

## IMPACT OF TECHNOLOGY ADOPTION ON CONSUMER BEHAVIOUR

Deniss Ščeulovs<sup>1</sup>, Elina Gaile-Sarkane<sup>2</sup>

*Riga Technical University*

*Meža str. 1/7 – 408, Rīga, Latvia*

*E-mail: <sup>1</sup>deniss.sceulovs@rtu.lv; <sup>2</sup>elina.gaile-sarkane@rtu.lv*

**Abstract.** Fast development of equipment and technologies, economic globalization and many other external circumstances stimulate the changes in consumer behavior. Usually consumer behavior has drawn upon theories developed in related fields of study of human behavior such as psychology, sociology, economics, behavioral economics, and anthropology, to develop a theoretical framework for the analysis of the behavior of consumers.

It is very convenient and up-to-date to use information and telecommunication technologies for communication among individuals what improves the information flow within an organization and outside. At the same time there are a lot of challenges for all involved parts – industry and society. These challenges are principally related to adoption of the technologies in the country what directly impacts the consumer behavior.

In the paper customer behavior in electronic environment have been analyzed, peculiarities of behavior caused by information and telecommunication technologies were funded out. The research conducted by the authors showed that information technologies create dynamic behavior what involves different from traditional market interactions and exchanges.

**Keywords:** consumer behavior, electronic environment, adoption of technologies, information and telecommunication technologies.

### Introduction

A society of the future is the society of knowledge, in which the capability of knowledge concentration and transformation in innovative and applicative solutions are important and respective values. Knowledge has become as a central resource of new society where knowledge workers are key elements of its work force. The basic strategy of achieving the knowledge society was set with the so called Lisbon goals (European Commission 2000). The key indicator for knowledge based society in EU is the Information Society. The objective is to broaden the access to the Internet and to produce content what adds value to European cultural and scientific heritage.

Customer behavior involves the thoughts and feelings experience and the actions they perform in consumption processes. It also includes all the things in the environment that influence

these thoughts feelings and actions. These include comments from other customers, advertisements, price information, packaging, product appearance and many others. It is important to recognize from this definition that consumer behavior is dynamic, involves interactions, and involves exchanges. Consumer behavior is dynamic because the thinking, feeling and actions of individual consumers, targeted consumer groups and society at large are constantly changing.

A vast number of individual differences can influence consumer behavior. Some of the most important include personality, lifestyles and psychographics, and motivation. Personality reflects a person's consistent response to his or her environment. It has been linked to differences in susceptibility to persuasion and social influence and thereby to purchase behavior. At the same time electronic environment is different and organizations cannot apply the same standards to the internet purchasing.

Since last century information technologies came into our everyday life and changed our everyday activities (Battelee, 2005). Information technologies are adopted by the vast number of consumers in Latvia as well as in the Baltic States and all around the world. Information technologies have changed consumer behavior (Figge, Hahn, 2004).

Adoption of information technologies is rather slow process but once it had happened, consumers are involved in the technology usage for very long time. According to statistical information access to the internet doubled every year since 2004 (it was 14.7% of all households) and in beginning of 2011 reached 63.6% of households in Latvia. 73,4 % of Latvians have ever used the internet in begging of 2011, 66.2% uses the internet regularly. 95.4% of enterprises with number of employees more than 10 use computers, 92.2% of them use Internet. Approximately 53.4% of all companies have webs or online data bases (Statistical Bureau of Republic of Latvia, 2011)

***Objective of the paper:*** to analyze customer behavior in electronic environment and find out peculiarities of behavior caused by adoption of information and telecommunication technologies.

***Research methodology:*** The authors employ well-established quantitative and qualitative methods of research: grouping, analysis, statistic method, etc

***The theoretical and methodological background*** of the research is formed by, scientific researches and publications, publications from mass media and professional literature; statistical information from legal institutions as well as information collected by the authors during the survey.

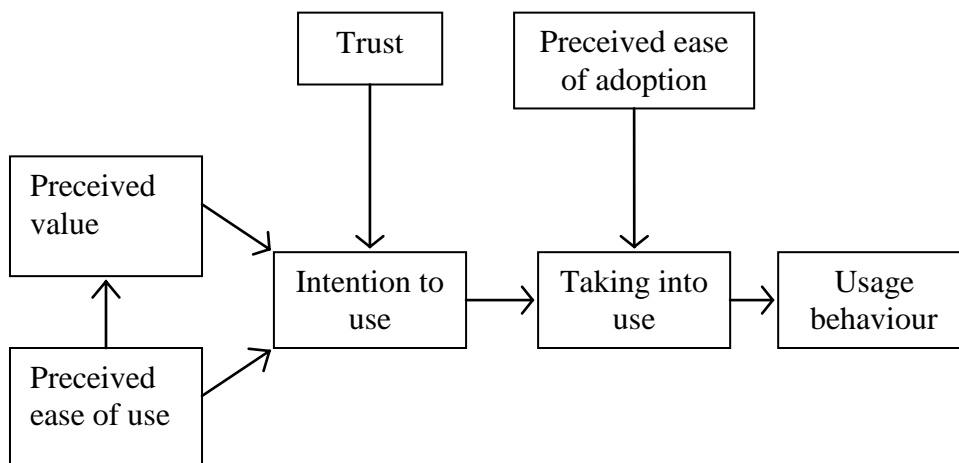
### **Theoretical Framework on New Technology Adaptation**

Computers and electronic communication networks play an increasing part in handling and processing of information since equipment is more precise and cheaper than work of people,

besides they provide the fastest storage and exchange of information (Gupta, et. al., 2004). The flow of information is the key to success in the computer age and information society (Sung, 2006) Successful employment of information raises the effectiveness and profitability of an organization (Hsia et. al., 2008)

There is a lot of researches done by international experts and scientists on topic how and why people adopt a new technology. The researches are devoted to two important levels – organizations and individuals. Among most important models the authors would like to emphasize Technology Acceptance Model, Motivation Model, Theory of Planned Behavior, Innovation Diffusion Theory etc. Davis Technology Acceptance Model (Davis, 1989) predicts information technology acceptance and usage. In this model the user's behavioral intention to use a technology is affected by their perceived usefulness and perceived ease of use of the technology.

This model was originally developed for studying technology at work. Later it has been used as such or modified to study user acceptance of consumer services such as Internet services or e-commerce (Kaasinen, 2005). The Technology Acceptance Model constitutes a solid framework for identifying issues that may affect user acceptance of technical solutions. As Davis and Venkatesh (2004) have proved, the model can be enhanced from the original purpose of studying user acceptance of existing products to study planned product concepts, e.g. in the form of mock-ups. This indicates that Technology Acceptance Model (see Figure1) could also be used in connection with technology development projects and processes to assess the usefulness of proposed solutions. Applied in this way, the model also supports the human-centered design approach.



**Figure 1.** Technology Acceptance Model for Mobile Services (Kaasinen, 2005)

Ajzen published theory about the Motivation Model (Ajzen, 1991) in which he describes that general motivation theory, extrinsic and intrinsic motivation, is an explanation for behavior.

Theory of Planned Behavior is built according to Theory of Reasoned Action by adding the construct of perceived behavioral control (Ajzen, 1991).

Innovation Diffusion Theory a widely supported model used in a variety of fields identifies five factors that impact technology adoption (Moore, Benbasat, 1991): compatibility, complexity, observability, relative advantage, trialability.

According to these factors seven constructs for individual acceptance of technology were developed: compatibility, ease of use, image, relative advantage, results demonstrability, visibility, and voluntariness of use.

There are a lot of theories what describes different factors what influences consumer behavior and adoption of information technologies. For example, as most important determinants are following (Vanketesh, Moore, 2003):

- the degree to which an individual believes that using the system will help him or her to attain gains in job performance or performance expectancy;
- the degree of ease associated with the use of the system or effort expectancy;
- the degree to which an individual perceives that important others believe he or she should use the new system or social influence;
- the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system or conditions.

According to this theory the authors would like to analyze the impact of information technologies on consumer behavior, especially on adoption of new technologies. There is also possible to put down the recommendations for organizations how to develop and promote for example, new web or portal. In case if a new technology is a new communication channel with customers, web, portal or e-business model it is possible to work our guidelines for development and customer adoption.

Organizations employ information and telecommunication technologies for internal and external communication, for exchange of information and raising their competitiveness by creation webs, portals, forums for discussion, e-shops etc. (Phillips, 2008). According to the authors' point of view, main benefits from using information technologies in the business are:

- Cost reduction. By minimizing all types of costs for communication, information exchange, distribution etc.,
- Increased competitiveness. The organization becomes modern and more competitive,
- Information exchange progress (easy and fast exchange with information),
- Convinces, including all around the clock activities,
- Up-to date information,
- Additional services etc.

At the same time there are a lot of challenges – related to adoption of novelties by customers. From process control standpoint the challenges are:

- Change of process. Electronic environment initiate changes what will affect the roles of all involved parts, rules, procedures, communication,
- Return on investments. Not always it is clearly defined - what is return on investment and how it will impact financial situation of an organization (for example social portals),
- Reliability of infrastructure. Data are integrated on a data network, high reliability and data protection is strictly demanded for both – organization and customer,
- State regulations. Law and public policy can determine data services. For example copyrights, data accessibility etc.

Existing models of new technology adoption very well describe all aspects of consumer behavior and points out specific features to what companies should pay attention on. New technology adoption models could be applied to web technologies and e-commerce. Thereby, by knowing both – adoption models and particularities of consumer behavior their can be used for:

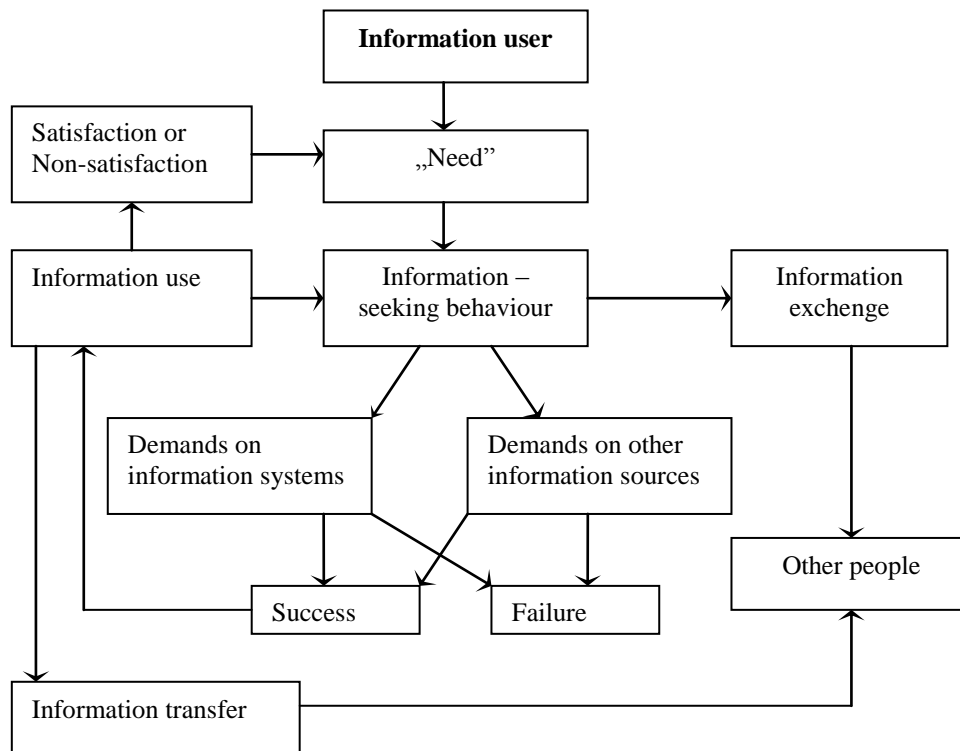
- Development of technology development and adoption plan;
- Analysis and control of technology adoption process;
- Escaping of mistakes;
- Modeling of consumer behavior;
- For development of methodologies and methods, etc.;
- Human information behaviour.

When organizations is going create web or communication channel with their customers, they should take into account that human behavior in searching for information varies in different ways according to characteristics, experience, knowledge and motivation of individuals what is under impact of various external factors (Ebner, Baumgartner, 2011). By knowing it the organization can develop strategy of system implementation and work according to the methodology. One of key points in information system adoption process is human information behavior.

Human information behavior is how individuals approach and handle information. This includes searching for it, using it, modifying it, sharing it, hoarding it, and even ignoring it. Consequently, when we manage information behavior, we're attempting to improve the overall effectiveness of an organization's information environment through concerted action. (Devenport, 1997). Nowadays it is important because customers are searching for information, comparing prices and trying to find best offer for themselves. And, according to statistical information, main activities in the internet are oriented on information exchange and information search.

On 1999 T. Wilson has developed information behavior model (see Figure 2). The model suggests that information-seeking behavior arises as a consequence of a need perceived by an information user, who, in order to satisfy that need, makes demands upon formal or informal

information sources or services, which result in success or failure to find relevant information. If successful, the individual then makes use of the information found and may either fully or partially satisfy the perceived need - or, indeed, fail to satisfy the need and have to reiterate the search process. The model also shows that part of the information-seeking behavior may involve other people through information exchange and that information perceived as useful may be passed to other people, as well as being used (or instead of being used) by the person himself or herself (Wilson, 1999).

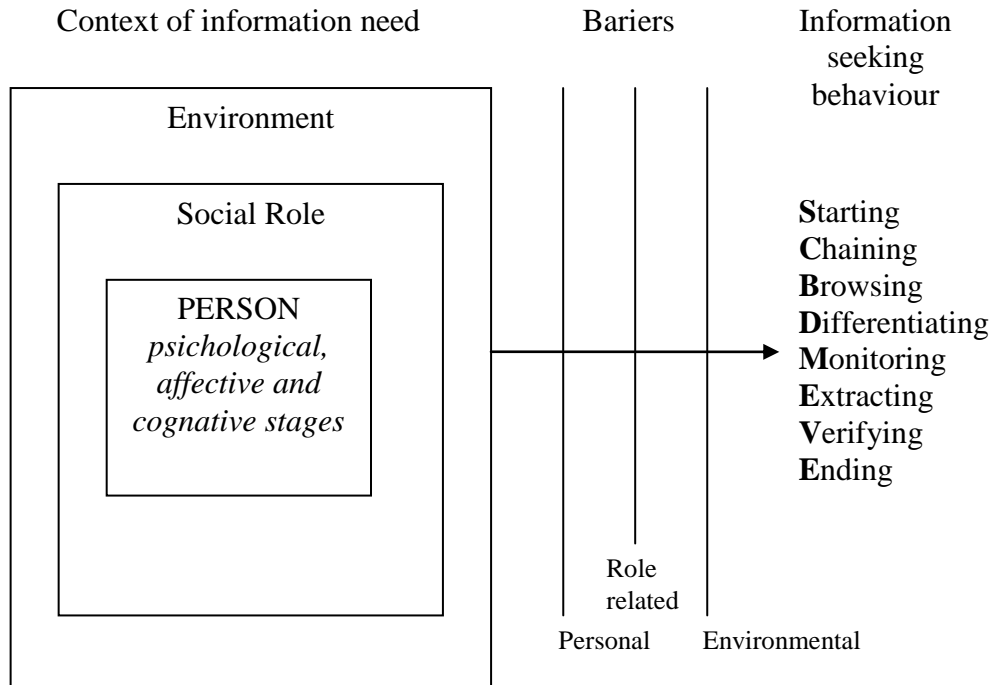


**Figure 2.** Wilson's information behavior model (Wilson, 1999)

At the root of the problem of information-seeking behavior is the concept of information need, which has proved intractable for the reason advanced by Wilson in 1981. According to Wilson need is a subjective experience which occurs only in the mind of the person in need and, consequently, is not directly accessible to an observer. The experience of need can only be discovered by deduction from behavior or through the reports of the person in need (Wilson, 2002).

The general concept of need is, of course, a psychological concept, since it refers to a mental state or states and a good deal attention has been given to the idea, its subjective character and the motivation for the expression of need or the physiological drives that result in the expression of need. (Wilson, 2002)

According to this for the organization what introduces new communication channel with their customers the need of information exchange should be clearly stated. Customers should understand benefits from the web in order to adopt this system.



**Figure 3.** A model of information-seeking behavior (Wilson, 2002)

In the same paper Wilson proposed a model of the circumstances that give rise to information-seeking behavior (see Figure 3 – simplified model). The main elements of Wilson's model are the situation within which a need for information arises (the PERSON performing a ROLE in an ENVIRONMENT), the barriers that may exist to either engaging in information-seeking behavior or in completing a search for information successfully, and information-seeking behavior itself. Figure 3 has been simplified and amended to show how Ellis (1989) work on information-seeking fits into the model (Wilson, 2002)

The authors recommend joining together both theories – human information behavior and consumer behavior theory (in the electronic environment). A vast number of individual differences can influence consumer behavior. Some of the most important include personality, lifestyles and psychographics, and motivation. Personality reflects a person's consistent response to his or her environment. It has been linked to differences in susceptibility to persuasion and social influence and thereby to purchase behavior. At the same time electronic environment is different and organizations cannot apply the same standards to the internet purchasing.

According to different theories of consumer behaviour and researches done by the authors up to now factors what have influence on consumer behaviour are: social, personal, economic,

situational, cultural, psychological and marketing mix communication. At the same time factors what influence information seeking process is - personal, role related and environmental?

The authors presume that according to both theories factors can be divided in three groups: direct, indirect and situational. Direct factors for the customers are environmental, for example access to the resources, current economical situation in the country (inflation, interest rates etc.), marketing mix and communication. As indirect factors the authors would point out cultural and social factors what are mainly role related, besides some of social factors could be applied to both – direct and indirect groups. Under the group „situational factors” the authors presume those who depends on the individual – psychological, personal and situational (with situational factors the authors presume environmental factors, impact of the situation, sales personnel etc).

The mentioned grouping would be important for development of recommendations for companies who would like to adopt in the market new tools of e-commerce or channels of communication via the internet.

### **Motivation and Consumer Behaviour in E-environment**

With an aim to analyze differences in consumer behaving motives in real market and electronic environment, the authors organized survey in the age group 18-25. This age group was chosen because according to the statistical data in 2011 98% of inhabitants in the age between 16 and 25 were using the internet (Eurostat, 2011). The period of survey is November-December, 2011. The total number of respondents was 172, both sexes. The questionnaire contained 6 question groups all oriented on range of parameters. The resume of the survey is described below.

According to the survey the target group uses the internet tools for: e-mailing (99%); information search (92%); social portals, peer group activities (84%); online banking (68%); skypeing (66%); playing games (45%); using music and movie services (96%); e-shopping (43%).

According to the results of this research and researches done before by other companies, e-mail is a leading e-commerce tool what is used by 99% of all internet users. These results clearly show interests of this target audience and simultaneously pay attention to e-sopping as upcoming activity. Therefore it is valuable to forecast how e-shopping could develop in the nearest future and what are motives, pros and cons for e-shopping in this target group.

This survey prescribes that benefits of the internet usage and e-commerce for the target group are: speed (95%); saves time (92%); rational (help to facilitate many processes) (87%); possibility to find more information at the same time (84%); accessibility (can use everywhere)(76%); all around the clock (65%); easy to use (63%); always updated (actual) information (59%); overall conveniences (56%); possibility easy to compare products and prices



(54%); punctuality and accurateness (49%); all kinds of goods in one place (45%); special (just online) discounter (e-coupons) offers (48%); possibility to follow the execution of the order (34%); no paper what should be filled (26%); environment friendly (no paper used no sales materials, brochures etc.) (25%); possibility to cancel order (19%).

From the results of the survey we can clearly see that values for the target group are speed and time saving, conveniences, updated information, etc.

According to the authors point of view the results of the survey confirm that consumer behaviour is changing under the impact of new technologies and especially under the impact of the internet and e-commerce. The values of today's customer are speed of actions, independence, conveniences, economy of resources.

By joining together aspects of three main theories - adoption of the technologies and, information seeking behaviour and changing consumer behaviour it is possible to create recommendations for a company who would like to perform in the market with new channel of communication in the internet. For success in the electronic environment this company should be motivating for consumers and of course differentiate themselves (see Table No.1).

**Table 1.** Mix of factors what should be taken into account for development of new e-channel

Constructs for new technology (also web) adoption	Group of factors what influence information seeking behaviour and consumer behaviour (in impact order)	Most important factor to what the company should pay attention
Compatibility	Direct, situational	Starting, browsing, monitoring, extracting etc.
Ease of use	Situational	Differentiation
Image	Situational, Indirect	Differentiation
Relative advantage	Situational, Direct, Indirect,	Benefits
Results demonstrability	Indirect	Monitoring, verifying
Visibility	Situational, Direct	Monitoring, extracting
Voluntary participation and use	Situational, Indirect, Direct	Starting, chaining

By applying the method of synthesis of theoretical developments and practical experience is possible to develop models for development and adoption of new e-commerce tools. All factors what influences the consumer behaviour could be analyzed more profoundly and, by linking them with practical examples could plan of strategic activities could be developed.

## Conclusions

The research contributes to better understanding of the specifics of factors what influences consumer behaviour in electronic environment. There are a lot of potential for further analysis of consumer behaviour. Therefore it is important to develop new methods and techniques for evaluation of consumer behaviour in e-environment.

Research results confirm that it is valuable to merge tighter three different theoretical approaches which have the same background. However, the field of research is very wide and this study presents just an insight into the large scope of different questions, which have to be tackled in the e-consumer behaviour research.

### References

1. Ajzen, I. (1991). *The Theory of Planned Behavior, Organizational Behavior and Human Decision Processes*. California: Wiley Publishing: 179-211.
2. Battelee, J. (2005). *The Search*. New York: Penguin Group Inc.
3. Davis, F.D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology, *MIS Quarterly*, 13 (3): 319-340.
4. Ebner, D., Baumgartner, R.J. (2006). *The Relationship between Sustainable Development and Corporate Social Responsibility*, Retrieved November 15, 2011 from <http://www.crrconference.org>.
5. European Commission (2000). Retrieved November 15, 2011 from <http://cordis.europa.eu/erawatch/index.cfm?fuseaction=ri.content&topicID=66&countryCode=L V&parentID=65>
6. Eurostat (2011). Retrieved November 11, 2011 from [http://epp.eurostat.ec.europa.eu/portal/page/portal/science\\_technology\\_innovation/data/database](http://epp.eurostat.ec.europa.eu/portal/page/portal/science_technology_innovation/data/database).
7. Figge, F. Hahn, T. (2004). Sustainable value added – measuring corporate contributions to sustainability beyond eco-efficiency. *Ecological Economics* 48 (2): 173-187. Retrieved from February 20, 2012. [http://www.csiproggress2007.org/index.php?option=com\\_frontpage&Itemid=1](http://www.csiproggress2007.org/index.php?option=com_frontpage&Itemid=1).
8. Gupta, A. et. al. (2004). An empirical study of consumer switching from traditional to electronic channels: A purchase-decision process perspective. *International Journal of Electronic Commerce*, 8(3): 131-161.
9. Hsia, T.L., Wu, J.H., Li E.Y. (2008). The e-commerce value matrix and use case model: A goal-driven methodology for eliciting B2C application requirements. *Information & Management*, 45(5): 321-330.
10. Johnstone D., Tate M. (2011). Bringing human information behaviour into information systems research: an application of systems modelling. Retrieved October 23, 2011 from <http://www.informationr.net/ir/9-4/paper191.html>.
11. Kaasinen, E. (2005). User acceptance of mobile services-value, ease of use, trust and ease of adoption. Retrieved November 2, 2011 from <http://www.vtt.fi/inf/pdf/publications/2005/P566.pdf>.
12. Knight J. (2005). *Cross-Border Education: Developments and Implications in the Asia and the Pacific Region*, UNESCO Forum Occasional Paper, Korea.
13. Moore, G. C., Benbasat, I. (1991). Development of an Instrument to Measure the Perceptions of Adopting Information. Retrieved October 28, 2011 from <http://www.informationr.net/ir/9-4/paper191.html>.
14. Phillips, A., Wright, C. (2008). E-Business's impact on organizational flexibility." *Journal of Business Research*. Article in press.
15. *Statistical Yearbook of Latvia* (2011). Riga: Statistical Bureau of Republic of Latvia, 499-505.
16. Sung, T. (2006). E-commerce critical success factors: East vs. West. *Technological Forecasting and Social Change*, 73(9): 1161-1177.
17. Venkatesh V, Morris M, Davis G, and Davis F. (2003). User Acceptance of Information Technology: Toward a Unified View, *MIS Quarterly*, 27(3): 425-478.

18. Wilson T. D. (2011). A General model of information-seeking behaviour. Retrieved October 02, 2011 from <http://www.informationr.net/tdw/publ/infbehav/chap2.html>
19. Wilson, T.D. (1999). Models in information behaviour research. Retrieved December 11, 2011 from <http://www.informationr.net/tdw/publ/papers/1999JDoc.html>
20. Wilson T.D. (2011). Information behaviour, an interdisciplinary perspective. Retrieved November 18, 2011 from <http://www.informationr.net/tdw/publ/infbehav/chap2.html>