Behavioral Segmentation in the development of B2B High Speed Data Services

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Abstract

The paper provides a behavioural segmentation in the development of B2B High Speed Data Services and it defines a Business-Oriented Model of Factors that Affect Adoption.
In this paper, we (1) review business Information Technology acceptance literature, (2) develop a qualitative research on a sample of twelve companies in Europe and USA, (3) formulate a research model, (4) empirically test the proposed model on a sample of 1.545 companies (19 industry segments) across the USA and five countries in Europe and present the results of our study. The paper supports the use of the technology acceptance model (TAM) to predict high speed service adoption. One minor alteration is made to the traditional use of TAM – perceived ease of use is not linked to perceived usefulness. This article also finds that the task-technology fit (TTF) model is a valuable addition to TAM in order to segment high speed data service adoption in the business market. The paper also makes several managerial implications.

Key words: High Speed Data service, Adoption model, behavioral segmentation, mobile data business services

Introduction

Wireless devices in the corporate environment include mobile phones, Personal Digital Assistants with wireless modems, wireless laptops, two-way pagers/short message systems, and wireless networks.
The overall goal of this paper is to understand factors influencing wireless adoption decisions and to provide a behavioural segmentation in the development of B2B High Speed Data Services.
The focus is on a "mobile office" service based upon 3rd Generation (3G) mobile telecommunication technology which provides mobile workers with fast, secure, convenient access to the services and information on their corporate networks. Plug-in PCMCIA wireless modem card enables existing laptop PCs and PDAs with always-on connectivity to the corporate network, via a secure Virtual Private Network (VPN) across a mobile operator's network.

The specific research questions are:

1. What are the most important technology factors in making the decision to adopt wireless high speed data services?
2. What are the constraining factors in wireless adoption?
3. What is the decision-making process for wireless adoption?

The paper provides a model of factors that affect adoption of high speed data services by companies.
In this paper, we (1) review business Information Technology acceptance literature, (2) develop a qualitative research on a sample of 12 companies in Europe and USA (3) formulate a research model, (4) empirically test the proposed model on a sample of 1.545 companies (19 industry segments) across the USA and five countries in Europe and present the results of our study. The paper supports the use of the technology acceptance model (TAM) to predict high speed service adoption. Purpose of the study is to verify that the task-technology fit (TTF) model is a valuable addition to TAM for high speed data service adoption in the business market.

Theoretical Background

This study lies in the intersection of two issues. The first is the technology adoption decision-making process. The second is the analysis of determinants of information technology acceptance and utilization among business users. Literature is reviewed and linked to the adoption of IT by companies, which forms the theoretical background of this research.

Technology adoption research has flourished in recent years (Agarwal & Prasad 1999; Davis 1989; Dishaw & Strong 1999; Gefen & Keil 1998; Igbaria, Parasuraman & Baroudi 1996; Moon & Kim, 2000; Taylor & Todd, 1995; Venkatesh 2000; Venkatesh & Davis 2000; Klopping & McKinney 2004; Pagani, 2004). Currently the most effective tool to describe adoption is the Technology Acceptance Model (TAM) (Davis 1989; Davis et al. 1989). In the Information System literature on IT adoption, researchers have conducted several studies to examine the relationship between perceived ease of use, perceived usefulness, and the usage of other information technologies (Davis 1989; Davis et al. 1989, Mathieson 1991; Adams et al. 1992; Szajna 1996; Hendrickson & Collins 1996; Chau 1997). Their researches have supported the Technology Acceptance Model (TAM) proposed by Davis (1989) which posits that perceived ease of use and perceived usefulness can predict the usage of technology. TAM was derived from the Theory of Reasoned Action (TRA).

A second model of technology adoption, the task technology fit (TTF) model, extends the TAM by considering how the task affects use. More specifically, the TTF model suggests that technology adoption depends in part on how well the new technology fits the requirements of a particular task. Dishaw and Strong (1999) found that TTF was somewhat more effective than the TAM for predicting use in work-related tasks; however, their study also concluded that a combination of TTF and the TAM into one extended model is a superior model to either the TAM or the TTF model alone.

Although there are numerous studies in the field of adoption and diffusion of marketing-enabling technology (Plouffe, Vandenbosch & Hulland 2001; Daghfous, Petrof & Pons 1999; Rogers 1995; Holak and Lehman 1990; Labay & Kinnear 1981), previous works have focused mainly on the adoption of products and technology (Verhoef & Langerak 2001; Au & Enderwick 2000; Eastlick & Lotz 1999; Davis 1989). There is a solid foundation of theories and previous studies on technology adoption (Julien & Raymond 1994; Brooksbank, Kirby & Kane 1992; Kirby & Turner 1993; Iacovou, Benbasat & Dexter 1995; Thong & Yap 1995; Harrison, Mykytyn & Rienenschneider 1997; Kleijnen & de Ruyter 2003; Van Akkeren & Harker 2003) but there has been little research regarding corporate

adoption of wireless services and the perspective on high speed data services in the business market is not considerably pronounced.

Recent studies on reasons why small business owner/managers adopt or do not adopt information technology (IT) and e-commerce technologies (Van Akkeren & Cavaye 2000; Fink 1998 Chau & Pederson 2000) have highlighted both inhibitors and facilitators to adoption. Small business adoption is discussed as being determined by decision maker characteristics, information system (IS) characteristics, organizational characteristics, and environmental characteristics (Thong & Yap 1995). Lack of speed is a barrier to adoption as mobile data technologies are slow and hence inefficient (Taylor 1999; Saunders et al. 1999). Another barrier is the perception of a lack of standardized IT environment for developing mobile data applications as impeding the growth of the mobile data market (Harrison 1999; Axby 1998). Limited bandwidth, higher usage costs, increased latency, and a susceptibility to transmission noise and call dropouts are also possible barriers to adoption (Duffy 1999; Johnson 1999). Another area of concern for end-users is security (Riggs & Bachelor 1999; Chan 2000).

Clearly the literature on mobile data technologies to date underlines the importance of highlighting the benefits of using the technologies, and the ease of use to potential users. Telecommunication companies are making enormous investments in new wireless technologies (Lehner 2003; Deitel et al. 2002). Now they are looking for killer applications to get pay offs (Lehner 2003). Several empirical studies took place in the last years to find out what possible killer applications are (Heinrich 2001; Ritzer 2001; Schlabach 2001; Horn 2002; Reinema et al. 1998; Reinema & Thielmann 2002; Rauch 2001; Waidenmaier 2001). But these killer applications aren't still found till today (Lehmann & Lehner 2003; Carlson et al. 2001; Martignoni & Stimmer 2002). Mobile Business Applications are successful if they are profitable for the application providers and attractive for the users as subscribers of this applications.

The Explorative Survey

Methodology

The explorative survey was conducted through interviews on a sample of twelve companies (five in USA and seven in Europe) having different size categories and ownership characteristics. The methodology for this research is case study (Yin 1993, 1994; Stake 1995). Interviews were conducted in 2003 and 2004 with the chief information officer or equivalent executive, and one or two managers in charge of telecommunications. Purpose of the analysis was to understand factors and attributes importance in the adoption process of High Speed Data Services. Interviews occurred at both the IT decision-making and IT operational levels of each company.
The specific criteria for company selection was the following: a mixture of high tech versus manufacturing; public versus private ownership; a majority of cases to have a global presence; and at least one company whose future is closely tied to broadband communication, i.e., the global entertainment company.

The companies analyzed in the pilot study belong to the following industries: (1) Distributor of industrial products; (2) Software Vendor and Services; (3) Medical Products Manufacturing; (4) Networking and Telecom Hardware; (5) Entertainment; (6) Media Broadcasting company; (7) Government and legal management company; (8) Insurance company; (9) Car manufacturer; (10) IT service company; (11) System Technology.

Each case met the validity criteria for case studies, in particular, construct validity, internal validity, external validity, and reliability (Yin 1994). The construct validity came from multiple evidence sources, review of the case study transcripts by interviewees, and multiple sources of evidence (interviews and documents). Internal validity came from the construction of a detailed research framework, indicating the steps in analysis, ahead of time (Yin 1994). External validity is limited, since this is an exploratory study. Reliability is based on a detailed case study protocol that documents the scheduling, interview procedures, recording, follow-ups, questions, and summary database (Yin 1994).

The research framework consists of factors under the groupings of organization, wireless decision-making, and wireless utilization. Under organization, the factors were industry, primary product(s), firm size, firm organizational structure, and current wireless dependency. The wireless decision-making factors consisted of cost, success of units already deployed, bandwidth, e-connectivity, security,

reliability, scalability/expandability, digital standards, technology suitability, project promoter, and level of decision-making. The wireless utilization factors were number of mobile devices deployed, extent of anticipated future deployment, uses of cell phones, and anticipated future uses.

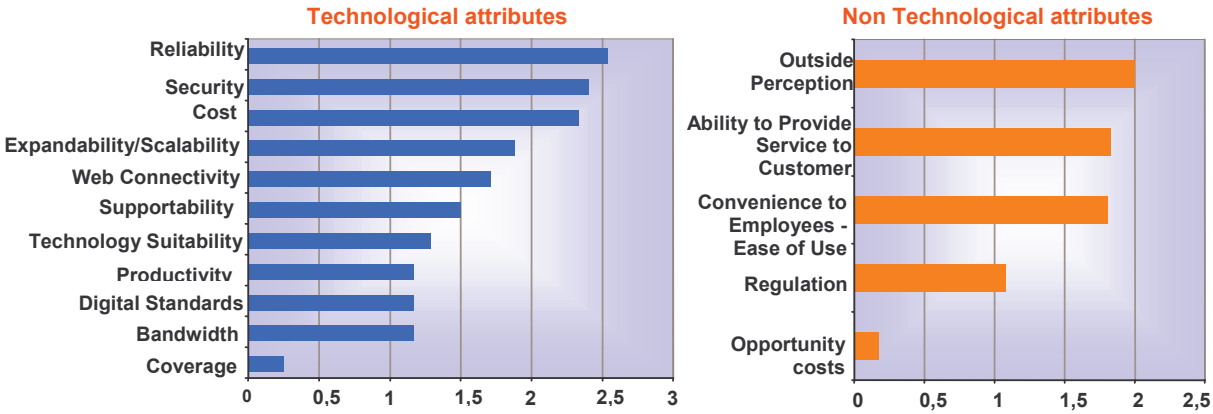
Findings emerging from the interviews

Companies analyzed were asked to indicate main important factors influencing the adoption process and for each of them to rate the relative importance measured in a scale 1-3. Figure 1 shows the relative importance for each attribute factor.
It emerges two main categories of attributes influencing decision to deploy High Speed Data Services:

- technological factors: reliability, security, costs, scalability, web connectivity etc.
- non technological factors: outside perception, ability to provide service to customer, convenience to employee, regulation, opportunity costs.

The most important technological factors for adoption are security, productivity, reliability, web-based connectivity, ability to provide service to customer, coverage. Security's prominence is consistent with other studies of mobile technology (Kleijnen et al. 2003). The security and reliability factors were not in the traditional adoption model (Davis 1989), but may have become more significant in the decade or more since those models were introduced. Reliability is a highly rated factor because it is so intertwined with the concept of coverage and the ability to provide the service required.

Figure 1 – Average Attributes importance



Connectivity to the web was mostly rated as of high importance, although respondents in four different firms specified that it is of low/no importance now, but medium to high importance for the future. Only one non-technology factor, customer service, is at the high level of the three technology factors discussed above. The service to the customers is consistent with the TAM model (Davis, 1989) and subsequent TAM studies (Adams et al. 1992; Gefen & Straub 1997; Lederer et al.2000; Pagani 2004).

The software provider company put a high emphasis on productivity, a new factor not in our theoretical model. It is consistent with the importance in TAM of usefulness (Davis 1989). The factors of reliability and cost were rated at medium to high. Several respondents stated that companies may not choose the cheapest alternative, if the key factors of security and convenience are not met. Reliability also is a leading factor and relates to the strategic importance of cell phones, verified by all respondents. Reliability and convenience also are consistent with the TAM factor of usefulness (Davis 1989).

Results and discussion: Psychometric Properties of the Instruments

Factor Analysis was performed on the individual items contained in the questionnaire in order to establish their suitability for performing the multivariate analyses used. A Principal Components Analysis (PCA) was used for data reduction to examine the factor structure and help the measures conform to recommended levels of reliability. The results presented here are based on sets of variables, guided by conceptual and practical considerations: (a) the acceptance of factor loadings of approximately .50 and above – this level is considered practically significant (Hair, et al. 1998), (b) most of the cross-loadings falling below .20. High communality values were observed for all the variables indicating that the total amount of variance an original variable shares with all other variables included in the analysis is high. Table 1 shows the summaries of the results of Principal Component Analysis factors and item loadings of ICT usage.

Table 1 – Principal Component Analysis

	Component					Communalities
	F1	F2	F3	F4	F5	
Cronbach's Alpha values	***.876***	***.752***	***.575***			
Bandwidth	**,874**	7,1E-02	5,5E-03	,137	,244	,848
Security	**,795**	-,384	,243	,177	-,305	,964
Scalability	**,819**	-,160	,141	,247	-,144	,799
Connectivity to web	**,812**	-,266	-8,2E-02	-,332	-,178	,878
Opportunity costs	**,650**	,309	-,340	2,7E-03	,373	,773
Outside perception	**,580**	6,5E-02	,340	-,527	,124	,749
Regulation	**,676**	-182	346	299	491	,941
Digital standards	,362	**,812**	-,323	4,1E-02	3,8E-02	,898
Technology suitability	,193	**,852**	,111	6,2E-02	-5,2E-02	,783
Reliability	,166	**,739**	-,293	-8,5E-02	-9,3E-02	,675
Coverage	-,399	**,606**	,339	-,351	,190	,801
Supportability	-,288	,272	**,684**	,494	-2,1E-02	,870
Ability to provide service to customer	-,176	,140	**,728**	-,213	-,343	,743
Employees ease of use	,146	,425	,102	**,707**	-,253	,777
Cost of access	-,433	-,229	-,560	**,398**	-5,8E-02	,716
Productivity	-448	-,170	,246	,159	**,718**	,831

Extraction Method: Principal Component Analysis. Five factors extracted: F1 Data connectivity; F2 Suitability; F3 Customer Satisfaction; F4 Efficiency improvements; F5 Perceived Usefulness.

Alpha (Cronbach) model is applied in this study to measure internal consistency, based on the average inter-item correlation. Reliability analyses show the following Cronbach's Alpha values: Data Connectivity (.876), Suitability (.752), Customer Satisfaction (.575). These reliability test results show alpha values exceeding .60 recommended by Hair et al., (1998) as the lower limit of acceptability, ensuring that the items grouping for the respective variables are reliable under the conditions of the local survey. Only efficiency improvements (F4) and Perceived Usefulness (F5) show low Alpha values. The mean of components showing internal consistency is for F1 1.7875 (very high), F2 1.3125 (medium), F3 1.6667 (medium). Extraction communalities are estimates of the variance in each variable accounted for by the factors (or components) in the factor solution.

Research Hypotheses

The attitude literature, including technology acceptance, provides the theoretical framework needed to define the linkages between beliefs about adopting and using Information Technology by companies, while the qualitative analysis provides the underlying structure for the theoretical model of the study.

The proposed conceptual model of Information Technology adoption for this study is shown in figure 2. The model is derived from the theories emerging from the literature review and from the findings of the qualitative analysis. The individual attributes associated with these characteristics are shown in table 2 along with their sources in the literature.
The actual usage behaviour is not employed at this stage of the study as a dependent variable in the research model as it will be widely validate in the next stage.

Therefore the following hypotheses are proposed:
Hypothesis 1: Web connectivity has a positive direct effect on awareness interest and evaluation
Hypothesis 2: Technology Suitability has a positive effect on intention to adopt
Hypothesis 3: Customer Satisfaction has a positive effect on intention to adopt
Hypothesis 4: Cost is a medium to high adoption factor
Hypothesis 5: Workforce Productivity has an high impact on perceived usefulness by corporate
Hypothesis 6a, 6b, 6c: Ease of Use factor, stressed in the TAM models (Davis 1989), has a big impact on intention to adopt, perceived usefulness and customer satisfaction
Hypothesis 7: Interest has an high impact on intention to adopt

Figure 2 – Research Model with directions of hypothesized relationships

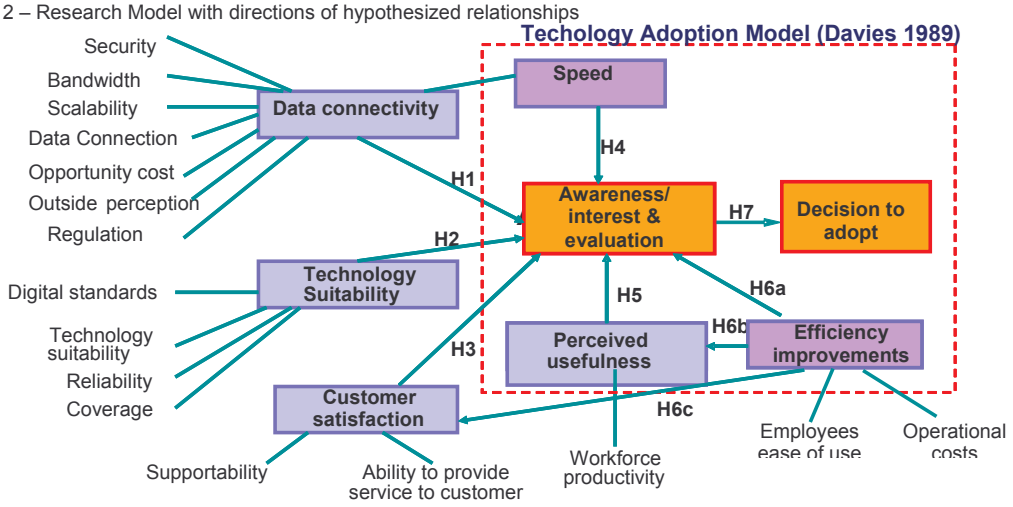


Table 2 – Constructs and associated attributes

Construct	Attributes and sources in the literature
Data connectivity	1. Data Speed (bandwidth) (Taylor, 1999; Saunders, Heywood, Doron, Bruno & Allen, 1999)) 2. Security (Riggs and Bachelor, 1999; Chan, 2000) 3. Scalability 4. Always on connectivity
Suitability	1. Reliability 2. Digital standards (Harrison, 1999; Axby, 1998) 3. Technology suitability 4. Coverage.
Customer satisfaction	1. Supportability 2. Ability to provide service to customer
Efficiency improvements	1. Employees ease of use (Davis, Bagozzi & Warshaw, 1989) 2. Operational costs (Duffy, 1999; Johnson, 1999)
Perceived usefulness	1. Workforce productivity

Testing the Hypothesis

After defining the adoption models and the related research hypotheses, purpose of this section is to validate the model through a quantitative analysis conducted on a sample of 1.545 companies operating in 19 industries across the USA and 5 countries in Europe. Specific objectives of this phase of the study are:

- prioritize customer needs determining the importance of attributes for each specific segment;
- segment customers according to their needs;
- prioritize segments according to potential profitability.

Purpose of this section is to identify the specific attributes that the application need to integrate in order to satisfy needs and requirements of the specific segment.

Sample and methodology

In order to measure the relative importance of attributes and factors, the study has been conducted through a quantitative analysis (questionnaire) conducted in 2004 on a sample of 1.545 companies across the USA and five countries in Europe. All companies belong to 19 market segments and have at least thirty mobile or remote data users. Market perceptions were obtained from interviews with Telecom/IT managers from major corporations. Respondents were required to make or influence decisions for a minimum of two of the following areas in order to qualify: MIS/IT/Network; Desk Top/PC/Laptop Systems; Landline Voice/Data; Mobile Voice; Mobile Data; Email.

For each of the following attributes the company was asked to evaluate the relative importance on a scale 1-10: (1) Workforce productivity; (2) Efficiency improvements; (3) Customer satisfaction; (4) Reduced Operational Costs; (5) Additional sales Revenues; (6) Establishing Data Connection; (7) Data Speed; (8) Always on connectivity; (9) Cost of access; (10) Coverage

The methodology is based on the well-known probabilistic ideal vector model (De Soete & Carroll 1983; Böckenholt & Gaul 1986; 1988; Gaul 1989; Baier & Gaul 1996). Deterministic points for alternatives and random ideal vectors for consumer segments are used for explaining and predicting individual choice behavior in a low dimensional attribute space where the same model formulation is employed for parameter estimation and for market simulation. First objective of the analysis was to verify for each industry segment the most important factors influencing the adoption process.
A discriminant function that is a linear combination of the component *x* can be written as equation 1, where *w* is the weighted vector and w_0 the bias or threshold weight.

$$U(x_t) = \sum w^t x_i + w_0 \qquad (1)$$

A simple linear classifier having *i* input units, each corresponding to the values of the components of an input vector. Each input feature value x_i is multiplied by its corresponding weight w_i the output unit sums all these products and emits a +1 if $w^t x + w_0 > 0$ or a -1 otherwise.
A two-category threshold weight linear classifier implements the following decision rule: decide w_1 if $U(x_t) > 0$ and w_2 if $U(x_t) < 0$. Thus *x* is assigned to w_1 if the inner product $\sum w^t x_i$ exceeds the threshold – w_0 and w_2 otherwise. If $U(x_t) = 0$, *x* can ordinarily be assigned to either class.

Prioritizing Customer Needs

Purpose of this phase is to identify which attributes and levels are most and least important to all customers on a segment basis. Each sector has different needs that must be understood separately.
The importance of an individual conjoint attribute is determined by the span of the utility levels for each attribute, compared to utility spans for other attributes (Westwood 1973).
The random variable $U(x_t)$ explains the utility assigned by companies of segment *t* to alternative *i*. The utilities, or measure *f* worth, for each attribute level are calculated from the preferences given by each respondent when asked to trade-off the different attributes and levels.
Findings emerging from the quantitative analysis (figure 3) show that workforce efficiency is the most important factor influencing the decision to develop high speed data services for insurance companies. Customer satisfaction represents the most important factor for companies which offer services for consumers. In the pharmaceutical sector additional sale revenues represent the main motivation to adopt new technology. Findings related to the perceived barriers that influence the decision to adopt high speed data technology (figure 4) show that mobile coverage is a critical issue for research companies. Data connection is perceived as critical issue by healthcare companies.

Figure 3 - Utility U_{it} of segment t

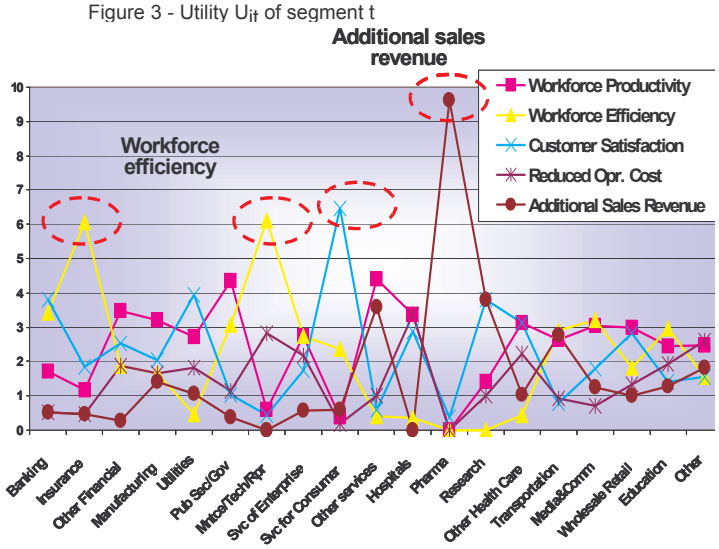
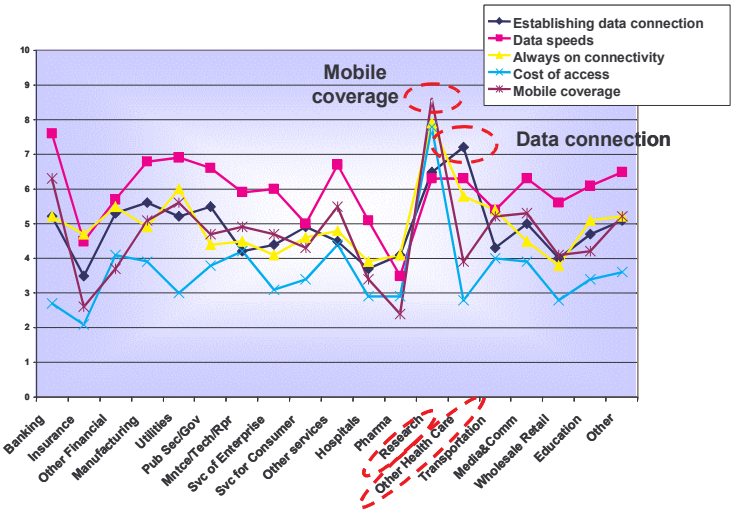


Figure 4 - Barriers to the adoption - importance of attributes (scale 1-10)



Among any group of companies, different companies will find different attributes importance. Needs based segmentation attempts to understand these differences by grouping together companies who assign similar levels of importance to the same attributes. The benefit of this approach over mass marketing is that it enables different products of services to be developed to meet the needs of different segments.
By identifying the two different groups, it is then possible to understand the value of developing a product that will appeal to one or both groups. Proximity matrix (Square Euclidean distances) (table 3)

gives the distances or similarities between items. It allows to identify a first cluster composed by Service of Enterprise, Education, Manufacturing, Public Sector/Government, Media & Communication and Other. Other financial, Transportation and Wholesale Retail form a second cluster.

Table 3 - Proximity matrix

Proximity Matrix

	Euclidean Distance																		
	1:banking	2:insurance	3:other financial	4:manufacturing	5:utilities	6:pub sec/gov	7:mntce/tec	8:Svc of Enterprise	9:Svc for consumer	10:Other service	11:Hospitals	12:Pharma	13:Research	14:Other Health care	15:Transport	16:Media &Comm	17:Wholesale Retail	18:Education	19:Other
1:banking		6,15	4,63	3,78	3,68	4,56	5,84	3,96	4,66	6,43	6,32	12,00	8,04	5,13	4,90	3,33	4,28	4,06	4,28
2:insurance	6,15		5,98	6,71	7,78	6,00	4,51	5,02	6,51	8,58	7,02	11,25	11,95	7,79	5,57	5,34	5,31	4,76	6,64
3:other financial	4,63	5,98		2,31	3,42	2,86	5,94	2,64	5,52	4,90	3,43	11,07	8,24	3,00	3,90	2,97	2,75	2,43	2,87
4:manufacturing	3,78	6,71	2,31		2,81	2,48	5,97	2,44	5,96	3,47	4,33	10,41	7,27	3,06	3,12	2,05	2,90	2,26	1,54
5:utilities	3,68	7,78	3,42	2,81		4,81	7,56	4,05	5,08	5,00	4,45	11,12	6,92	2,88	4,92	4,13	3,70	4,08	3,08
6:pub sec/gov	4,56	6,00	2,86	2,48	4,81		5,40	2,54	7,08	4,46	5,02	11,56	9,07	4,59	3,60	2,00	3,47	2,65	3,38
7:mntce/tec	5,84	4,51	5,94	5,97	7,56	5,40		4,46	7,75	8,05	7,23	12,35	10,53	7,81	5,21	4,87	6,03	4,32	5,57
8:Svc of Enterprise	3,96	5,02	2,64	2,44	4,05	2,54	4,46		5,81	4,83	3,50	10,74	9,03	4,37	3,22	2,13	1,96	1,50	2,39
9:Svc for consumer	4,66	6,51	5,52	5,96	5,08	7,08	7,75	5,81		8,34	6,25	11,47	8,81	5,96	6,72	5,76	4,90	5,93	6,31
10:Other service	6,43	8,58	4,90	3,47	5,00	4,46	8,05	4,83	8,34		5,96	8,93	7,37	5,45	3,52	4,18	4,78	4,52	3,61
11:Hospitals	6,32	7,02	3,43	4,33	4,45	5,02	7,23	3,50	6,25	5,96		11,21	10,06	4,48	5,67	5,11	2,88	4,22	4,16
12:Pharma	12,00	11,25	11,07	10,41	11,12	11,56	12,35	10,74	11,47	8,93	11,21		11,80	10,91	8,82	10,51	10,10	10,04	9,86
13:Research	8,04	11,95	8,24	7,27	6,92	9,07	10,53	9,03	8,81	7,37	10,06	11,80		8,05	7,61	7,96	9,14	8,52	7,32
14:Other Health care	5,13	7,79	3,00	3,06	2,88	4,59	7,81	4,37	5,96	5,45	4,48	10,91	8,05		5,37	4,63	4,20	4,13	3,47
15:Transport	4,90	5,57	3,90	3,12	4,92	3,60	5,21	3,22	6,72	3,52	5,67	8,82	7,61	5,37		2,40	3,75	2,39	2,85
16:Media&Comm	3,33	5,34	2,97	2,05	4,13	2,00	4,87	2,13	5,76	4,18	5,11	10,51	7,96	4,63	2,40		2,83	2,02	2,77
17:Wholesale Retail	4,28	5,31	2,75	2,90	3,70	3,47	6,03	1,96	4,90	4,78	2,88	10,10	9,14	4,20	3,75	2,83		2,61	3,18
18:Education	4,06	4,76	2,43	2,26	4,08	2,65	4,32	1,50	5,93	4,52	4,22	10,04	8,52	4,13	2,39	2,02	2,61		2,02
19:Other	4,28	6,64	2,87	1,54	3,08	3,38	5,57	2,39	6,31	3,61	4,16	9,86	7,32	3,47	2,85	2,77	3,18	2,02	

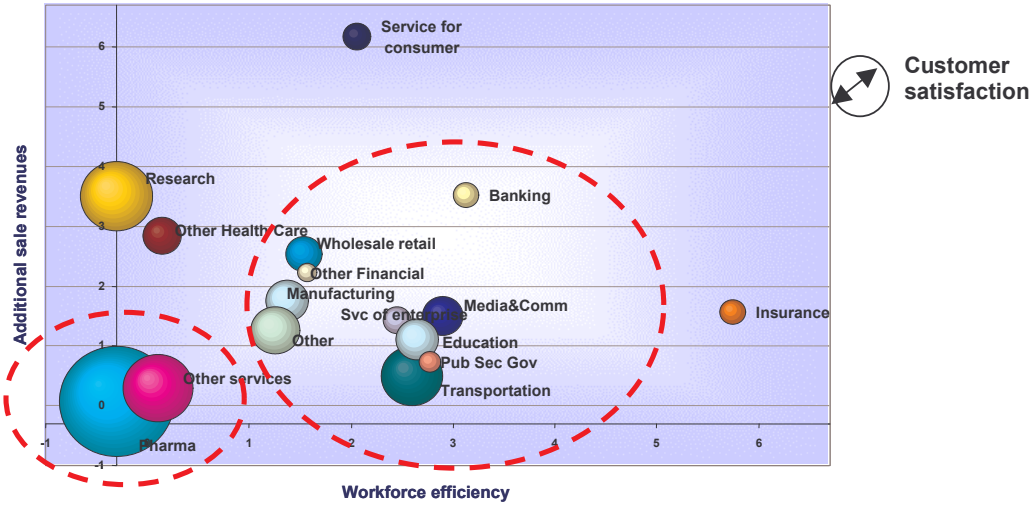
This is a dissimilarity matrix

Pharmaceutical and research are the most dissimilar sectors.
We consider also three attributes characterized by high extraction communalities (figure 5):

1. efficiency improvements (.953)
2. customer satisfaction (.946)
3. additional sales revenues (.955)

It emerges three main clusters (figure 6)

Figure 5 - Importance of efficiency improvements, customer satisfaction and additional sale revenues



Prioritizing segments according to potential profitability

The conjoint segments are now prioritized according to two criteria:

- which segments are the most valuable;
- which segments offer greatest potential for profit.

The modeling is carried out for each of the segments, thus making it easy to identify which products and segments offer the greatest opportunities for profit.
Three steps are followed to model the market share and profit potential of segments:

1. calculate the share of preference for existing products in the market
2. convert the share of preference into an estimate of share of purchase
3. estimate the market share and profit potential, by segment for high speed data services.

The first step towards using conjoint data to estimate high speed data services' profit potential is to convert the utility data into a description of product preference. We adopt in this study the share of preference technique. A product's share of preference represents the share of utility allocated to a product, relative to the other products that have been defined in the market simulation (Hase 1991).
High Speed Data Services' total utility is defined by the sum of the utility values of the attribute levels that have used to describe it. The service is described in terms of the following attributes: (1) Level of interest; (2) Workforce Productivity; (3) Workforce Efficiency; (4) Customer Satisfaction; (5) Reduced Operational Costs; (6) Additional Sales Revenue; (7) Establishing data connection; (8) Data speeds; (9) Always on connectivity; (10) Cost of access; (11) Mobile coverage.

Let U_i^k (t) denote the utility value assigned to service *i* at time t by the segment *k* in a population *K*.
The U's denote scale values or *strict utilities* which summarize the desirability of the alternatives. These scale values are functions of the attributes of the alternatives, often interacting with the characteristics of the respondent segment, and possibly interacting with features of the choice set as a whole. The scale values is assumed to have an additively separable linear form:

$$U_i^k = x_{i1}w_1 + x_{i2}w_2 + \ldots + x_{ij}w_j$$

With the *x*'s fully specified functions of measured attributes and characteristics and/or self-explicated scales of service aspect and the *w*'s importance weight parameters to be estimated.
The *w*'s importance weight parameter is included in a range 1-10.
Share of utility/ preference is measured by the following:

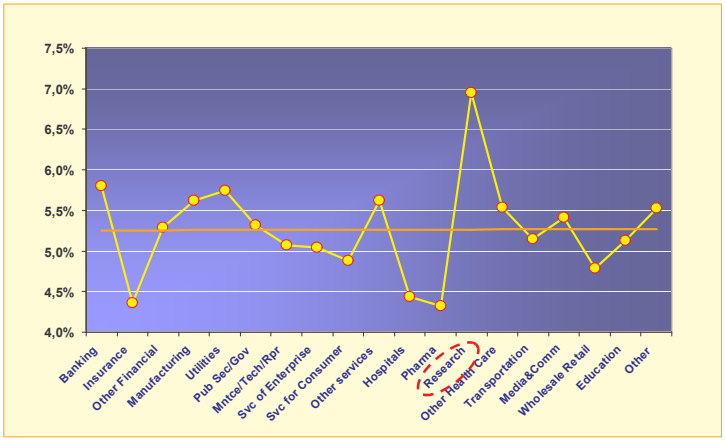
$$\text{Share of utility/ preference} = \frac{\Sigma_{jk}(w\ x_j)}{\Sigma_{k\,jk}(\quad)}$$

From table 4 High Speed Data service[illegible] of 44.70 for banking sector and 33.60 for insurance segment.
The services would therefore have a 6% share of utility/preference for banking (44,70/sum of utility by all segments) and 4% for insurance (33,60/sum of utility by all segments).
It emerges also an high correlation between share of utility/preference and Intranet (0.5) and percentage of remote users working on the road or travelling (0.33).

Table 4 - Part-worth utilities

	Banking	Insurance	Other Financial	Manufacturing	Utilities	Pub Sec/ Gov	Mntce/ Tech/ Rpr	Svc of Enterprise	Svc for Consumer	Other services	Hospitals	Pharma	Research	Other Health Care	Transport	Media& Comm	Wholesale Retail	Education	Other
Level of interest	7,7	6,2	6,5	7	7,6	6	5,4	6,6	5,4	7,4	5,2	6,3	6,5	6,7	5,4	6,7	6,6	6	7
Workforce Productivity	1,71	1,16	3,47	3,21	2,73	4,36	0,60	2,75	0,39	4,40	3,37	0,00	1,40	3,13	2,63	3,06	3,00	2,44	2,47
Workforce Efficiency	3,42	6,05	1,87	1,67	0,45	3,08	6,12	2,75	2,35	0,400	0,36	0,00	0,00	0,45	2,89	3,19	1,83	2,95	1,56
Customer Satisfaction	3,82	1,86	2,53	2,05	3,94	1,03	0,45	1,74	6,47	0,60	2,89	0,38	3,80	3,13	0,79	1,81	2,83	1,41	1,56
Reduced Operational Cost	0,53	0,47	1,87	1,67	1,82	1,15	2,84	2,17	0,20	1,00	3,37	0,00	1,00	2,24	0,92	0,69	1,33	1,92	2,60
Additional Sales Revenue	0,53	0,47	0,27	1,41	1,06	0,38	0,00	0,58	0,59	3,60	0,00	9,63	3,80	1,04	2,76	1,25	1,00	1,28	1,82
Data connection	5,2	3,5	5,3	5,6	5,2	5,5	4,2	4,4	4,9	4,5	3,7	4,1	6,5	7,2	4,3	5	4	4,7	5,1
Data speeds	7,6	4,5	5,7	6,8	6,9	6,6	5,9	6	5	6,7	5,1	3,5	6,3	6,3	5,4	6,3	5,6	6,1	6,5
Always on connectivity	5,2	4,7	5,5	4,9	6	4,4	4,5	4,1	4,6	4,8	3,9	4,1	7,9	5,8	5,4	4,5	3,8	5,1	5,2
Cost of access	2,7	2,1	4,1	3,9	3	3,8	4,2	3,1	3,4	4,4	2,9	2,9	7,8	2,8	4	3,9	2,8	3,4	3,6
Mobile coverage	6,3	2,6	3,7	5,1	5,6	4,7	4,9	4,7	4,3	5,5	3,4	2,4	8,6	3,9	5,2	5,3	4,1	4,2	5,2
Total utility	44,70	33,60	40,80	43,30	44,30	41,00	39,10	38,90	37,60	43,30	34,20	33,30	53,60	42,70	39,70	41,70	36,90	39,50	42,60
Share of utility/ preference	**6%**	**4%**	**5%**	**6%**	**6%**	**5%**	**5%**	**5%**	**5%**	**6%**	**4%**	**4%**	**7%**	**6%**	**5%**	**5%**	**5%**	**5%**	**6%**

Figure 6 – Share of utilities/preferences by segment



The Acceptable Set-Up Price for Segments

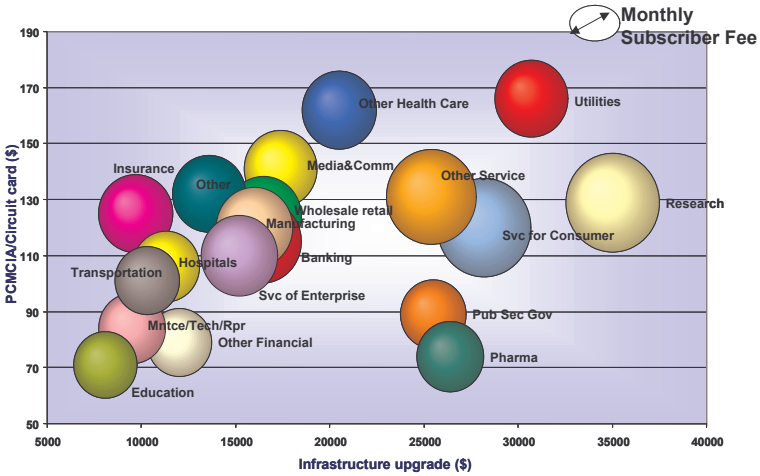
Cost of access represents one of the most important element to be considered in the development of high speed data service. A detailed *cost/throughput model* of the economics of service adoption identifies three critical cost components:

- Possible upgrade to the company's existing remote access infrastructure
- One time PCMCIA card cost
- Monthly tariff

Figure 7 shows these three cost components for each segment. It emerges an high correlation with share of utility/preference for each segment in this order:

- Infrastructure upgrade (0.4778)
- Monthly Subscriber Fee (0.4672)
- PCMCIA Circuit card (0.4027)

Figure 7 – Cost components for each segment



Adoption of High Speed Data Services: Discussion

Standardized parameter estimates for the revised model are presented in Figure 8. As shown, decision to deploy was predicted by Awareness/ Interest and evaluation (β= 0.807) which in turn is predicted by High Speed (β= 0.617), Web connectivity (β= 0.364), technology suitability (β= 0.365), customer satisfaction (β= 0.077) and perceived usefulness (β= 0.282).
Web connectivity is predicted by both High Speed (β= 0.333) and always on connectivity (β= 0.568). Operational costs influence perceived usefulness (β= 0.341).

Figure 8 – Standardized Parameter Estimates

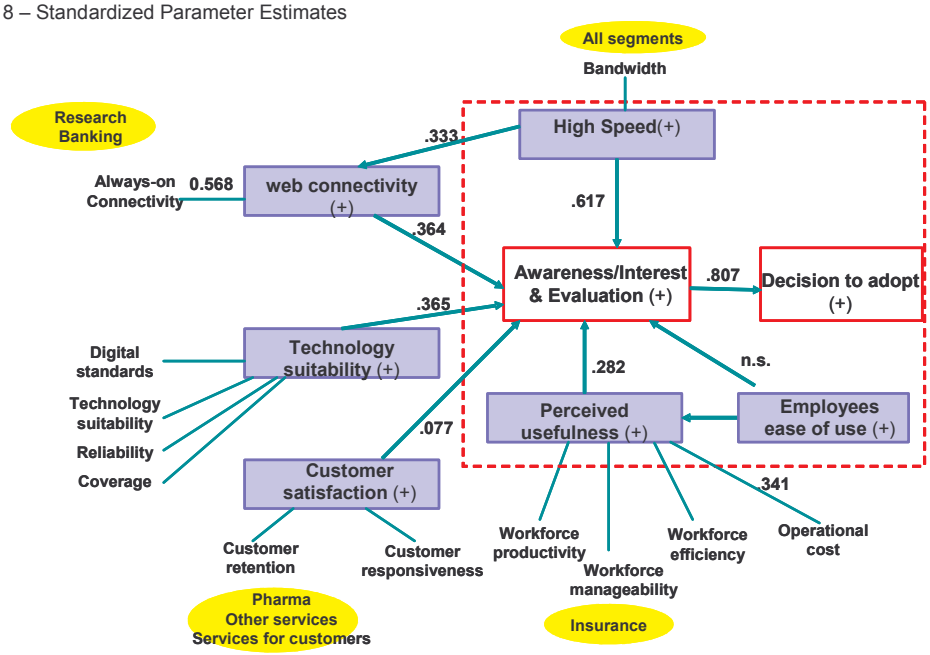


Table 5 – Summary of research results

	Hypotheses	Business
H1	Web connectivity has a positive direct effect on awareness interest and evaluation	Supported
H2	Technology suitability has a positive direct effect on awareness, interest and evaluation	Supported
H3	Customer satisfaction has a positive direct effect on awareness, interest and evaluation	Supported
H4	Speed has a positive direct effect on awareness, interest and evaluation	Supported
H5	Perceived usefulness has a positive direct effect on awareness, interest and evaluation	Supported
H6	Ease of use has a positive direct effect on awareness, interest and evaluation	Supported
H7	Ease of use has a positive direct effect on perceived usefulness	Not Supported
H8	Ease of use has a positive direct effect on customer satisfaction	Supported
H9	Awareness, Interest & evaluation has a positive direct effect on intention to adopt	Supported

Perceived Usefulness (PU) (β= 0.282) is significantly positively related to awareness and interest which influence intention to adopt (β= 0.807). This result is consistent with previous studies on TAM. It implies that if business users perceive High Speed Data Service to be useful, they will be more likely to adopt the innovation.

On the other hand, perceived ease of use is not significantly related to interest (H7), contradicting expectations. This finding concurs with the original TAM and a study focused on Inernet banking adoption (Chan and Lu, 2004), but contradicts he results of many previous studies (Lu and Gustafson, 1994; Moore and Banbasat, 1991), where ease of use was a significant determinant of intention to use a computer technology.

Managerial Implications

The study contributes to diffusion research by using detailed primary data about firms and institutions in several sectors and comparing the influences that affect their awareness and adoption of mobile data technologies.

The intent is to provide tools for analyzing the demand factors that will drive adoption of mobile services in the enterprise market by taking specific examples from case-study research and an explorative quantitative survey and examining them in a systematic and comparative manner.

Results emerging from the study allow us to:

a. Identify the importance of attributes for each segment of companies
b. Segment customer needs
c. Prioritize segments according to their potential profitability

The study identifies the factors influencing the adoption of Information Technology by business. It also provides empirical support for a research model that modifies the well known TAM. The results reveal that interest to adopt plays a significant role in influencing intention to adopt wireless services. High Speed is perceived one of the most important determinants of adoption. Also web connectivity and technology suitability play an important role influencing service adoption.

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