

Challenges in buying technology intensive business services

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Abstract

This paper focuses on challenges in buying special types of business services, technology intensive services especially in SME context. The purpose of this research is to find out, what kinds of purchasing challenges can be related to buying technology intensive business services. Two streams of literature are addressed. Firstly, we will define the characteristics of technology intensive business services through literature related to information technology systems and their purchasing. Secondly, we will explore the industrial purchasing literature in which the topic of business services has recently received research attention. On the basis of these, we have identified four sets of purchasing challenges related to technology intensive business services; service-related, buyer-related, technology-related and business process-related. These are elaborated on through an empirical study. As an empirical context we have taken the buying mobile advertising services. Mobile advertising service system provides an interesting example of technology intensive business services and it provides a fruitful and topical empirical context. The study includes a qualitative empirical part that is composed of a multiple case study setting. In the empirical part, we gather data from an experiment where a mobile advertising system was generated and tested through several field trials. Based on the theoretical understanding and the empirical data, we present a categorization of the challenges that are related to buying technology intensive services and also some important purchasing tasks that can be relevant to overcome the challenges. Our study contributes to the existing industrial purchasing literature by exploring the complexities related to purchasing in this new and context, which is growing in importance in the practice.

Introduction

This paper focuses on buying special types of business services, technology intensive services. The general topic of buying services has recently received research attention (Axelsson and Wynstra 2002, Roth, Money, and Madden 2004, Axelsson, Wynstra, and van der Valk 2005) due to its increasing importance in the practice. Companies in almost every industry branches are more and more surrounded by various technological innovations that are interconnected to their business. Companies need to buy and utilize different types of technological information and communication systems that change their existing processes and operations or even change the way of doing business. Examples of such systems include ERP, mCRM or mobile advertising systems. Although these include a product-like core, the software and possibly also hardware, for customers these can be considered as services as customers buy the services that these types of systems perform. Hence, technology intensive services form a major topic of interest and a key priority for many business organizations when they are making considerable investments to take advantage of the new business possibilities offered by, for example mobile technologies (Anckar and D'Incau 2002).

The current research on buying business services, especially technology intensive ones is scarce. Issues such as business service categorization (Fitzsimmons, Noh and Thies 1998), purchasing processes (Roth et al. 2004), and interaction in services exchange (Axelsson and Wynstra 2000) have been studied. Furthermore, purchasing processes and evaluation criteria of information technology systems have received interest (Snijders and Tazelaars 2005), especially so in more practically oriented literature (e.g. Hansen, Dorling, Schweigert and Lovett 1999). However, the industrial purchasing literature has, so far, only scantily addressed the specific features and challenges of buying technology intensive business services. Moreover, the way the purchasing is influenced by the fact that the purchased service changes the buying company's existing business processes has not been covered in the research to any great extent. This important topic clearly needs further elaboration.

The purpose of this research is to find out, *what kinds of purchasing challenges can be related to buying technology intensive business services*. More specifically, our focus is on SMEs. Purchasing technology intensive business services presents many challenges. The needed technological knowledge and expertise, maybe in highly specified field of technology, is high in these types of purchasing processes (Snijders and Tazelaars 2005). Furthermore, as the new technological services change the existing ways of doing business, challenges in buying the services grow even more complicated. The companies may not even precisely know how to use these services. In addition, the possibilities and/or limitations that these technologies offer might remain unveiled for the buyer during the procurement process. Finally, the selection of a certain technology intensive service also brings along a certain technology that may generate a number of network related possibilities and/or restrictions for the buyer.

The purchasing of technology intensive business services represents a complex task to any kind of company, but it can be seen as especially challenging for SMEs. In almost every field of business, there is an increasing need for various types of technology intensive services, such as information technology systems (Riemenschneider & Mykytyn 2000). Thus, apparently even the SMEs can't avoid the technological development in their businesses. The SMEs can often be run by owner-managers whose expertise is mainly focused on the business it self. Their purchasing skills or technological skills can be limited which causes problems especially in the buying of technology intensive business services. Therefore, we will focus on SMEs in understanding the purchasing challenges of technology intensive business services.

As an empirical context we have taken the buying mobile advertising services. Mobile advertising service system provides an interesting example of technology intensive business services and it provides a fruitful and topical empirical context. Mobile advertising offers new perspectives for companies' traditional advertising mechanisms (Barnes 2002, Mort and Drennan 2002) and the role of mobile advertising as a part of companies' advertising has also been increasingly studied topic (e.g. Harrison and Andrusiewicz 2004, Scharl, Dickinger and Murhpy 2005).

This study includes first a literature review on buying business services and on technology intensive services. A preliminary understanding of the challenges of buying technology intensive services in a situation where the existing business processes are altered by the service is presented in a theoretical framework. This framework is then empirically elaborated. The study includes a qualitative empirical

part that is composed of a multiple case study setting. In the empirical part, we gather data from an experiment where a mobile advertising system was generated and tested through several field trials. A number of retailers in the Oulu region in Finland participated in the experiment as mobile advertisers. Several of them were interviewed with respect to the purchasing challenges. Based on the theoretical understanding and the empirical data, we present a categorization of the challenges that are related to buying technology intensive services. From this knowledge we will also generate managerial implications for tackling with the identified challenges.

Nature of technology intensive business services

Business service represents a phenomenon that is continuously growing in importance in business due to the increasing outsourcing conducted by companies. The distinguishing features of services as object of exchange have for long been acknowledged in the services marketing literature. Services have been described as being intangible, difficult to demonstrate in advance, impossible to store, produced and consumed simultaneously, co-produced by the service provider and the customer, produced, consumed and often sold on the same location and impossible to transport (Normann 1992). These commonly agreed features of services; inseparability, heterogeneity, intangibility and perishability have currently also been criticized a lot. It has been suggested that a better way of portraying service is to regard it as a perspective on value creation rather than a category of market offerings and moreover, by focusing on customer's perspective on value and understanding that services are about co-creation of value with customer and the interactive, processual, experimental, and relational nature form the basis for characterizing service (Edvardsson, Gustafsson & Roos 2005). Accordingly, business services are objects of exchange, where the value is created for the customer through a relationship between the service provider and the customer involving interactive, processual and experimental aspects. Business services represent a heterogeneous group of objects of exchange ranging from rather simple and standardized services to complex and highly tailored professional services. One way of classifying the various types of business services is to take a look at the focus of the service either in property (e.g. maintenance or waste disposal), people (e.g. food service or training) or in processes (e.g. bookkeeping or legal) of the buying company and the importance of the service to the buyer firm (Fitzsimmons et al. 1998).

In technology intensive services, high technology, e.g. software is employed to create the service. In addition to the high technology element, these services also include the service element and possibly some hardware elements as well. This ensemble is represented for the customer through the customer interface through which the customer uses the service. The high technology products have for long been seen as having such distinguishing features that e.g. in marketing these need specific concepts and models (Beard & Easingwood 1993). High technology products employ turbulent technology and this has its impact on their use, marketing and purchasing compared to low technology products (Gardner, Johnson, Lee & Wilkinson 2000). Technology intensive services can include e.g. ERP (Enterprise Resource Planning) systems consisting of MRP (Material requirements planning), MRPII (Manufacturing resource planning) and CRM (customer relationships management) systems, using internet or mobile technologies (i.e. mCRM) or different types of EDI systems (Electronic Data interchange). The significance of traditional EDI systems has diminished after the development of internet-based systems. The different types of information technology systems purchased by companies provide information to/from finance, accounting, sales, marketing, planning, production, purchasing, human resource, logistics and distribution. (Koh and Saad, 2006.) The aim of such systems is to improve the efficiency of the entire processes of producing organizations from receiving customer order up until manufacturing and delivering the value for the end customer (Koh And Saad, 2006). Although these include a product-like core, the software and possibly also hardware, for customers these can be considered as services as customers buy the services that these types of systems perform.

Purchasing of various types of information technology systems in business-to-business markets has received a considerable amount of interest in the literature (e.g. Hansen, Dorling, Schweigert and Lovett 1999). However, these often concentrate more on the technological issues of these systems and the service elements, e.g. training and product support issues are evaluated as separate elements in the evaluation process of the systems. However, if we consider these purchases as technology intensive business services as a whole, a broader view on purchasing is needed. In other words, from the buyer's perspective, what creates value in the buyer firm's own business processes, is

not the software system and additional services, but the way the whole service supports its own processes. Therefore, the analysis of these systems as technology intensive business services (not just information technology systems) can be justified.

Technology intensive business services represent a highly complex object of exchange from the perspective of the both parties; the service provider and the buyer. From the purchasing perspective, the complexity of the challenges faced in relation to these kinds of acquisitions is however, perhaps even more complicated. What makes these challenges important objects to study is the fact that most of the existing purchasing knowledge is related to drastically different types of products and services. For example, typical tactical purchasing tasks, such as requirements definition of evaluation criteria are no longer that clear in the context of technology intensive business services.

Buying technology intensive business services in small firms

As an object of exchange, the services have for long been acknowledged to differ from physical goods in the services marketing literature as well as in the operations management, but purchasing perspective has only recently been put forward (Smeltzer & Ogden, 2002). Buying business services usually represents a complex process and the role of purchasing expertise in buying business services can often be rather limited. For example, in buying marketing services often only the marketing department is involved in the buying process even though purchasing involvement could generate benefits and cost savings (van der Valk, Reunis & Wynstra 2005). More specifically, in small companies it may often be in fact one person, who takes care of various managerial tasks in the company, ranging from supply management, marketing, finance and top management. Thus, the buying of technology intensive business services, especially in SMEs represents an area of business management that needs research attention. In the following, we will explore the existing literature in order to identify the kinds of purchasing challenges that have been addressed in the existing research.

On the basis of the literature review that we conducted, four different types of purchasing challenges with respect to technology intensive business services can be identified. Firstly, the main concerns of purchasers' in buying business services has been argued to be the determining of the total costs of ownership of the services (e.g. Hurkens, van de Valk & Wynstra 2006) and the service specifications (e.g. Smeltzer & Ogden, 2002). In other words, the service itself represents challenges in terms of its content and evaluation of its quality (van der Valk et al. 2005). Thus, we define the *service-related challenges* as the first category of challenges. Secondly, the purchasing process of business services has been described as more complex than in physical products in business markets (Fitzsimmons et al. 1998). Especially, if we take into consideration the SME context, where purchasing and technological expertise may be limited in the buying, we define a second group of challenges as *buyer-related challenges*.

Thirdly, with respect to technology intensive services, the technology also brings forth certain challenges for the buyer. The challenges acknowledged in the literature related to buying information systems include e.g. the maturity of the software and the compatibility of the software to the existing systems (viite). These types of challenges are referred as *technology-related challenges* in our study. With respect to the categorization of business services on the basis of their importance and focus on either property, people or processes (Fitzsimmons et al. 1998) technology intensive business services can be identified as to focus on the processes but their importance on the buyer can be either low or high. This means that technology intensive business services can be seen as facilitators of the various business processes of the buyer or they can be more like professional services that have greater impact also on the processes changing them. Thus, as the fourth type of purchasing challenges, we identify the *process-related challenges*. In the remainder of the chapter, we will explore each of these four types of challenges more in-depth on the basis of the existing literature.

Service-related challenges

The specification of the service is one of the main challenges in any type of service exchange, and especially in purchasing business services (Smeltzer & Ogden 2002). It is difficult for the buyer to evaluate in advance, what the service will consist of as it does not yet exist. In technology intensive business services, the technology usually can be demonstrated before hand. However, the service elements and thus the total value generated by the whole offering remain to be only predicted

beforehand. Especially in professional services, it is often argued, that the evaluation of the service is made on the basis of evaluating the expertise of the service provider's personnel. Existing business relationship between the service provider and customer then helps this evaluation where as the lack of previous experiences about the service provider makes the evaluation for the customer very complex.

In addition to evaluating the service offered by the service provider, also the identification of one's own needs represent challenges for the buyer. Basically, especially in professional services, the need is based on a problem that the customer organization has in its own business processes. Solution to these problems is what the services should then be about. Defining the needs and requirements for the service is usually the first difficulty faced by the buyer in the complex purchasing process. Specifying the service need can be done by defining the content of the service by focusing on input, throughput, output or outcome (Axelsson & Wynstra 2002). Taking the input perspective, the needed resources and capabilities of the service provider are defined. The throughput illustrates the process of the service production where as the output refers to the function or performance of the service. Finally, the outcome perspective takes the value of the whole service into account. The way the service is defined in relation to these perspectives, naturally also has an impact on the responsibilities of the service providers as well as the buyers.

Thus, the service related challenges in buying technology intensive business services also include the aspect of value co-production brought out in the services context (Edvardsson et al. 2005). It is seen, that services always include also the effort of the customer, in other words services are about co-production. This means that also the value created by the service is a joint effort of the counterparts. The customer's activity in the services usually also create costs, but without these costs the value of the service may be unattainable. Thus, in buying technology intensive business services, challenges in the purchasing process also include the identification and completion of the customer's own effort in the service process. For example, the customer need to carefully analyze one's own needs and communicate these to the service provider. This might require considerable amount of managerial effort.

The costs of a technology intensive business services purchase also represent major challenges for the buyers (Smelzer & Ogden 2002). The concept of total cost of ownership can be used in making sense of all the relevant life-cycle costs of buying and using certain product or service. In business service context, the total cost of ownership –approach has been argued to provide a useful tool to uncover the obvious as well as hidden costs of conducting business with different suppliers (Hurkens, van der Valk & Wynstra 2006). According to a study by Hurkens et al. (2006), it is important to develop an accurate description of the physical and administrative processes in the pre-transaction, transaction and post-transaction phases of the purchasing process in order to identify all the relevant costs generated by the purchase.

Buyer-related challenges

The second identified category of purchasing challenges in technology intensive business services is the buyer-related challenges. In the case of SMEs, the purchasing as well as technological expertise may be limited and this creates certain buyer-related challenges in buying technology intensive business services. Small firms' purchasing behavior differs from that of larger companies (Morrissey & Pittaway 2004). In small firms, purchasing is often managed by owner-managers whose expertise does not lie usually directly in the purchasing such as professional purchasers' in larger corporations. Furthermore, their motives in the purchasing decision making are more often related to other types of variables than profit maximization (Morrissey & Pittaway 2004). This makes the purchasing challenges of small firms with respect to technology intensive business services even more complex. Especially, if the firm itself does not operate in any technology industry, the level of technological expertise can be very low. This and the fact that the purchasing expertise of the owner-managers as buyers may be limited make the purchasing challenge even more complex.

Technology-related challenges

Technology intensive business services include high technology elements and this naturally brings forth challenges. The two main issues raised in the literature on buying information technology systems are the compatibility of the system to the existing systems in the buying organization and the exceeding costs. Technology usually means complexity at least in terms of understanding it from the

purchasing perspective. According to a study by Rooks and Snijders (2001), the problems of SME's information technology products include lack of proper documentation, incomplete accompaniment and slow adjustment of the software. In terms of buying information technology systems, a lot of tactical advices on how to conduct the purchases have been presented in the literature (Hansen et. al 1999). For example, these include different kinds of process guidelines and evaluation criteria that the companies can use in their information technology system purchases. However, currently it also has been argued, that such an extensive effort put in developing acquisition process guidelines for information technology systems' purchasing can in fact lead to increased costs due to too extensive managerial processes in handling the purchasing processes (Snijders and Tazelaars 2005). Thus, at least in terms of information technology systems, the detailed process guidelines are not necessarily the main point in successful purchasing. This can also be relevant observation on a more general level and enable us to assume, that with respect to buying technology intensive business services; the challenges of purchasing these types of services lie elsewhere than in careful purchasing process definition.

In addition to the compatibility problem, an essential issue with respect to technology related purchasing challenges, is also the maturity of the technology it self. Technologies develop continuously and new versions are typically introduced at least in terms of software systems. At the early phase of their existing, any technology usually includes various bugs and deficits which are taken care of in the new version. Thus, from the purchasing perspective, the maturity of the technology presents challenges. In addition to understanding the technology to the extent necessary, also the maturity of and development of the technology creates challenges.

Business process-related challenges

Technology intensive business services are usually related to the business processes of the buying organization and their importance can vary (Fitzsimmons et al. 1998). Business services can be seen as facilitators of the different business processes of the buyer or they can be more like professional services that have greater impact also on the processes chancing them. The fact that the purchased services and included information technology systems influence on the existing business processes of the buyer makes the purchasing challenges of these services even more difficult. In order to fully understand the service; its specification, quality, costs etc. a careful analysis of the business processes involved and their possible change is needed. Especially in relation to information technology systems, the alignment of the information technology strategy and the business strategy creates benefits (Byrd, Lewis & Bryan, 2006). This means that information technology investments need to be considered in the light of the business strategy and business processes of the company.

One way of approaching this issue is to take a look at the software industry literature, where one basic division between different types of software has been the distinction between tailored and standardized software systems (Alajoutsijärvi, Mannermaa & Tikkanen 1999). In terms of software used in different types of information technology systems in organizations, tailored software is developed for the specific needs of the customer where as standardized software is offered as such to various customers. Any kind of combination of these both can of course also exist. This brings forth the idea of the existing processes being either supported by tailored information technology systems or changed by the more standardized systems. Developing tailored software must begin with the analysis of the existing business processes that the software should support or change.

Summary of the identified purchasing challenges

The four identified purchasing challenges of technology intensive business services represent the main areas (service, buyer, technology, and business process) that need to be taken into account in the buying process of technology intensive business services. The four categories can be partly overlapping, and in certain instances it may be difficult to make a clear distinction between the categories. However, these do provide the essential elements of understanding the complexities faced in buying technology intensive business services and thus these are used as a basis for the empirical elaboration. We have summarized the challenges related to buying technology intensive business services identified on the basis of the literature review in Table 1.

Purchasing challenges	Examples
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Service –related	Specification of the service, identification of own needs, total costs, co-production of service/value
Buyer-related	Understanding the technology, purchasing expertise
Technology –related	Compatibility to existing information technology systems, maturity of the software
Business process –related	Understanding the process where the service is connected to, changes required in the processes

Table 1. Purchasing challenges in buying technology intensive business services.

The identified challenges are well in accordance with the challenges identified by van der Valk et al. (2005) in relation to value-added marketing services. In their study, the three main challenges included the identification of the content of the service, evaluating the quality of the service and pricing the service. In our classification of the challenges, the service –related challenges include the content and the price issues. The quality aspects are related to both the service related challenges but also to the technology -related challenges in terms of quality of the technology in relation to the service need of the buyer. Next, we will elaborate the challenges through an empirical study.

Empirical research methods

We have conducted an empirical study for further explore the purchasing challenges identified in the literature. Qualitative approach was chosen in order to gain more in-depth understanding of the purchasing challenges in technology intensive services setting.

As an industry context we have chosen the emerging mobile advertising (m-advertising) business. This is mainly due to our participation in a large research project, in relation to which also the founding ideas of this study were brought out. Rotuaari –research project is a multi-disciplinary research project in which an infrastructure and a service system for context dependent m-advertising has been developed and tested by the volunteered retailers in the Oulu region. Business around m-advertising service is growing fast and m-advertising can be seen as a one of the most important and promising forms of emerging mobile services (see e.g. Varshney and Vetter 2002). M-advertising has received increasing attention in recent research (e.g. Barwise and Strong 2002, Salo and Tähtinen 2005, Tsang, Ho and Liang 2004) but from the purchasing perspective it has not yet been studied. However, due to the early stage of the development, there are different kinds of challenges that need to be solved before m-advertising service can be efficiently utilised in buying firm's marketing operations. Therefore, it is interesting and topical business field that needs to be further studied.

Empirical data for the examination of the purchasing challenges of the companies taking part in the m-advertising service were obtained from the experiment organized by the research project in summer 2005. In the experiment the research project approached local retailers and offered them a possibility to test a new m-advertising service system, i.e. to design, implement, target and send their m-ads to the real end consumers. The experiment represented a complex purchasing situation for the retailers. The m-ad system is a technology intensive business service and although the retailers did not need to pay for the service provider, they still faced a purchasing –like situation as they needed to consider the various aspects of taking part in the experiment and using the m-ad services. Representatives of the Rotuaari-project introduced the service system to retailers in person and then ask their willingness to participate in the experiment. If the retailer agreed to participate he/she got detailed instructions for using the service system and implementing the m-ads. Retailers also had a possibility to get hand-in-hand training in using the service. There were three options how to implement the m-ads: either the retailers made the m-ads themselves, used their advertising agency or let the research project personnel implement the m-ads. In the experiment altogether 54 local retailers registered in to the m-advertising service system and acted as m-advertisers.

After the experiment, data were gathered through thematic interviews with 13 retailers in relation to their experiences on the new advertising media (see appendix 1). In the selection of the interviewees

we used multifaceted criteria to ensure that the sample properly represents different types of m-advertisers. Firstly, the interviewed 13 advertisers were selected from the various fields of retailing. Secondly, the selection was based on the advertisers' activity during the field trial, i.e. representatives of both those who had created several m-ads and those who did not actually send any m-ads were interviewed. Finally, we selected m-advertisers that had designed their m-ads themselves, those that had used an ad agency, and those that had outsourced the m-ad design to the research project's personnel. The interviewed retailers included a restaurant and night bar, three clothing stores, travel agency, insurance company, a dentist clinic, a doctor's clinic, bookstore, a natural product store, and two hobby shops. The persons interviewed were the ones who were responsible for the mobile advertising operations during the experiment. These included owner managers as well as persons in charge of marketing.

The interview themes were not specifically aimed at purchasing issues but included many relevant topics, e.g. objectives for and expectations of using mobile advertising service, experiences in mobile advertising (including quality of training and guidance, design and implementation of mobile ads, usage of mobile advertising tool), and effectiveness and utility of mobile advertising and proposals for improvement of the service. What is interesting is that the challenges related to purchasing of this kind of service clearly emerged from the data. Hence, the interviews provided us with fruitful and rich data also from this perspective.

The interviews lasted 30-60 minutes and they were tape-recorded and transcribed. The analysis of the empirical data was conducted on two analysis levels. The acquisition of the mobile advertising services taking place during the experiment in the Rotuaari –project provided a single case for our study and it was thus treated as the main analysis level. This was studied through using the individual retailers' experiences as sub-analysis level. In other words, the purchasing of mobile advertising services was studied through the experiences of the 13 retailers; i.e. these did not provide individual cases. The empirical data analysis was conducted by categorising the data according to the four purchasing challenges identified; service –related, technology –related and buyer –related and business process –related challenges.

The mobile advertising experiment through which the buying of technology intensive business services is here studied possess certain limitations that need to be taken into account at this point, however. First of all, the costs for the experiment for the retailer advertisers were very low, as they did not have to pay anything for the service provider, the Rotuaari –research project. Thus, one could argue that this was not a case of 'buying' at all. However, the acquisition of the service included various other types of costs for the retailers; e.g. possible payments to their advertising agencies for making the ads (it they used one) ad well as time and effort put into the experiment in terms of making the ads and trying to make the most of the service at hand. A second limitation of the empirical data is the fact that the experiment was a field trial of the technology applied in the mobile advertising system and this brought forth many technological problems that were rather severe at certain points during the experiment. Thus the role of technology can be seen as over emphasized in the data, but as we acknowledged this, we also took this into account during the data analysis.

In the following, we will first introduce the mobile advertising as an industry context. After this, we will move on to the empirical analysis in the next chapter.

An empirical study

Empirical context

This study explores purchasing challenges in technology intensive services of which mobile advertising service is a current example. M-advertising refers to ads that are sent to and presented on mobile devices and the essence of m-advertising is the idea of reaching customers regardless of their location (Barnes 2002). More specifically, it is about delivering the right information to the right person at the right time (Siau, Lim and Shen 2001) as it enables personal targeting of the message (Salo and Tähtinen 2005), and reaching the receiver according to the predefined sending criteria (e.g. Varshney and Vetter 2002). Furthermore, mobile device allows m-advertising to be highly interactive as it is possible to engage consumers to discussions and transactions with the advertiser (Barwise and Strong 2002). Hence, m-advertising offers the advertiser significant benefits over traditional media,

and the 'old' way of sending one-way messages to large target groups and relying on ad repetition is losing its effectiveness (see e.g. Barnes 2002).

Mobile advertising service thus represents technology intensive business services that are in fact rather new for most SMEs. Due to the novelty of the services neither the service provider nor its customer usually has a long experience of it. Similarly, the m-advertising service studied here was new for the buyer. Therefore, also the relationship between the counterparts is new and no commonly agreed forms of co-operation exist. In addition, the complexity and technical nature of the services increases the uncertainty related to their purchasing. This influenced also the situation in which retailers had to decide whether they were willing to invest their resources into the testing of new service or not.

The mobile advertising service system used in the experiment of the Rotuaari-project is next shortly described. The users of the system were an administrator (service provider, i.e. the research project), advertisers (local retailers) and end users (local consumers). Service provider hosted the system and gathered and updated the databases of consumers. The m-advertisers created and sent the m-ads by using the web-based advertising tool. In the advertising tool they created m-ads using their own marketing material. M-ads could include photos, texts, animation, videos and music and they could invite the receivers in discussions and transactions with the m-advertiser. In addition to the m-ads, the m-advertisers defined the criteria according to which their m-ads were targeted to the consumers, e.g. gender, age and interest areas of the receiver, and also sending hours and sending dates of the m-ads.

The consumers also used the same web-based m-advertising tool to register into the system. They received m-ads based on the personal information they provided while registering. Consumers defined the same sending criteria as m-advertisers and updated them whenever they felt like it. This ensured that each consumer received only such m-ads that s/he finds valuable (see Salo and Tähtinen 2005). M-advertising service system then searched m-ads that matched both the m-advertisers' and consumers' criteria and sent the m-ads to consumers via either SMS, MMS, or Wap Push.

In the following, we will discuss the empirical findings on the basis of the four suggested purchasing challenges categories.

Service related –challenges

Specification of the service. The identification of the content of the service was a major problem for the retailers during the experiment. It can be seen that the different retailers focused on different characteristics of the service and therefore saw the content very differently. Some of them paid attention only to technical features of the service, either in relation to the usage of the service (e.g. technical usability of the advertising tool) or the characteristics of the m-ads and their sending criteria. The others emphasized the consumer-related issues (e.g. how the service is perceived by the end consumers) and some focused solely on the possible future development of the service. Thus, the content of the service varied a lot between the different retailers.

The newness of the service was important factor that hindered the understanding of the total service offering and the value related to it. Therefore, starting to use the service was found challenging as there were no previous experiences or even references that would have helped the implementation of the service.

“It is such a new media! You have no idea what kind of m-ads the others have done. It was a little bit like ‘what should I do? What are the others doing?’” Science center

Obviously, most of the interviewees were not familiar with all the characteristics or possibilities the service could provide them. This became evident from the interview data as some of the retailers asked questions about the service that showed their limited understanding about even some quite basic characteristics. This uncertainty and lack of understanding in turn limited retailers' motivation to use their resources in learning to use the service efficiently. Hence, the newness of the technology intensive services creates a challenge especially for the service provider to make sure that the buyer is well informed about the special features of the service and how to efficiently utilize these characteristics.

Identification of own needs and requirements. Many retailers explained their willingness to test m-advertising service system as a desire to see how it actually functions and how it could be utilized in their marketing operations. When asked about their own needs or expectations in relation to the service many did not have any.

"We did not have any (objectives). Only to get to see how it functions in practice. We did not expect any success based on this but only to see from the inside how this kind of service actually functions." Health food and pet shop

One reason for this can be found again from the newness of the service; if you do not know what it is and how it functions you probably cannot have many expectations for it. Thus, also the concrete benefits that could be obtained from the service did not become very clear to the retailers. Hence, it can be argued that the identification of the own needs is important as the organization that does not have clear objectives for the usage of the new technology intensive service usually is not prepared to utilize the service efficiently.

"We hadn't had defined what kind of role this (m-advertising) could play in our marketing. [...] And our personnel's understanding about the possibilities of m-advertising is not very good either. Maybe those are the reasons why we did not use our resources to this." Hobby shop

Although retailers did not have many defined needs or requirements for the service when they started to use it this was not the case anymore after the test. On the contrary, almost all retailers brought out requirements that the service has to fulfill before it can be established and commercially efficient. The service was regarded as highly technological and fast-developing as well as being still at the very initial stage of development, which created uncertainty in relation to its usability, effectiveness and reliability. The challenges identified were related to e.g. ease of use of the service, developing important new features for the service (e.g. ability to locate the receiver of the m-ad and measurability of the effectiveness of the service), legislative issues, privacy concerns, lack of databases of willing receivers of m-advertising, and solving many certain technical problems.

Service co-creation. It is argued in the services marketing literature that the service is a result of the co-production between service provider and the customer. In this case, however, there were not many co-productive elements in the m-advertising service production. Lack of own effort and resources were pointed out by many retailers as a main reason they did not receive much benefits from the service. Hence, one critical challenge related to this kind of services is how to engage the buyer to the service process.

Closely related to co-production view on services, also the interaction between the service provider and the buyer may represent a challenge in this kind of service context. Some retailers felt that they would have needed more training in using the service. They would have valued closer co-operation in designing and implementing the m-ads, specifically because the service is new and they did not have previous experience of what kind of m-ads are good and effective.

"It would have helped if the research project had described what kind of m-ads... what type of m-ad we should have made. Give instructions and suggestions and help in implementing the m-ad. [...] Now we only had the advertising tool and technical requirements." Night club and restaurant

Costs. Due to the fact that retailers did not actually have to pay for using the service, the costs of purchasing m-advertising service were only discussed in terms of their future willingness to pay for the similar service. Although all the retailers seemed to be willing to pay for this kind of service they pointed out many challenges that need to be solved before monetary investments become topical. These challenges are mostly same as the ones identified above, especially the need for developing the service further and some kind of evidence of the effectiveness of the service.

"It (willingness to pay for m-advertising) depends on the situation at hand... legislation, target audience. And it would be nice to see studies on how effective it is, are consumers

interested and so on. I could imagine that in the future it could be one part of our marketing.” Doctor’s clinic

Buyer-related challenges

The buyers in our empirical data represented a group of very different types of organizations. Some of them were small owner managed retailers while others were medium-sized and part of larger chains, for example clothing retail chains or a local representative of a large insurance company. However, all of the companies faced the typical SME purchasing challenges in terms of acquiring and using the mobile advertising service. None of the retailers explicitly included purchasing professional into the mobile advertising service evaluation and process. The service was more seen as a marketing experiment, and people involved in it either possessed marketing or technological skills in the company.

The technological complexity, however, did not play any essential role in the empirical data. The user interface, i.e. making of the m-ads, was made rather easy for the retailers.

“In my opinion in the user interface (putting the m-ads into the system) there was nothing especially bad, everything was very useful. It was very clear. You could not send wrong ads to wrong people at the wrong time, which was a good thing. “ Night bar

The level of needed technological understanding was mostly related to the way the possibilities provided by the technology could be fully exploited. For example, the system offered possibilities to define the m-ad sending criteria very sophisticatedly in terms of the weather conditions, or mood and interests of the receiver. Furthermore, the system enabled the use of video and sound effects in the advertising, but these were often considered as too complex to realize by the retailers. It can be argued, that the technological understanding of the buyer was mostly related to the way they could understand the full potential and content of the service. Thus, there were related to service challenges.

Technology related –challenges

All m-advertisers were the continuously developing their processes from technological perspective and from business perspective. The M-advertisers were developing their marketing more towards sophisticated segmented and targeted markets. Most of the advertisers had already running CRM processes and e-marketing solutions were either already operating or under construction. The M-advertisers had already started the adoption of internet marketing systems and perceived mobile marketing as next step of the development.

The retailers had positive perspective towards new technological solutions and felt that the business that they are running deserves to follow time. In general the retailers were more enthusiastic than technologically oriented or capable of perceiving the potential risks of benefits of the technology.

“well of course with the new ones. We are as a company as well future-oriented and we don’t want to get stuck... ...personally I like always prefer new things rather than staying put. You know, I tend to look alongside me rather than in tube. “ Book store

However they were extremely anxious about that the systems they adopted in the business operations could not generate negative perceptions among their customer base i.e. they were afraid of creating systems that started spamming people.

Understanding the complexity of the technology from the purchasing perspective. In overall the procurement choice whether or not to implement the m-advertising system was made based on flimsy reasoning. The decision making to procure was based typically on the enthusiasm on participating with such novel service as well as the operational capabilities to produce single advertisement to the system. The resources potentially required for the optimal utilization of the system of the potential risks related to the m-advertising was not fully comprehended.

The retailers equated M-advertising system with traditional marketing communications channels as print or broadcasting media, which are build on mass messages with mass audience. The retailers felt frustrated thus the number of send advertisements were low and seemed inadequate compared with

traditional medias however the effectiveness of marketing communication was not compromised. The Retailers rarely questioned the size of the segment and they were targeting rather focused on criticizing the low number of m-advertisements sent.

In some cases the purchaser had difficulties for comprehending the event the general idea of the system offered for him/her to procure. The challenges were related typically with the language used by the offering counterpart of the complexity of the system or the lack of knowledge of the procuring counterpart.

“We read it twice, like what the [...] they mean about this. Could not they say this in Finnish”
Science center

These difficulties were related both the general understanding of the technological system in general and the individual features of the system.

The M-advertisers perceived the challenges related to the novelty of the technological system. Most of the retailer perceived that the benefits generated from the systems did not overcome the difficulties related to the devices. The major concern among the retailers were that the number of mobile devices compatible with the M-advertising system is not high low. In some case the person creating the actual m-advertisements even lacked the compatible device for receiving advertisement that the system is sending. Therefore the abilities to develop own capabilities and learn from own experiences were challenged.

Compatibility with existing systems. The major challenges in m-advertising system adoption process were the adoption with existing information technology systems. The challenges related to existing systems could be categorized in two groups. The retailers already using CRM-system had technical difficulties with adopting the m-advertising system with their previous ones.

“Naturally, if we got it for instance working with our loyal-customer program... ..But it would be like that, you know, that it would make our customers stronger” Garment store

The retailers that had the CRM-systems under development or did not had any formal systems suffered business process related difficulties. The absent capabilities of understanding the value creation process of their customers hindered the full utilization of the system they adopted in their business. They just expected that the new system per se is the solution to all their problems and they do not have to put any effort for understanding their customer.

“I don't no, can I see somewhere how many ads are received... ..It is so hard to measure naturally, does it have any affect on our cash registers”. Leather store

However the retailers understanding the value creation of their customer perceived the true potential of the m-advertising system as well and could overcome the challenge.

“The electric media is so easy, that “with this SMS free entrance”, we can see the result right a way, like within an hour. “

Maturity of the technology. The low level of technological maturity of the m-advertising system hindered retailers for utilizing all the potential of the system. The technological novelty and consequently the low number of compatible mobile devices among test-users prevented retailers for investing to making the m-advertisements. Also some of the retailers did not itself have the suitable device they could perceive all the possibilities of the new technology or at least receive m-advertisement that the other retailers had created.

“We didn't have such resources. We didn't like... were ready to invest, when our advertising agent takes 100€/hour and they would have taken like five or ten hours... and we are going to sell one 10€s sparkling wine. It did not seemed reasonable” Nightclub and restaurant

“Hah... Basically if we had used advertising agency for doing this we would not be able to get our money back, even if all would have bought jacket for 200€”

The system was perceived as rather low in terms of technological maturity among m-advertisers. They perceived the system as more likely to be adopted at the moment by the technologically oriented innovators than great majority of the population.

“It is naturally for the people, who are interested in these. For instance it seems that ADP-stores or mobile phone stores would use it efficiently. Average Joe does not want to mess with those much and search for settings” Leather garment store

In spite of the technical problems faced during the experiment the retailers perceived the m-advertising system as promising tool for tomorrow for adopting in loyal customer marketing communications and reaching the segments not able to reach with traditional print media. Thus, buying technology-intensive business services can also include the element of future orientation; meaning that the service bought may also hold value in terms of gaining experience of the service already along with the other innovators. How this can be taken into account in the purchasing process, certainly represents a challenge.

Business process -related challenges

M-advertising service offered new viewpoints to the retailers' existing advertising operations as the retailers compared it to their existing process. Majority of the interviewees pointed out that their marketing processes, and advertising processes in particular, are currently undergoing a radical change in which the more traditional forms of advertising are being replaced and complemented by the electronic and mobile media. Hence, the new m-advertising service was considered as a potential part of this development process. However, first the buyer firm needs to learn to use the new kind of service and new advertising formats it has no previous experience of. This was emphasized by many of the retailers. It was also pointed out that the implementation process of the m-ad is in many ways different and requires new skills and resources from the buyer firm. It was also pointed out that in order to be able to change the old processes the new ones need to be carefully designed and their benefits need to be clearly informed throughout the buying organization.

Some of the retailers felt that m-advertising service could be used as such besides their other advertising processes. Those retailers did not make a difference between their traditional advertising methods and a new m-advertising service. Instead, they used the same processes in implementing the both mobile as well as other ads, and use the similar ads in the m-advertising service system and other advertising channels.

“I used the same line (in the m-ads) that we have chosen for this year. I mean the same colors and logo. It was similar to those we have used in our newspaper ads. [...] I think it (the m-ad) was therefore so easy to do because it was the same ad.” Doctor's clinic

However, as the m-advertising service is in many ways very different from the more traditional ways of advertising and its main benefits lie in utilising these different characteristics efficiently, it creates a challenge for the buyer to understand the differences and utilize the specific features of each advertising medium. Hence, it would be important for the buyer to realize that starting to use the new service may require adaptations and changes in their existing marketing processes. For example, newspaper ads are usually targeted at undifferentiated mass audiences while m-advertising enables reaching specific consumers with specific needs. If this distinction between two very different advertising methods is not identified it becomes difficult to utilize them effectively. Thus, it is particularly critical in the case of new technology intensive services to notice that they often differ significantly from the existing service systems of the buying company and cannot be as such integrated to them.

On the other hand, some retailers saw the m-advertising service as a distinct yet possibly complementary system to their existing marketing systems. They pointed out that the m-advertising service could be integrated in e.g. their loyal customer programs or CRM systems, and it could effectively change and develop their existing marketing processes. Those retailers, however, again brought out many challenges that need to be overcome before this integration of systems is possible. For example, the relation between the new service and existing marketing systems can so far be undefined, or the existing systems as such are not compatible with the new service system. Also inter-

organizational issues such as lack of knowledge and distrust towards new technological implications may hinder the development.

“Functioning of our own system is still at the very poor level so that this (m-advertising service) could have been fluently integrated to it. [...] We should discuss more about mobile advertising inside the company. I think we should have more information in our organization about the possibilities offered by m-advertising. And really, our own systems, for example this loyal customer thing or some kind of club-idea should be at the further level.” Hobby shop

The m-advertising service system examined in this study represents standardized type of software, i.e. it was the same system for all the retailers involved. Therefore it should be noted that the challenges identified here can be very different in the case of tailored software.

Conclusions

This study has explored the purchasing challenges related to technology-intensive business services especially in SME context. We have theoretically composed four different sets of purchasing challenges and then elaborated on them empirically. The four identified purchasing challenges, service –related, buyer –related, technology –related and business process -related challenges turned out to also hold up in our empirical study. In the following, we will present the main findings of this study with respect to these challenges. We will also pose some ways to tackle with these challenges along with the discussion. These are summarized in Table 2.

In buying technology-intensive business services, one of the most important service-related purchasing challenges is the problem of defining the service. What the service actually is about, what it includes and what kind of value does it provide for the customer are essential issues in this from the purchasing perspective. The specification of the service and the identification of one’s own needs are of course connected to each other. In technology-intensive business services, the need identification can actually be rather vague in the sense that customers may have only some problems in their own processes or they may just be aware of the new service available. However, non-specific own need’s identification can in fact lead to futile service as was evident in our empirical data. Furthermore, with respect to service-related challenges, the issue of co-creation was found very important in this study. Thoroughly understanding and evaluating the nature and level of customer effort in the service process is essential in the value creation. Not only does this help the buyer to evaluate the total costs of the service, but also this may increase the value creation of the service considerably. On the basis of this study, the customer’s participation in the service process in technology-intensive business services was found important.

The second category of purchasing challenges identified in this study included the buyer-related challenges. This means mainly the characteristics of SMEs as industrial buyers. Naturally, it may include several limitations with respect to the level of technological and purchasing expertise. This naturally creates challenges in the buying process. Our empirical data included various types of companies, but none of them were directly involved in technology markets themselves and thus many of them possessed a rather low level of technological understanding. However, according to our empirical study, the importance of technological understanding was not that significant in the buying and utilizing of the service. The customer interface of the software system and also the whole service was devised so that the required level of technological understanding of the customer was as low as possible. In other words, in our empirical data for example the software tool for making mobile advertisements was made as simple as possible for the customer. Thus, in buying technology-intensive business services, the importance of technological understanding may not be as important as expected on the basis of the literature. However, the purchasing expertise turned out to be important challenge especially in the SME context. Buying technology-intensive business services, however, is not that much about general purchasing principles; e.g. tendering, evaluating and negotiation. With respect to the purchasing expertise, the most important areas are in fact in more related to the specification of the object of exchange and the co-creation aspect discussed in the service-related challenges.

Third category of purchasing challenges was the technology-related challenges. Mainly two aspects of this were pointed out in the existing literature; the compatibility of the purchased technology into the customers' existing systems and the maturity of the technology. Both of these were considered as very important in our empirical study as well. With increasing amount of different types of information also within SMEs, and with increasing variety of different information systems to handle this information, the compatibility of all of these systems seems essential also in light of our study. Value of the technology-intensive business service may be increased by a careful analysis of the compatibility. For example in mobile advertising setting, the existence of database of key customers could be used in mobile advertising in case the systems would be compatible. With this feature lacking in the offered service, full value potential was not reached from mobile advertising. From the purchasing perspective, this is certainly something that needs to be taken into account in the purchasing process. Secondly, the maturity of the technology emerged quite intensively at least in our empirical study which was of course mainly due to the fact that it was about experiment of the software system. However, the buyers need to be aware of the technological maturity of the system and thus also anticipate the level of technological problems and their possible cost effects. Both the compatibility and the maturity issues are not necessarily something that the buyer needs to have an expertise – level knowledge of, but rather from the purchasing perspective it is essential to evaluate whether the service provider is able to communicate these issues to the customer. These are probably something that is more connected to the service provider's expertise. Still, the customer needs to be able to ensure that the service provider is aware of these and communicates these issues to the customer.

Finally, the fourth category of purchasing challenges that was identified in this study was the business process -related challenges. In buying technology intensive business services, the more or less broadly and intensively the existing processes of the buyer company a related to the service. This means that rarely the technology intensive business service is something that is totally separate of the way the company operates. Technology intensive business services change or support the existing processes. From the purchasing perspective this creates many challenges. On the basis of this study, it can be argued that the understanding of the issue is very much also related to value created through the service. If the existing processes are not changed or even involved in the purchased technology intensive business service, the value creation from the whole service may be seriously hindered. Thus, from the purchasing perspective, it seems to be important to carefully identify the processes that are related to the new service and also to analyze the way these are changed by the service.

Table 2. Important purchasing tasks in relation to the identified purchasing challenges.

Purchasing challenges	Important purchasing tasks
Service –related	Thorough analysis of own needs helps also in definition of the service. Evaluating the nature and level of co-creation needed increases the value of the service (awareness of the costs and increasing the value).
Buyer-related	Choosing the kind of technology intensive business service that does not require high level of technological expertise helps to tackle with the difficult purchasing task.
Technology –related	Evaluating the service provider's capability to understand the compatibility of the offering to the customer's existing information technology systems may help in ensuring the compatibility. Evaluating the service provider's capability to communicate about the maturity of the technology helps in creating realistic vision of the service.
Business process – related	Identifying the processes where the service is connected to and the changes required helps in attaining as full value potential as possible.

The conclusions put forward in this study certainly need to be critically considered as the research strategy includes some limitations. First of all, our empirical study represents a unique setting where a newly developed technology for mobile advertising was un-commercially tested. Although we had the possibility to access this unique and fruitful data, it is of course important to bare in mind its limitations.

With respect to future research avenues in terms of buying technology intensive business services a more versatile empirical research is needed. Furthermore, in addition to more diverse empirical contexts, the attention needs to be pointed shifted from merely identifying the challenges more towards the purchasing strategies and perhaps also to the supplier relationship perspective as well. All in all, the number and importance of technology intensive business services appear to be increasing in the future and thus the area deserves more research attention within industrial purchasing discourse.

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