Consumer Behaviour at Multi-Channel Retailers

Track 1: Customer Relationship Management, Channel Management and Segmentation, Buyer Behaviour in Multichannel Environments, Channel Portfolio Management, Managing the Online/Offline Channel Mix, Channel Collaborations

Maximilian Teltzrow*, Bettina Berendt, Oliver Günther

[1]Institute of Information Systems, Humboldt-University Berlin
Spandauer Str. 1, 10178 Berlin, Germany
http://www.wiwi.hu-berlin.de/~teltzrow/
Tel.: 030-2093-5730
Fax: 030-2093-5741
{teltzrow,berendt,guenther}@wiwi.hu-berlin.de

Consumer Behaviour at Multi-Channel Retailers

Keywords: Multi-Channel Retailing, Channel Mix, Consumer Behaviour, Web Usage Analysis

ABSTRACT

Consumer behaviour at pure Internet players has been analysed thoroughly in earlier work. When it comes to retailers with multiple distribution channels, however, new behaviour patterns can be observed. Given the fact that multi-channel retailing is much more common than Internet-only, the analysis of consumer behaviour in a multi-channel context constitutes a challenge for the deeper understanding of e-business.

The contribution of this research is threefold: first, this study provides an overview of how the 50 largest e-retailers presently coordinate the interaction between sales on their web sites and in physical stores. Second, we present findings from a consumer survey suggesting what consumers like about multi-channel services on retail sites. Finally, user behaviour is empirically evaluated based on transaction and web log data from a large multi-channel retailer. The results indicate a strong demand for multi-channel services and suggest that retailers should expand their multi-channel service spectrum.

INTRODUCTION

Retail sites experience significant traffic and sales growth. Conversion of online visitors to paying customers increases, too: for US retailers conversion increased to 3.1% in 2001 up from 2.2% in 2000. In 2001, online retail sales accounted for 2.4% (1.7%) of the total US (EU) retail market (BCG 2002). Whereas Internet-only businesses could not materialize profits anticipated from reduced transaction cost, lower operational cost and economies of scale (Steinfield et al. 2002), established retailers employing the Internet as a sales and information channel in addition to their physical stores (*multi-channel retailers*) have successfully entered the online market. According to a recent study, multi-channel retailers generated 67% of the total online sales in 2001 up from 52% in 1999 (BCG 2002). Meanwhile, the seamless integration of different customer touch points such as stores, Internet and Call Centres has become a major IT expenditure for most retailers (Deloitte 2001). The increasing prevalence of multi-channel retailing calls for empirical research of multi-channel usage behaviour and the interaction between online and offline channels.

The remainder of this study is organized as follows. The first section gives an overview of related work. In the following sections approaches to analyse consumer behaviour in a multi-channel context are presented. The applied research method is threefold: first, results from an analysis of the 50 largest e-retailers and their multi-channel service mix are presented. Second, findings from a consumer survey at a large multi-channel retailer are pointed out and explanations for consumers' multi-channel preferences are given. Third, web usage analysis is used for the exploratory analysis of consumer behaviour in a multi-channel context. Finally, results are summarized in the last section of this work.

RELATED WORK

Many theoretical contributions about multi-channel retailing focus on whether and how different sales channels should be integrated (Gulati et al. 2000). Whereas earlier work points out channel conflicts such as sales cannibalisation resulting from the establishment of multiple sales paths (Stern, Ansay et al. 1998), more recent work suggests that the close alignment of e-commerce capabilities with existing infrastructure infers performance and sales improvements (Zhu and Kraemer 2002). Steinfield (2002a) argues that the integration of online and offline sales channels may support the acquisition of new customers, thereby generating increased revenues and reduced costs. Steinfield (2002a) sees a major advantage of hybrid business models in a reduction in the lack of trust that often faces Internet-only businesses. Goersch (2003) argues that multi-channel retailers may benefit from the fact that site visitors are aware of a company's physical store network and thus have a lower risk perception online. More convenience and better support may also benefit customer satisfaction and retention at multi-channel retailers (Goersch 2003). Lohse and Spiller (1997) claim that the reputation of a physical store network may positively influence the perceptions of an online shop. Furthermore, integrative elements such as a common infrastructure, common operations and cross-channel marketing may also represent an advantage for hybrid businesses (Zhu, Kraemer 2002).

A few authors have explored aspects of multi-channel retailing based on confirmatory analysis (Straub et al. 2002, Devaraj et al. 2002). Devaraj et al. (2002) tested components such as perceived ease of use and usefulness in structural equation model analysis to explain consumers' satisfaction and channel preference. Empirical research about consumer behaviour at multi-channel retailers remains scarce, however (Goersch 2003). Steinfield (2002) demands further analyses that can test whether, and under what conditions, integrated multi-channel business models work well. Gallaugher (2002) calls for a better understanding of channel interdependencies to determine how e-business will affect a firm and its industry. Goersch (2003) demands to empirically test the influence of multi-channel business models on consumer behaviour. Stone et al. (2002) identify the importance of understanding customer needs in a multi-channel context.

Besides hypothesis testing on the basis of theory, exploratory methods have been suggested to analyse online visitors' interests and preferences. Web Usage analyses has been introduced to find out more about consumer behaviour (Cooley and Mobasher 1999). Several authors have suggested user segmentations based on web log analysis (Spiliopoulou and Pohle 2001, Mobasher et al. 2002). Moe and Fader (2001) differentiated several browsing typologies on retail sites. Shahabi et al. (1997) described a clustering procedure for user sessions to determine user segments. Heer and Chi (2002) proposed a technique that utilizes a number of information sources including web logs to create a model of user profiles. Whereas consumers' web usage behaviour has been researched thoroughly for Internet-only retailers, only few contributions focus on multi-channel usage. In (Teltzrow and Günther 2003), web usage metrics describing consumer behaviour at multi-channel retailers have been introduced. Session clusters exhibiting interest in store-related information have been identified at a multi-channel retailer. In (Teltzrow and Berendt 2003), new metrics measuring multi-channel affinity have been proposed.

The integration of other sales and communication channels such as catalogues, call centers or kiosks are not further regarded in this study. A portfolio analysis of sales channels and their ability to interact with customers has been suggested in (Jung et al. 2002).

THE SERVICE MIX AT LARGE MULTI-CHANNEL RETAILERS

Multi-channel retails are increasingly dominating the online retail market. In 2003, multi-channel players comprised 43 of the top 50 e-retailers[1], versus 42 in 2001, 40 in 2000 and only 27 in 1999 (Gallo and McAlister 2003). For some of the remaining pure retailers, however, changes towards multi-channel retailing can be observed. The largest e-retailer Amazon.com, for example, features products from merchants with physical retail stores since 2002.

The question arises what site services multi-channel retailers can offer in contrast to pure Internet players. The customer purchasing process (Howard and Sheth 1969) is a helpful model to point out the differences between the two types of retailers. The purchase model differentiates phases where a company

- claims someone's attention (*acquisition*)
- offers information to potential customers (*information*)
- settles a transaction with a customer (*settlement*)
- keeps customers recurring (*after-sales*)

Figure 1 depicts an integrated view on the purchasing phases at multi-channel and pure Internet retail sites. The settlement phase has been further differentiated into *order*, *payment* and *delivery* phases to point out characteristics of multi-channel retailers. The dotted arrows indicate the sales path at pure Internet retailers. In contrast, the continuous arrows indicate phase transitions at multi-channel retailers where online customers can switch to the use of traditional offline channels.
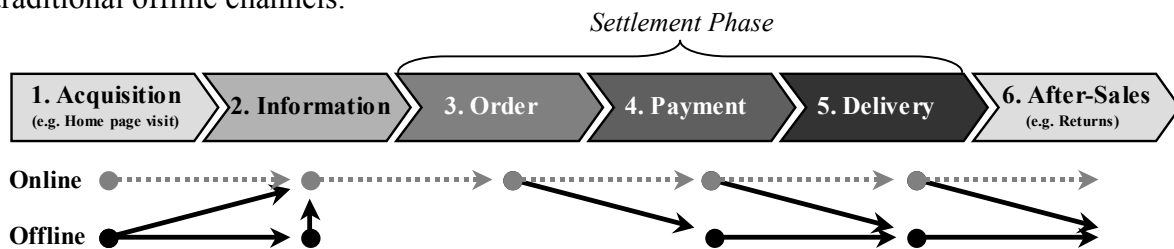

Figure1: The Online Purchase Process at Multi-Channel Retailers

For each single phase of the customer purchasing process differences between multi-channel retailers and pure Internet players have been pointed out:

1. In the *acquisition* phase a consumer is attracted to a retailer's web site. All visits on Web pages that are semantically related to the initial acquisition of a visitor belong to this phase. In contrast to Internet-only retailers, visitors on multi-channel retail sites may have been referred from physical stores to the site.
2. In the *information* phase a customer collects information about products and services. On a retail site, all visits on pages providing an overview of product categories and single product pages belong to this phase. In contrast to Internet-only players, multi-channel retailers can provide information about offline services in this

---

[1] To be considered for inclusion in the sample, the company had to generate at least 50% of its sales from direct-to-consumer retail operations, including stores, catalogs, and other direct marketing vehicles. Direct marketing companies selling though catalogues, call center and the Internet were also considered as multi-channel retailers.

phase. For example, information about offline services and physical stores can be offered on the web site.

3. The first step of the settlement phase begins when a customer enters the *order* process. All steps before payment and delivery belong to this phase such as the check-out of the shopping cart or input of customer data.

4. In the *payment* phase, multi-channel retailers can offer an additional payment option to their customers. In contrast to pure Internet retailers, multi-channel customers may pay cash in-store.

5. Multi-channel retailers can also offer more *delivery* options than pure Internet retailers. They may offer their online customers to pick up products in-store.

6. In the *after-sales* phase, multi-channel retailers may extend an additional service to their customers: defect or unsatisfactory orders may be returned in physical stores.

The analysis of multi-channel characteristics in the customer purchasing process facilitates the identification of five distinct site services on multi-channel retail sites:

- *store locator*: multi-channel retailers can offer pages allowing online visitors to find physical stores in their neighbourhoods.
- *inventory check*: site visitors may check inventory or search for special offers in physical stores.
- *offline pickup*: visitors may place an order online, but pick up products in a physical store.
- *offline payment*: online orders can be paid in a physical store.
- *offline returns*: online orders can be returned in a physical store

We observed the availability of these services at the world's 50 largest e-retailers in 2002 (Gallo and McAlister 2003). 43 of these e-retailers operate multiple distribution channels, seven are pure Internet-players. From the 43 multi-channel retailers, 30 operate physical stores[2] and 13 primarily operate direct distribution channels such as catalogues, TV or call centres. For the remaining 30 e-retailers with a physical store network, Table 1 gives an overview of their present service combinations for online orders:

Number of Retailers	Store Payment	Store Pickup	In-store Return	Store Locator	Inventory check
3	✔	✔	✔	✔	✔
2		✔	✔	✔	✔
4			✔	✔	✔
10			✔	✔	
2				✔	✔
9				✔	

Table 1: Online Service Mix at Large Multi-Channel Retailers

As a result of this analysis, it has been found that many retailers do not offer the full multi-channel service spectrum. The most common service combination includes store locator pages and in-store returns of online orders. All retailers in the sample offer store-locator pages and

[2] Only retailers with more than 20 stores have been counted.

about two thirds have an in-store return policy. Eleven companies in the sample allow online customers to check inventory or special offers in physical stores. Five companies offer to pick up online orders in physical stores. Their pickup service is always combined with a real-time inventory check on the web site. Three companies are true multi-channel retailers that offer the full multi-channel service spectrum including payment in cash at a store after an order has been placed online.

A retailer's choice of a particular service mix seems to depend on the company's product portfolio and its store network's size. Those sample retailers that offer the full multi-channel service spectrum sell hard goods such as office supplies or electronics and operate a nationwide retail network. Sometimes it is not obvious, however, why some retailers offer the full multi-channel spectrum (e.g. Sears.com) whereas others do not (e.g. Wal-Mart.com). Personnel expenses and differences between online and offline pricing policies may be possible reasons for the lack of multi-channel services at large retailers. For example, some retailers offer designated store areas for the pickup of online orders. Some stores sell products at a discount, which could confuse customers when they pick up online orders and recognize a lower in-store price. A possible solution to this problem has been chosen by Circuit City© Stores, Inc. On the web site, the retailer announces that any discounts in-store also apply to online orders on the day of pickup.

Retailers that do not offer in-store pickup, yet, take a lot of care to extend flexible delivery choices to their customers. For example, a few retailers offer same-day delivery for specific zip code areas. Others offer a range of options from inexpensive ground shipping to more expensive express delivery.

The development of multi-channel retailers' service mix should be watched over the next years. It seems that e-retailers with in-store pickup have made good experiences with their service mix as new customers might be attracted to visit a physical store, where retailers generate the most of their sales volume.

CONSUMER SURVEY

After the evaluation of the service mix at large multi-channel retailers, we analyse multi-channel retailing from the consumer's point of view. Therefore, an online survey has been conducted to explore visitors' likes and dislikes about a specific multi-channel retail site. The regarded multi-channel retailer offers a full multi-channel service spectrum in the sense of Table 1.

The company operates an e-shop and a network of more than 5000 retail shops in over 10 European countries. The retailer sells more than 10,000 consumer electronic products (e.g. TV's, DVD players, kitchen appliances) both online and offline.

Payment options include online payment with a credit card, cash on delivery, or payment at a physical store. Online customers can choose between direct delivery or pickup in stores. Above a specific order amount, no shipping costs apply. The site's return policy offers customers to ship returns without charge or to return products at a physical store. These choices allow a thorough analysis of the customers' service preferences in a multi-channel context. This section investigates consumers' opinions about multi-channel services.

Over a time period of one month, visitors to the multi-channel site were invited to respond to the question "what do you like and dislike about this (multi-channel) web site?". Answers could be given in plain text – no default format was required. The provided length for each answer was practically unlimited. As an incentive to participate, three high-value electronic devices were raffled among the respondents. In order to discourage participants from giving

opportunistic answers, participants were reminded that *any* feedback was welcome regardless if it was positive or negative.

The answers were analysed and categorized manually. The categorization was based on a search for key words and phrases in the answers. The total number of data set entries amounted to 4267 answers. 206 answers could be clearly identified as double entries and were not further used in the analysis. 1034 answers were short and unspecific and sorted out in the further analysis. From the remaining 3026 answers 4151 comments about various aspects of the web site were counted. The comments were categorized into specific topics and divided into likes or dislikes (cf. Figure 2). The topic *multi-channel services* is ranked fifth in the overall number of comments in this specific sample. The comments about the site's multi-channel services were analysed in more detail. The remaining topics are not further explained in this study.
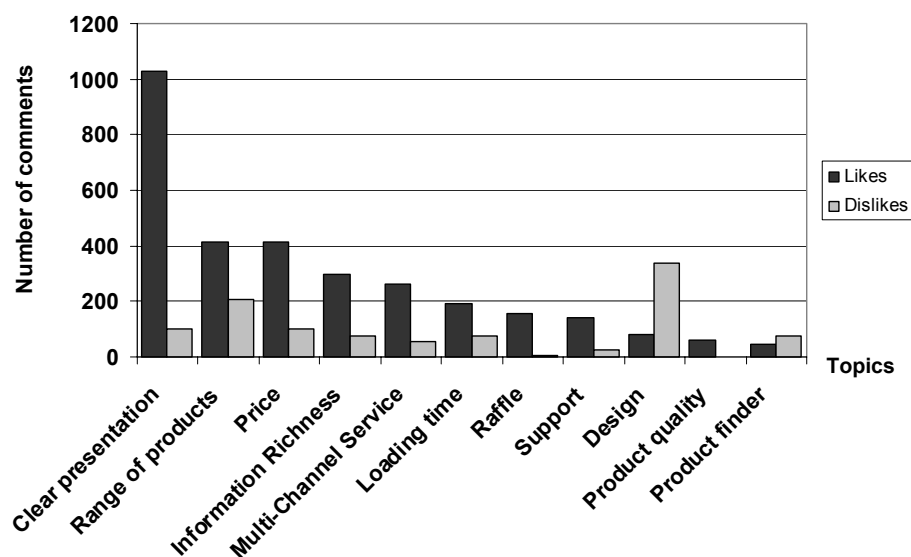

Figure 2: Visitor's Likes and Dislikes about a Multi-Channel Site

A total of 345 answers focused on likes or dislikes about the retailer's multi-channel services. These answers have been further examined. Most of the comments (185) praised the retailer's offer to combine online ordering and offline pickup. 76 of the 185 comments contained specific reasons why customers liked the option to pick up online orders. The main reasons have been counted:

1. *Cost Savings*: personal pickup at stores incurs no delivery cost (43)
2. *Time*: waiting times can be avoided; customers do not want to depend on retailer's delivery times (16)
3. *Consultation*: customers liked the option to ask questions in-store (12)
4. *Damage prevention*: a few customers claimed they could avoid transport damages when picking up a product personally (5)

48 of the remaining comments about the site's multi-channel services expressed satisfaction with the offline store locator. 15 users liked the choice to handle product returns via a local retailer because they could save time on re-shipping the order. Visitors who

expressed discontentment with the retailer's multi-channel services (53) primarily criticized the lack of stores in their neighbourhood or technical deficiencies of the store locator.

MULTI-CHANNEL TRANSACTION BEHAVIOUR

To gain a better understanding of multi-channel usage behaviour, this section analyses customer transaction data from the multi-channel retailer introduced in the previous section. We used transaction information from 13,653 customers who made 14,937 transactions over a period of 8 months in 2001/02. The transaction data was anonymised.

First, *payment, delivery* and *return preferences* were analysed. The analysis of customers' transaction data complements the results from the previous survey section and provides a better understanding of consumers' service preferences.

For the formal representation of the results, the statement of association rules has been used (Agrawal et al. 1993). An association rule is a transaction $X \Rightarrow Y$, where X and Y are sets of items. Given a database D of transactions, where each transaction T is a set of items such that $T \; \varepsilon \; D$. $X \Rightarrow Y$ expresses, whenever a transaction T contains X, then T probably also contains Y. The probability of rule confidence (c) is defined as the percentage of transactions containing Y in addition to X with regard to the overall number of transactions containing X. Thus, the rule confidence can be understood as the conditional probability $p \; (Y \subseteq T | X \subseteq T)$. $X \Rightarrow Y$ has support s in the transaction set D if s% of transactions in D contain $X \cup Y$.

Payment and Delivery Preferences
We first applied the representation of association rules to customers' payment and delivery preferences:

(1) *Online Payment* $\Rightarrow$ $_{s=0.27, \, c=0.97}$ *Direct Delivery*
(2) *Online Payment* $\Rightarrow$ $_{s=0.02, \, c=0.03}$ *In-store Pickup*
(3) *Cash on Delivery* $\Rightarrow$ $_{s=0.02, \, c=0.06}$ *Direct Delivery*
(4) *In-store Payment* $\Rightarrow$ $_{s=0.69, \, c=0.94}$ *In-store Pickup*

For example, the first row would be read as follows: if a customers chose online payment using a credit card, she also chose direct delivery with 97% probability. This rule could be identified in 27% of the transactions. Thus, 3686 orders were delivered directly.

Surprisingly, in 69% of the transactions, customers placed an order online but chose to pay and pick up their order at a physical store (rule 4). Survey-based research conducted by the research company Jupiter has come to similar results. It found that three times as many online consumers would prefer to pick up an order in a local store than meet a retailer's minimum order threshold for free shipping (Swerdlow et al. 2002). Possible explanations for the observed user behaviour have been suggested in the survey section of this paper.

In 27% of the transactions, customers chose the service combination of online payment and direct delivery – the typical and sole service combination offered at pure Internet retailers. Only very few customers tend to combine online payment and in-store pickup (rule 2). Furthermore, only a few customers paid cash on delivery (rule 3).[3]

As a conclusion, most customers arriving via the online channel tend to use multi-channel sites to collect information and place orders but prefer physical stores for pickup and

---

[3] This service option depends on customer's credit ratings and has not been offered to all customers.

payment. Less than one third of the customers in the sample are traditional online users who chose direct delivery and online payment.

Return Preferences

Furthermore, consumers' return preferences were analysed. At the regarded retailer, 10% of all online orders were returned within eight months. The results were as follows:

(5) *Return* $\Longrightarrow$ $_{s=0.06,\ c=0.87}$ *In-store*
(6) *Return* $\Longrightarrow$ $_{s=0.04,\ c=0.13}$ *Mail-in*

The findings indicate a high demand for the retailer's service of in-store returns (87%). Though no shipping costs were charged for returns, only 13% of all returned orders were mailed back. In all of the transactions where customers returned the products via mail, they had chosen online payment and direct delivery when they placed their order.

Some reasons for the observed behaviour have been discussed in the previous section. Further reasons need to be explored in more detail. For example, a reason could be that customers may wish personal assistance in the return process. Replacement or guarantee issues may also have an influence on the observed user behaviour. The offer to return products at a physical store seems to be a successful service as two thirds of the largest multi-channel retailers have such a policy (cf. the service mix analysis).

Repeat Customers

Finally, repeat customers' transaction preferences were analysed. In particular the migration behaviour of customers' delivery preferences was analysed. Migration measures the number of customers who switched their delivery preferences in at least one transaction after their first transaction.

The number of repeat customers amounts to 10% of all customers over a time span of eight months at the regarded retailer. Only 9% of repeat customers changed delivery terms after their first transaction.

(7) *Direct Delivery* $\Longrightarrow$ $_{s=0.001,\ c=0.15}$ *In-store Pickup (in at least one following transaction)*
(8) *Direct Delivery* $\Longrightarrow$ $_{s=0.003,\ c=0.85}$ *Direct Delivery (in every following transaction)*
(9) *In-store Pickup* $\Longrightarrow$ $_{s=0.001,\ c=0.10}$ *Direct Delivery (in at least one following transaction)*
(10) *In-store Pickup* $\Longrightarrow$ $_{s=0.004,\ c=0.90}$ *In-store Pickup (in every following transaction)*

The analysis of repeat customers' migration behaviour did not point out a clear trend towards direct delivery or in-store pickup. The support for repeat customers who switched to in-store pickup (rule 7) was equal to the support for customers who switched to direct delivery (rule 9) in at least one following transaction after the first one. Rule (9) could be interpreted as a development of trust towards the retailer's delivery competence. However, the sample of repeat customers is very small. 90% of repeat customers did not change transaction preferences at all. Thus, not enough empirical evidence is given to make further assumptions based on the observed migration behaviour.

As payment and delivery preferences are closely coupled (cf. rules 1-4), findings for payment migration turned out to be similar.

MULTI-CHANNEL BROWSING BEHAVIOUR

Finally, web usage analysis has been applied to further explore consumer behaviour in a multi-channel context. The analysis is based on web log data. Hence, it also includes behaviour patterns from site visitors who did not engage in an online transaction.

The data source included 92,467 unique user sessions from the company's Web logs from 21 days in May 2002. In the absence of cookie identifiers, sessions were determined by the use of session IDs. Visits of known robots were eliminated, and the usual data cleaning steps were performed (Cooley and Mobasher 1999). Each of the 760,535 page requests that remained after filtering were mapped onto the concepts of the customer purchasing process. This allows us to deal with terms that directly reflect our abstract view on the business process. This procedure provides two main benefits: First, the data are much easier to interpret by the analyst in a highly interactive analysis approach. Second, statistical analysis can be applied on a more general level, e.g. on product group rather than on product level. Fig. 3 depicts a multi-channel concept hierarchy for the regarded multi-channel retailer.
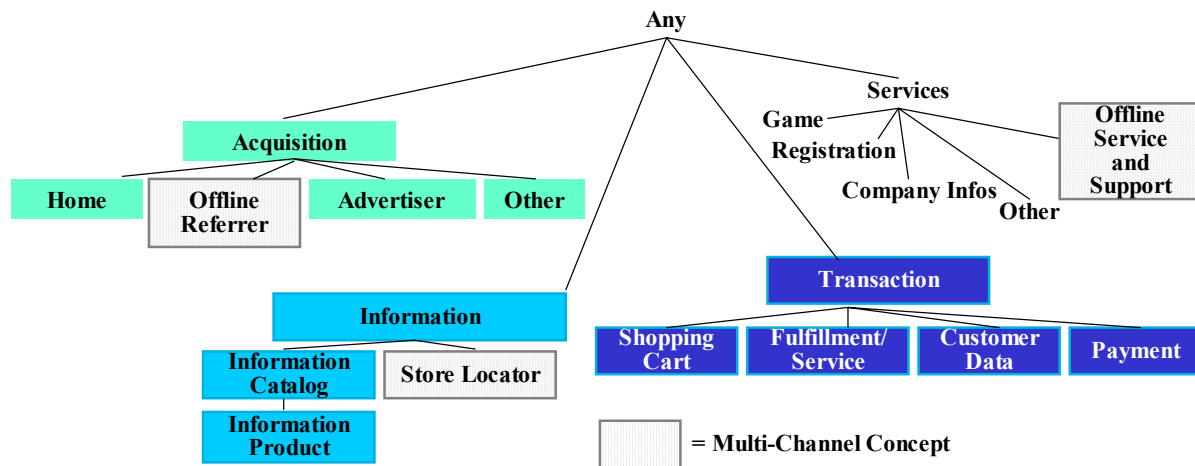
Figure 3: Multi-Channel Site Taxonomy

13% of all user sessions included at least one invocation of the store locator concept. This number demonstrates the importance of the multi-channel concept. As it includes all visits – including sessions with one-time page requests – this percentage is relatively high. For more than 6% of the sessions, pages belonging to the store locator were used as the exit page. This indicates a group of visitors that collects information online before locating the next store. The store locator was also the concept with the second-highest percentage of one-click visitors (12.5%). The behaviour pattern of one-click visitors on the shop locator is interesting as it indicates shoppers who are solely interested in finding the next retail store. Thus, they use the web site as a type of "yellow pages".

The findings support the idea that online visitors exhibit a high affinity for offline sales channels.

IMPACT OF PRODUCT ATTRIBUTES

The last part of the analysis is based on the combination of transaction and product data. It has been found that online visitors who live near a shop are more likely to purchase online than customers who live far away (Kohavi 2003). In (Teltzrow, Berendt 2003) it has been

found that customers who picked up their purchases in-store lived closer to the next store than those who chose direct delivery. However, the studies have not regarded the influence of product attributes. Thus, this section examines product attributes such as *size, weight* and *price* and their impact on delivery preferences.

We first analysed the product weight of articles in each order. Weight information was available for 2834 articles in 2641 transactions. For these orders results were as follows:

Weight [grams]	Pickups [%]	Deliveries [%]
0-1,000	61%	39%
1,000-5,000	64%	36%
5,000-10,000	72%	28%
10,000-40,000	75%	25%
>40,000	62%	38%

Table 2: Impact of Product Weight on Delivery Preferences

Interestingly, the percentage of direct deliveries decreased with the orders' weight. For very heavy products (>40kg), however, the number of direct deliveries increases significantly from 25% to 38%. An explanation for the high number of pickups of very heavy products could be a high product value.

We then focused on the ordered articles' lengths, heights and widths. Measurements were given for 2557 articles in the transaction sample. It has been found, however, that none of the articles had measurements of more than one metre in any dimension. The analysis of smaller measurement intervals had no significant impact on delivery preferences.

Finally the order value of 14937 transactions was compared with delivery preferences.

Order Value [$]	Pickups [%]	Deliveries [%]
0-50	67%	33%
50-100	70%	30%
100-150	65%	35%
150-200	68%	32%
200-300	67%	33%
300-500	72%	28%
500-1000	86%	14%
>1000	93%	7%

Table 3: Impact of Order Value on Delivery Preferences

An interesting finding from this analysis suggests that the number of pickups increases with the order value. Customers seem to like the option to look at a product, consult personal assistance and pay in-store before taking products home. The effect of the retailer's shipping policy – products exceeding an order value of $100 are shipped free – can also be observed. Below an order value of $100, 30% of orders are shipped directly. This number increases to 35% for orders ranging from $100-150. In the upper price ranges, this effect seems to be compensated through the customers' preferences to pick up high-value items in-store.

CONCLUSIONS

The multi-channel service mix at the top 30 multi-channel e-retailers in 2002 has been evaluated. The findings demonstrate that retailers increasingly extend multi-channel services. However, the analysis has shown that company's have not yet fully exploited their multi-channel service potentials. The analysis of consumer preferences demonstrated a clear demand for such services, however. A survey with 4267 respondents showed consumers' strong appreciation of multi-channel features. Explanations for these multi-channel preferences were given.

Furthermore, web usage analysis of transaction and web log data has demonstrated consumers' unambiguous demand for multi-channel services. An analysis of transaction data clearly pointed out consumer preferences for in-store services. Web usage analysis also indicated the success of a multi-channel service strategy.

As a conclusion, the findings suggest that companies should further extend their multi-channel services to meet consumer demands.

REFERENCES

Agrawal, R., Imielinski, T. and A. Swami (1993). "Mining associations between sets of items in massive databases". In ACM SIGMOD *International Conference on Management of Data*, Washington, D.C.

BCG, Shop.Org (2002). The State of Retailing Online 5.0, *Press Release* June 2002.

Cooley, R., Mobasher, B., Srivastava, J. (1999) Data preparation for mining world wide web browsing patterns. Knowledge and Information Systems, 1(1), February 1999

Deloitte (2001), The Global Retail Report, available at http://www.stores.org/pdf/GlobalRetail01.pdf

Devaraj, S., Fan, M., Kohli, R. (2002) Antecedents of B2C Channel Satisfaction and Preference: Validating E-Commerce Metrics. *Information Systems Research*, Vol. 13, No.3, p. 316-333

Fu, Y., Sandhu, K., Shih, M., Asho (1999): Generalization-Based Approach to Clustering of Web Usage Sessions. In: WebKDD 1999, San Diego, CA, (21-38)

Gallaugher, J.M. (2002). E-Commerce and the Undulating Distribution Channel. *Communications of the ACM, July 2002*

Gallo, R., McAlister, J. (2003), The Top 50 Retailers, Technical Report, August 2003 http://www.retailforward.com

Gulati, R., Garino, J. (2000). Get the Right Mix of Bricks and Clicks. *Harvard Business Review* May-June 2000.

Heer, J., Chi, E.H. (2002): Separating the Swarm: Categorization Methods for User Access Sessions on the Web. In: ACM CHI 2002 Conference on Human Factors in Computing Systems, ACM Press, (2002). Minneapolis

Howard, J.A., Sheth, J.N. (1969). The Theory of Buying Behaviour. John Wiley & Sons Inc., N.Y.

Jung, H., Louvieris, P., Oppewal, H. (2002). Channel Management Strategy in eCommerce environment: Portfolio Management Approach. Proceedings of the International Conference on Information and Communication Technologies in Tourism (ENTER2002), Springer Verlag, Innsbruck, Austria, January, 2002.

Kohavi, R. and Parekh, R. Ten Supplementary Analyses to Improve E-commerce Web Sites, In Proc. 5th ACM WebKDD 2003 Web Mining for E-Commerce Workshop "Webmining as a Premise to Effective and Intelligent Web Applications", Washington D.C.

Lohse, G.L. and Spiller, P. (1998). "Electronic Shopping," *Communications of the ACM*, Vol. 41, No. 7, p. 81-87.

Mobasher, B., Dai, H., Luo, T., Nakagawa, M. (2002): Discovery and Evaluation of Aggregate Usage Profiles for Web Personalization. Data Mining and Knowledge Discovery, Vol. 6(1)., (61-82)

Moe, W. (2001): Buying, Searching, or Browsing: Differentiating between Online Shoppers in-Store Navigational Clickstream. Journal of Consumer Psychology, Vol. 13(1&2).

Shahabi, C., Zarkesh, A.M., Adibi, J., Shah, V. (1997): Knowledge Discovery from User's Web-Page Navigation. In: 7th IEEE International Conference On Research Issues in Data Engineering (1997), (20-29)

Spiliopoulou, M., Pohle, C. (2001), Data mining for measuring and improving the success of web sites. Data Mining and Knowledge Discovery, 5:85–114, 2001.

Steinfield, C., Adelaar, T. and Y.-J. Lai, (2002). Integrating Brick and Mortar Locations with E-Commerce: Understanding Synergy Opportunities. *Proceedings of the 31st Hawaii International Conference on System Sciences, Hawaii.*

Steinfield, C. (2002a). Understanding Click and Mortar E-Commerce Approaches: A Conceptual Framework and Research Agenda. *Journal of Interactive Advertising*, Vol. 2, No. 2, Spring 2002.

Stern, L.W. and A.I. Ansay (1992). Marketing Channels. Englewood Cliffs, Prentice Hall, N.J.

Stone, M., Hobbs, M., and Khaleeli, M. (2002), Multichannel customer management: the benefits & challenges, Journal of Database Marketing, Vol 10 No 1 2002 pp39-53

Straub, D., Hoffman, D., Weber, B., and Steinfield, C. (2000). Measuring E-Commerce in Net-Enabled Organizations: An Introduction to the Special Issue. *Information Systems Research*, Vol. 13, No. 2. p.115-124)

Swerdlow, F.S., Deeks, J., Cassar, K. (2002): In-Store Pickup Implement Last Mile Policies to Optimize Technology Investments. Vol. 10, Jupiter Research, (November 2002)

Teltzrow, M., Berendt, B. (2003), Web-Usage-Based Success Metrics for Multi-Channel Businesses, In Proc. 5th ACM WebKDD 2003 Web Mining for E-Commerce Workshop "Webmining as a Premise to Effective and Intelligent Web Applications", Washington D.C.

Teltzrow, M., Günther, O. (2003), Web Metrics for Retailers. Proc. 4th International Conference on Electronic Commerce and Web Technologies, Lecture Notes in Computer Science, Springer, Berlin/Heidelberg/New York

Zhu, K. and K. Kraemer (2002). Electronic Commerce Metrics: Assessing the value of e-commerce to Firm Performance with Data from the manufacturing sector. *Informations Systems Research*, INFORMS, Vol. 13, No. 3, September 2002, p. 275–295.