Furthermore we make a distinction between experience goods (i.e. fish, DVD-player from an unknown brand, software from hackers), goods consumers must experience to value them, and non-experience good (Philips or an obscure other brand, Microsoft or unauthorized freeware). To have some idea about the value of a specific good we used the difference between a known brand or reputation as an indicator of the possible value information a product or service may have. Shapiro and Varian (1999) indicate that this is the way producers overcome the problem of experience good via the Internet. Another important issue concerns the type of product and the related price. There is very little research in this area that is valid, since the claim often made by respondents that they are willing to buy products and services for a specific price via the Internet is not substantiated in everyday reality, where sales lag behind. Nevertheless, to have some indication, we have drawn a distinction between fast-moving consumers goods and services and more expensive durables.

### 3. Research Methodology

In this paper we argue that the choice of channel in the pre-sales, sales and after-sales phases depends on a set of variables related to the physical context (home, university, mobile), the type of product (information good, service or product; fast moving or durable), the degree to which the quality of the product can be assessed in advance (experience), the degree of personalization and the level of trust (see figure 1 for the conceptual model). To test this model we used a policy capturing methodology.



**Figure 1:** *Conceptual Model*

Policy Capturing, also known as Factorial Survey, Vignette Studies or conjoint experiments (Vriens, 1995; Molin, 1999), is a method for studying choice that combines the advantages of multivariate experimental designs with sample survey procedures. Policy Capturing studies in relation to media choice can be found in Martocchio, Webster and Baker (1993), Webster and Trevino (1995), Van de Wijngaert (1996) and Bouwman & Van de Wijngaert (2002). It is a method that can be used to uncover the underlying

principles of human evaluation (Rossi and Nock, 1982). The basic idea behind Policy Capturing is to present people with contrived hypothetical situations. These situations, or vignettes, are developed by combining characteristics of the concepts introduced above.

In all, 360 vignettes were written based on all possible combinations of the concepts (independent variables) and their values (3x3x2x2x2x5). The following is an example:

*Imagine that you are at home (context) and that you are looking for an expensive software programme (information product, durable). You are not sure if the programme is really suitable. There is a website where the software is for sale by Microsoft (quality known). The supplier's website has a link to their privacy and warranty policy, etcetera (characteristic-based trust services). It is also possible that a friend may provide you with the software or that you can buy it at a local store (physical channel). Which medium would you use (1) to see if the software is really the software you are looking for, (2) to initiate the transaction (3) to actually buy the software and (4) to obtain additional manuals that are necessary to understand the software after the transaction is completed?*

In this vignette there is no specific reference to the level of personalization of the website. Another vignette has the exact same wording but it also includes a remark with regard to personalization.

The structure behind the 360 vignettes and the wording was discussed with colleagues that were involved in the Place project. Furthermore, the vignettes were pre-tested by both experts and graduate students. The students had to answer questions about the likelihood that the situation described in the vignette might occur in their daily lives. Based on the comments from the experts and students, the wording of some of the vignettes was changed, as were some of the questions.

Every questionnaire was customized and only contained one vignette that was introduced at the very beginning of the questionnaire. Respondents were asked to read the vignette carefully and keep the vignette in mind when answering questions with regard to:

- the suitability of each of the channels on a four point scale and
- the final choice for one of these channels for
- each of the four transaction phases

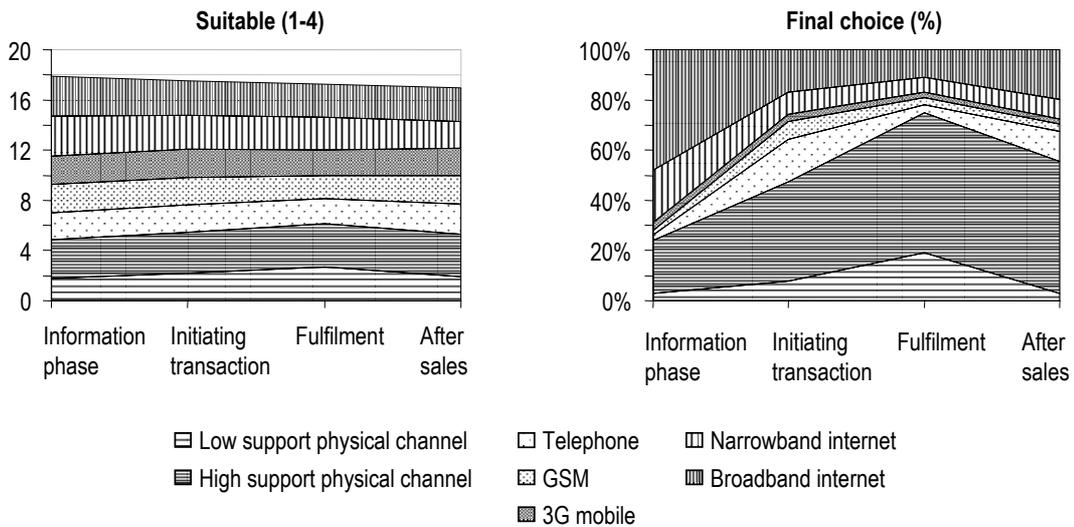
The data were collected in classes of graduate students in the field of ICT (both Msc and PhD) at several Dutch universities. To show the effects of variances in the variables under study and to avoid spuriousness, we have opted in favour of a homogeneous group. The students are all of an age group that may be expected to be experienced and familiar with most of the technologies. In all, 360 questionnaires were distributed and returned. We decided to leave out 38 questionnaires due to partial non-response and some obvious misinterpretations. To test the conceptual model (figure 1) we used logistic regression analysis (for a detailed description of this method, see Menard,1995).

#### **4. Results**

Figure 1 shows both the suitability of and final choices in favour of all channels in the four transaction phases. Looking at the overall picture, we see that all channels are more or less equally suited to fulfil a need. However, when we look at the final choices, we see clear differences between channels. Broadband Internet is considered the most suitable medium for searching information in the pre-sales phase. SMS is considered least

suitable. In their final choice respondents show a preference for the Internet via limited capacity lines (21%) as well as broadband (48%).

In the initiation phase respondents consider physical channels the most suitable, followed by broadband and narrow band Internet, with mobile and fixed telephony closing the ranks. In the end respondents prefer physical channels (48%) to telephone (17%) and narrow (9%) and broadband (17%) Internet. Although the Internet is considered more suitable than mobile or fixed telephony, more people prefer fixed telephony to the Internet. Although mobile telephone is considered equally suitable as the fixed alternative, remarkably few respondents actually make use of mobile technology. In all, a mere 10% opted in favour of a mobile channel.



**Figure 2:** Suitability of a Channel and Media Choice in the Process

High support physical channels are considered far more suitable than any of the other media for the fulfilment of a transaction. It is striking to see that low support physical channels and narrow band and broadband Internet are considered equally suitable. In the fulfilment phase traditional physical channels still account for 75%, while the mobile channels only account for 5% and the Internet for 17%.

High support physical channels, broadband and narrow band Internet and fixed telephony are also considered far more suitable than the other media in the after sales phase. The traditional channels still account for more than 50% of the final choice of media, while broadband Internet is chosen by 20% of the respondents. Again, mobile channels, even the new 3G channels, do not play a significant role.

We will only present one example of the logistic regression analysis we performed ( see table 1). The example in table 1 shows that experience good, home context and the fact that it concerns a service are important arguments to choose the physical channel. We will summarise the results in overall tables for physical (table 2), mobile (table 3) and Internet channel (table 4) separately. Only the significant ( $p < 0,05$ ) relations are presented.

**Table 1: Logistic Regression Analysis for Physical Channel in After Sales Phase**

	B	S.E.	Wald	df	Sig.	R	Exp (B)
Fast moving/durable	.475	.247	3.710	1	.054	.062	1.608
Experience good	1.607	.251	41.145	1	.000	.297	4.986
Personalization	.070	.247	.080	1	.777	.000	1.072
Home	.592	.265	4.985	1	.026	.082	1.808
Services	-.626	.263	5.563	1	.018	-.090	.538
Techtrust	-.074	.319	.054	1	.817	.000	.929
Constant	-2.948	.680	18.814	1	.000		

Table 2 shows that the choice of a physical channel to initiate a transaction, for fulfilment and after sales services most of the time only depends on the type of product and the fact that what is concerned is a good consumers must experience to value. It furthermore depends on the fact that what is concerned are durable goods, products and/or services.

**Table 2: Patterns Found in Logistic Regression Analysis of Physical Channels**

	Information	Initiation	Fulfilment	After sales
Context				Home
Product type		Product	Info	Product
		Service	Product	Service
Experience good		Exp good		Exp good
Fast moving good		Durable		Durable
Personalization				
Trust level				

As far as a choice in favour of mobile channels is concerned, it is clear that the mobile context plays an important role in all except the fulfilment phase. It is clear that fulfilment of transactions does not take place in a mobile context. Respondents shift towards the more traditional physical channel. Furthermore, it is important that what is concerned are information and services and not physical goods. In the after sales phase personalization is also an important explanatory factor.

**Table 3: Patterns Found In Logistic Regression Analysis For Mobile Channels**

	Information	Initiation	Fulfilment	After sales
Context	Mobile	Mobile		Mobile
Product type		Information		Information
		Service		Service
Experience good				
Fast moving good				
Personalization				Personalized
Trust level				

The choice in favour of the Internet channel can be explained by the type of product in the phase in which the transaction is initiated. The choice for the Internet in the fulfilment phase with regard to information and services, and most strikingly not where physical products are concerned, is explained by the inclusion of a privacy statement and/or the certification of the website by a reliable third party. In the other phases certification and privacy statements are not important explanatory factors. The choice in favour of the Internet in the after sales phase depends on the university context, is not affected by the type of product, the fact that they are durable and whether or not media the value has to be experienced.

**Table 4: Patterns Found in Logistic Regression Analysis for the Internet**

	Information	Initiation	Fulfilment	After sales
Context				University
Product type		Information	Information	Information
		Product	Service	Product
		Service		Service
Experience good				Experience
Fast moving good				Durable
Personalization				
Trust level			Privacy statement	
			Certificate	

## 5. Discussion and Conclusions

### 5.1 Limitations of the Policy Capturing Study

Policy capturing studies are an increasingly popular way to research possible future behaviour. In earlier studies the research method proved to be reliable and valid. However, the tradition of this type of study is still young and results should not be accepted at face value. If we look back at the research project, our main concern is that

the vignettes are artificially manipulated. Some of these variables may appear to be more explicit than others. Furthermore, it is expected that the vignette defines the mindset of the respondent. In the pre-testing stage of the questionnaire we explicitly asked the respondents to what kind of variables we referred. In almost all cases the variables that were meant to be noted were indeed noted.

A possible explanation for the results is that we did choose a type of information, product or service that was too specific, and that the students were sometimes not familiar with the examples we used. However, in the pre-testing stage of the questionnaire we asked questions regarding the realistic nature of the cases as seen from the student's point of view. Another explanation for the result might be an orientation towards broadband Internet on the part of the students. At their universities most of them have constant access to real high-speed networks.

The question emerges whether it is possible to generalize on the basis of these results.. First of all, we believe that students most likely are today's most experienced users and that they will be the future users of new 3G mobile and broadband Internet services. Furthermore, most of them have hands-on experience with mobile devices, and buy the most advanced gadgets. We expect them to be the lead users. The reality in which students live today will be the future for all consumers. Nevertheless, it would be interesting to replicate this study with a representative sample of the national population.

## **5.2 Conclusions and Future Research**

In this paper we have focused on the choice in favour of physical, mobile and Internet channels in different phases of a transaction process. Internet plays an important role in the first phase of the transaction process, while physical channels are still the dominant media in the execution phase of the transaction and the after sales phases. In light of the numerous options available, the choice in favour of mobile media is rather limited. Of the mobile media, UMTS is considered the most attractive in almost all phases of the transaction process. But in the end few respondents chose for mobile technologies. The expectations for broadband Internet are considerably more optimistic.

Overall we can conclude that synergy between channels, as shown in the Place case studies, is important: respondents switch between the different channels in different phases of the transaction process. Only a small minority opts for the physical channel from outset and sticks to that choice. The general pattern is one whereby people will start looking for information on the Internet but will slowly shift towards the physical channel. Here the question of causality becomes apparent. Although the Place case studies did show that firms strive for synergy the survey showed that the firms included in the case study were innovators and early adopters and the majority of firms still use the Internet to provide information. The Internet is also the dominant channel in the information phase for most respondents and is less important in the other phases of the transaction process, although a substantial minority (17%) still opt for either small- or broadband Internet.

It was our hypothesis that physical context plays a role in the choice of channel. This effect can be seen only in the after sales phases and where the choice for mobile channels is concerned. In the choice in favour of a mobile channel the mobile context plays a significant role. However, as it turned out, this proved not to be the case in the transaction phases. Transactions conducted via mobile devices and applications cannot be explained by any of the variables we introduced. People still prefer to conduct their transactions in a physical setting, so it is not very likely that transactions will be conducted via mobile devices. Mobile devices can play a role in other phases of the transaction process, but only then when the transaction is directed at information goods or services. Furthermore,

it is very striking that personalization is only an explanatory variable in the after-sales phase.

It is striking that although trust and the way to build a technical secure transaction system is discussed extensively in the literature, respondents are guided more by characteristic-based (privacy policy statements, warranty conditions) and institution-based trust services (certificates). Prior own or third party experiences or technology, which are supposed to build trust, appear to be important. Trust services, as might be expected, only play a role in the actual transaction phase.

Different product characteristics play a role in the choice of channel after the information phase. Especially the choice in favour of the Internet and Mobile channels in the transaction (fulfilment) phase depends on the intangible nature of the information and services, whereas physical products, known value (experience good) and durability influence the choice in favour of physical channels in the transaction initiation and after sales phases. These factors also influence the choice in favour of the Internet in the after sales phase.

All in all, policy capturing studies help us understand decisions people make in specific situation and the factors that influence these decisions, and thus shed light on future behaviour. Especially in a time were there is much uncertainty surrounding the adoption and use of all kinds of new emerging technologies: 3G and beyond, broadband Internet etcetera, policy capturing studies can play an important role in understanding the factors that influence the choice of channel people make. We expect the value of policy capture studies will become clearer when they are used to examine specific services and business cases.

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