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**The Consumer Direct Services Revolution in Grocery Retailing: An Exploratory Investigation**

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**Abstract**

**Purpose** - To provide empirical evidence and explanation of the phenomenon that providers of home delivery of groceries are still of minor importance in highly concentrated retail markets.

**Design/methodology/approach** - Based on a critical literature review three propositions were set up. A web based survey was conducted with two prospective consumer groups for home delivery providers: time starved consumers and consumers with Internet affinity. A structural equation modeling analysis was applied in addition to uni- and bivariate analysis.

**Findings** - In contrast to some assumptions in the literature shopping in stores for groceries was not generally perceived to be an annoying activity. Respondents were aware of their own shopping logistics efforts in terms of spatial and temporal distance when shopping in stores but were unable to convert these efforts into costs. Any

perceived inconvenience connected with shopping for groceries had no impact on respondents' willingness to pay for home delivery services or their future intentions to use such services.

**Research limitations/implications** - The study only investigated two specific consumer groups within highly concentrated urban grocery retail markets. However these groups may be considered typical of most western European countries and thus the study's findings are of importance to retailers.

**Practical implications** - The major findings suggest that in general home delivery service may not be considered a strategic competitive advantage in grocery retail markets. Other marketing issues such as pricing, assortment and store personnel still substantially affect a consumer's choice of retail formats. This leads to the conclusion that home delivery providers should either appeal to niche markets and/or offer additional differential criteria compared to traditional retail formats.

**Originality/value** - The paper argues for a different viewpoint for researchers investigating the topic of Internet-based distance retailing. Further, the reintegration of logistical tasks from consumers should not be considered detached from other format choice criteria.

**Keywords** Home delivery, Grocery retailing, Internet, Consumer direct service, Consumer logistics

**Paper type** Research paper

## **Introduction**

This paper discusses the area of consumer direct (CD) related logistics, particularly how the logistics related to home delivered groceries ordered over the Internet are perceived by consumers. As academic and practical discussions in logistics focus more on technical suggestions of how to solve the 'last-mile' problem to the private households (e.g. Pflaum *et al.*, 2000; Cairns, 1996), CD logistics still appears to be problematic.

Different studies have shown that costs for CD logistics are very high compared with the traditional model, and consumers have high expectations of 100 per cent order fulfillment (Britt, 1998). The notion here is that extra costs for this service are met by consumers as there is an underlying assumption that certain groups of consumers are demanding CD services and are willing to pay for the extra services provided by CD logistics (Anonymous, 2001a; Anonymous, 2001b). This 'consumer willingness to pay for the last mile' hypothesis (Anonymous, 2002) was the starting point for this research. We believe this hypothesis represents an example of what Stock (2002) calls a 'logistics myopia' as both practitioners and academics might fail to recognize the strategic implications of logistics activities. Thus, we refute this hypothesis and argue what is missing in the whole CD discussion is the integration of the consumer's voice.

The purpose of this study therefore is to evaluate consumers' perceived awareness of their logistical efforts in time, space and related costs to overcome the last mile problem, and their readiness to use alternative channels to supply their households with groceries. Additionally we want to identify consumers' available logistics infrastructure and logistical behavior when using CD services. We therefore examined shoppers and consumers directly with notions of CD in order to receive a detailed assessment regarding the attractiveness of this particular way of grocery shopping. From a marketing point of view we have tried to discover how logistical efforts undertaken by consumers are relevant in their choice of a retail format.

The paper is structured as follows. After a theoretical presentation of the retail character of CD, which we see simply as another form of distance retailing (Berman and Evans, 1998), the second part of the paper presents the results of a web-based consumer survey (n=528; representing two different target groups for CD). The findings show that the 'willingness to pay for the last mile' hypothesis cannot be supported as consumers perceive traditional shopping not to be that much of a burden. Further, some consumers have a clear idea of their logistics efforts in terms of time and space but are not able to transfer these efforts into costs. Based on these findings, we will conclude with a discussion on the threats and opportunities for retailers involved in grocery distance shopping.

### **The concept of consumer direct**

#### *Consumer direct – a new retail format?*

The home delivery (HD) of grocery goods ordered over the Internet is called consumer direct (CD) and includes outbound ordering and inbound logistics from a consumer's perspective. It means that private users or consumers use some form of electronic means or other online services for the ordering of food/grocery items that are later delivered to their private homes (Orler and Friedman, 1998). Corbae and Balchandani (2002) expect the market for CD services in Europe to reach over Euro 100 billion by the year 2010. This would represent a market share on total grocery retail sales of over 10 percent.

Efficient Consumer Response Europe (2002), Pflaum *et al.* (2000), Siebel (2000) and Orler and Friedman (1998) argue that the successful implementation of this food/grocery home shopping growth requires technological maturity in the marketplace. Looking at the current state of consumer Internet use and their technological maturity, there is huge potential for online food or grocery retailing. Recent studies have shown that over 110 million people in the US,

representing 69 percent of the adult population, use the Internet (GfK, 2005). A similar pattern is in Europe; for example Internet penetration in Sweden is over 75 percent (GfK, 2005). Also, other IT-based interfaces such as fax machines, mobile phones or the use of credit cards and client cards will help to drive the success of CD (Efficient Consumer Response Italy, 2002). However, there are certain barriers that make CD difficult, e.g. the case of unattended deliveries to a household and their related security issues (McKinnon and Tallam, 2003). The success of CD also depends on logistics. Corbae and Balchandani (2001) estimated that over 900 million deliveries need to be carried out to 35 million households in Europe, thus there is a need for specific small-scale logistics in this area.

#### *Consumer direct segments*

From a classical marketing channel perspective, CD is a distribution channel that produces a consumer specific service output like any other channel (Coughlan *et al.*, 2001). From a retail marketing point of view, any retail store format or retail institution can be seen as the result of a segmentation process and an attempt to satisfy specific consumer needs (Levy and Weitz, 2004). The basic notion of CD suggests that certain groups of consumers appreciate the value-added of CD (Brown *et al.*, 2003). CD services are presented as a practical way for a lot of consumers to shop for their groceries as the majority of shoppers are not satisfied with their shopping experiences (Siebel, 2000; Anckar *et al.*, 2002). Orler and Friedman (1998) characterize this group as ‘shopping avoiders’ and present other segments that CD appeals to (see Table 1).

**Place Table 1 here**

**Table 1: Typology of CD target groups (Orler and Friedman, 1998; Corbae and Balchandani, 2001)**

Different segments demand different CD services and Orler and Friedman (1998) and Corbae and Balchandani (2001) predict a fast growing market share for CD. However, the authors also refer

to the logistical challenges of home delivery (HD) being the logistical side of CD and a low consumer loyalty towards such services.

Overall, this suggested segmentation is reasonable as opposed to the suggestions of Coughlan *et al.* (2001) who argue that whenever a group of consumers is willing to accept a service output, here in terms of spatial convenience and/or waiting and delivery time, a new marketing channel can be set up. However this typology can be characterized as a normative approach that considers technology affinity and time for shopping as the main factors for CD services choice. The descriptions of the segments are also vague in terms of 'classical' socio-demographic variables, such as age, household size and family life cycle (Berman and Evans, 1998).

#### *The logistics behind consumer direct services and its consumers' attractiveness*

With the introduction of the Internet CD initiatives have presented themselves as a counterpart to in-store format-based grocery retailers who offer their services from one central point or store to a maximum of people (Van den Poel and Leunis, 1999). Consumers here take up the logistical responsibility by collecting their goods in the store, i.e. materials handling, and carrying the purchased goods to their homes either on foot or by car, i.e. transportation. This effort can be calculated in terms of time, where time for waiting at the cash desk has to be added to the total delivery time. Alba *et al.*, (1997) introduced a transaction cost based choice model that a consumer has in mind while weighing up which purchasing alternative might be the best. They determined that consumer transaction costs for supermarket shopping are high, while those for interactive home shopping, i.e. CD are low. This might be the case for the so-called precaution-shopper, who – in terms of logistics – sources huge lot-sizes at once in order to have high inventory levels at home as 'safety stocks'. Such a scenario introduces the assumption of a

rational acting and deciding consumer (Bretzke, 1999). In fact all consumers have to provide storage (e.g. a refrigerator) and transportation facilities (e.g. a vehicle) to bridge the time and space between procurement and consumption (Granzin and Bahn, 1989; Granzin *et al.*, 1997). Those cost factors should also be taken into account when assessing the hidden costs of store shopping (Bell *et al.*, 1998).

Although these market numbers may make Internet-driven commerce to private households, or Business to Consumer (B2C), appear attractive, recent market data show that such sales account for only 1.6 percent of total trade volume is discouraging (Hudetz, 2002). But CD-experts predict the market share for CD services in the European and US-market to be up to 12 percent; the 'devil' seems to be in the logistical detail (Pflaum *et al.*, 2000; Engelsleben, 2000; Siebel, 2000).

The European Efficient Consumer Response Initiative (ECRE, 2002) has offered an overview of existing last mile business models for CD logistics highlighting differences between various modes for delivery points (from pick up at the store to unattended HD), and delivery time (from nearly just-in-time to non definite). From a CD logistics point of view, Morganosky and Cude (2002) present the 'pick-up-from-store' as the most favored delivery option, which could be seen as the best-practice from benchmarking the real consumer way of shopping. The authors suggest therefore that the long-term feasibility of picking and delivering from stores from a cost perspective presents a number of supply side questions that need to be further addressed by future researchers. The issue is serious as Schlögel and Tomczak (1999) point out a CD provider has to find the balance between sales and logistics costs per location. While in the classical store model there are high sales and low costs for one location, sales decrease and costs increase the more a provider delivers direct to consumers. This is mainly due to the missing consolidation effects and economies of scale (Bretzke, 1999). The literature suggests extra costs will be paid by consumers

since they can calculate their own cost and savings. If the difference between the costs of their own shopping and the costs of getting the groceries delivered to the homes is positive, the consumers will achieve savings. However Barth *et al.*, (2002) argue consumers do not calculate the costs of shopping since this process seems to be too complex, time consuming and not necessary. These contrary views led to the following research assumptions and problem, which will then be further discussed based on the empirical study.

Overall it is difficult to identify a 'best-in-class' business model, other than Tesco in the UK, who is today's 'home-delivery champion' at least in the UK. By 2002, Tesco had 750,000 online registered customers and was processing 110,000 orders a week (Butler, 2005; Bawden, 2005). In early 2003 Tesco's online sales were more than 65 percent of the UK Internet grocery markets (Bawden, 2005).

### **Consequences for the research problem**

Summarizing the foregoing discussion, we have argued that the CD debate is missing the integration of the consumer in examining their logistical activities (e.g. Bretzke, 1999; Alba *et al.*, 1997). Therefore this study's efforts concentrated on the demand and consumer side of the CD logistics, i.e. HD services, and generated the following research propositions:

*P1. Consumer Logistics Awareness proposition:* A consumer is aware of his/her shopping logistics in terms of spatial and timely distance and related costs.

This proposition tests the concept of the rational consumer who knows about the costs of various shopping possibilities and perceives the provision of storage and transportation facilities. The CD studies indicate consumers are willing to demand HD services if they are convenient, however the studies did not investigate the logistical burden as perceived by consumers.



*P2. Consumer Logistics willingness to pay proposition:* A consumer who outsources the shopping logistics is willing to pay for CD service because he/she is aware of his/her opportunity costs (i.e. transaction and logistical costs).

This proposition seeks to confirm notions that the rational consumer, who economically assesses all shopping possibilities, chooses the best alternative on that basis. P2 can be considered a continuation of P1. Further, if consumers perceive shopping as a logistical burden and can assess the costs behind this burden, then what price are they willing to pay for an ‘outsourced’ service?

*P3. Consumer Logistics inconvenience proposition:* Perceived inconvenience of shopping groceries in stores has a positive influence on the willingness to pay for and use of HD of groceries.

To test this proposition the exogenous variable ‘inconvenience’ was operationalized by the general (negative) attitude towards shopping of groceries in stores and the assessment of the most frequently shopped outlet. This approach adopted the view of authors cited above who state that the growing attractiveness of CD and therefore HD is a logical consequence of shopping inconvenience in physical retail outlets.

## **Methodology**

In order to test these research propositions we surveyed consumers with a high affinity to the Internet who are said to represent prospective CD customer groups as suggested by Orlor and Friedman (1998) (see Table 1). Table 2 summarizes the research design:

**Place Table 2 here**

**Table 2: Research design**

The questionnaire dramaturgy was designed to mentally lead respondents through their shopping habits and endeavors when procuring goods in their most frequently used outlet. Thereafter they

were presented with the possibility to ‘outsource’ grocery shopping to a third party. By doing so the ‘spill over’ effect from the first questions made HD tangible for those respondents who have never used distance retailing services. As the number of consumers presently using HD for groceries is limited compared to the general population we focussed on two specific segments: ‘time starved’ and ‘new technologist’ stemming from the typology of Orlor and Friedman (1998) and Corbae and Balchandani (2001). These notions have been pre-tested previously (see Teller and Kotzab, 2003; Kotzab and Teller, 2003) and in this study an alumni group from the Vienna University of Economics and Business Administration represented the ‘time starved’ while current students represented the ‘new technologists.’ The Internet was consciously used as the research medium to reach those respondents actually using it and/or able and willing to use it (Grant, Teller and Teller, 2005).

Univariate and bivariate analyses (e.g. correlation analysis, Mann-Whitney *U* test). were conducted to test Propositions 1 and 2. Structural Equation Modeling (SEM) was applied to identify causal effects between the different variables for Proposition 3.

## **Research results**

### *Sample characterization*

Table 12 in the Appendix provides the socio-demographic characteristics of the two respondent groups. In both cases the Internet was found to be used on a regular basis. Respondents indicated that they were mainly responsible for grocery shopping in their own household (~70 percent of the total grocery supply). This does not seem to be surprising since most of them live alone. The average respondent buys groceries at least twice a week. Table 3 shows that the two groups are homogeneous regarding the criteria procurement responsibility (*t*-test,  $p > 0.05$ ) meaning that the person who uses the Internet is also mainly responsible for the purchases. Contrary to that the

shopping frequency and the amount spent at each trip significantly differs between the two groups ( $t$ -test,  $p < 0.05$ ). This might be due to the significant difference in household income and therefore available amount of money for buying groceries (Correlation analysis; Spearman's  $\rho$ ;  $p < 0.05$ ).

**Place Table 3 here**

**Table 3: Shopping behaviour**

In a next step those respondents who have had groceries delivered to their home (see Table 4) were given a list of statements and asked to evaluate their shopping experience in case of shopping for goods in the supermarket or via HD. The different statements were grouped into three categories of convenience, logistics and marketing (Eastlick and Feinberg, 1999). When it comes to the comparison of the shopping experience in a store with the shopping experience of home shopping, a sober picture for HD services emerged as there were no significant differences in the assessment of both purchasing in stores and (for those who have experience) with HD (see Table 4 and Figure 1).

**Place Table 4 here**

**Table 4: Experience with HD of groceries**

Figure 1 shows that the concept of HD is perceived as very convenient but all respondents considered this shopping possibility as being almost as pleasant as shopping groceries in stores. Only the logistics of HD was seen as timesaving and less laborious while most marketing criteria of stores were better evaluated than the marketing criteria of HD. The typical home delivered product were beverages (26 percent multiple response,  $n=125$ ), followed by frozen food (9 percent) and bakery products (8 percent), which can be seen as kind of difficult to handle products in terms of weight, size and protection. Next, the evaluation of both shopping in store

and HD were compared for those respondents (alumni and students,  $n=130$ ) who have had groceries delivered to their homes. Again, there were significant differences between the assessments of the different statements regarding the two modes of shopping within the two samples. Only 'friendly personnel', 'cleanness', 'advice' and 'pleasant' were assessed in the same way (Wilcoxon-Test;  $p>0.05$ ).

The differences between the samples showed there is almost overall homogeneity ( $p>0.05$ ) in the assessment of store shopping and HD between the groups. In particular, looking at shopping with HD, there was no significant difference between the assessments of the 'convenience' statements. However, nearly all groups evaluated store shopping as not such a burden as reported in the CD literature. This was even surprising in the group of shoppers, where we expected a confirmation of the 'time-starved' scenario (Orler and Friedman, 1998).

**Place Figure 1 here**

**Figure 1: Assessment of store- vs. non store shopping**

#### *Consumer Logistics Awareness (P1)*

Table 5 shows the results of consumers' perceived logistical framework of individual shopping action in terms of distance in space and time.

**Place Table 5 here**

**Table 5: Estimation of distances between stores and household in meters and minutes**

Most of the respondents estimated the distance between their homes and their usual stores to be between 100 and 1,000 meters. This would take them between 3 and 5 minutes to walk. The differences among the two groups can be regarded as significantly different (Mann-Whitney  $U$  test,  $p<0.001$ ) whereas the 'time starved' overcome a larger temporal and spatial distance.

These results can be interpreted twofold. Either consumers are definitely aware of their shopping logistics or they are not. We believe the findings are reliable, since Schnedlitz *et al.*, (1999) discussed a high shop density in Austria concluding that any Austrian can shop for groceries within 5 minutes from their homes or workplace. From these results, we can better understand the indicated high shopping frequency and the low average amount spent per shopping trip (see Table 3).

The results of how consumers convert their logistics efforts into costs (see Table 6) were not supportive as most respondents, independent of which group they belong to, evaluated their costs as being zero.

**Place Table 6 here**

**Table 6: Estimated logistical costs of shopping**

Based on these findings consumers in this context appear to partially rational: they know about the logistics side of shopping but are unable to calculate these efforts in terms of prices/costs.

#### *Consumer Logistics willingness to pay (P2)*

Following the notions of Wertenbroch and Skiera (2002) respondents were asked at the end of the questionnaire whether they were willing to pay for HD services. The results are shown in Table 7. The most frequent answers (modus) were Euro 2.00 by the 'new technologists' and Euro 5.00 by the 'time starved' respondents. The assessments were significantly different between the two groups whereas 'new technologists' were willing to pay less than 'time starved' (Mann-Whitney *U* test,  $p < 0.05$ ). Interestingly we could not identify a significant correlation between household income and the willingness to pay in both groups (correlation analysis; Spearman's *rho*;  $p > 0.05$ ).

**Place Table 7 here**

**Table 7: Willingness to pay for outsourcing of shopping groceries**

The relationship between the willingness to pay for outsourcing the shopping function and the logistical variables ‘distance in meters from home to store’ and ‘distance in minutes from home to store’ is shown in Table 8.

**Place Table 8 here**

**Table 8: Correlations between logistical dimensions and directly/indirectly estimated costs of shopping**

Although most of the correlations are significant ( $p < 0.05$ ) they appear to be rather weak ( $r < 0.42$ ). This implies that spatial and temporal distances do not influence the willingness to outsource shopping endeavors to a considerable degree. The same pattern, significant but weak correlations, emerged when investigating the relationship between the willingness to pay for HD and other factors operationalizing the degree of carried out shopping logistics (see Table 3) such as:

- Size of the shopping basket (expenditures per shopping trip)
- Frequency of grocery procurement (average shopping frequency)
- Degree of procurement responsibility (share of grocery procurement for the household)

In summary the data indicates that the observed willingness to pay for HD cannot be satisfactorily explained by the degree of logistical endeavors undertaken by respondents when shopping groceries in stores.

Finally respondents were asked about their future use intentions for HD of groceries (see Table 9) and identified a more pessimistic attitude (Mean > 3.7; six point rating scale; 1=will certainly use HD, 6=will certainly not use HD). The majority appear not very likely to use HD of groceries in the future. However, the willingness to outsource grocery shopping is significantly higher in the group of ‘time starved’ respondents (Mann-Whitney  $U$  test,  $p < 0.001$ ).

**Place Table 9 here**

**Table 9: Prospective chances of the Internet used as a media to carry out grocery shopping**

Comprising the results from testing P1 and P2 we conclude that while consumers have the ability to assess shopping logistics by given parameters, they have an inability to convert these endeavors into monetary dimensions at the same time. These findings seem to be surprising when considering the specific kind of education of respondents which is said to sharpen economic and/or rational thinking.

#### *Consumer Logistics inconvenience (P3)*

Figure 2 provides an overview over the variables and constructs included in the model set up based on proposition 3. To test the model Structural Equation Modeling (SEM; using Amos 5.0) was applied to try and explain structures or patterns amongst a set of latent variables, i.e. constructs, typically measured by manifest variables by analysing the correlation or variance/covariance input matrices of all variables (Hair *et al.*, 1995).

The analysis was applied to both respondent-groups in order to reach the critical sample size of 200 necessary to conduct SEM (Bentler, 1990). Most latent variables were measured by means of multi-item scales. The item generation was drawn from literature and/or previous studies. According to Proposition 3 the model consists of the exogenous (latent) variables ‘assessment of (negative) general attitudes towards shopping groceries in stores’ and ‘assessment of perceived inconveniences of shopping in the most frequently visited store’ and the endogenous (latent) variables ‘willingness to pay for HD’ and ‘willingness to use HD in the future’. According to this proposition both exogenous variables positively affect the two endogenous variables. A more detailed description of these constructs and their indicating variables is described in Table 14 in the Appendix. Figure 2 illustrates the proposed causal effects within our model.

**Place Figure 2 here**

**Figure 2: Proposed Structural Model**

Before interpreting the results of the causal effects between constructs in the structural model ( $X1, X2 \rightarrow Y1, Y2$ ), we determined that the empirical data fit the model. The most important descriptive overall fit measures Goodness of Fit (GFI) and the adjusted goodness-of-fit index (AGFI) meet the criteria of being higher than 0.9 (Baumgarten and Homburg, 1996; Hair *et al.*, 1995). The Root Mean Square Error of Approximation (RMSEA) is also below the required level of 0.08 which indicates also a good fit of the model (Hair *et al.*, 1995). Tables 14 and 15 in the Appendix shows other fit measures necessary to evaluate the overall and local fit of the model which – without going into detail – turn out to be satisfactory.

Table 10 shows the parameter estimates of our structural model (g11 – g23). All parameters are insignificant at the 5 percent level which means that the exogenous variables or constructs do not significantly influence the endogenous variables or constructs.

**Place Table 10 here**

**Table 10: Estimates of structural equation coefficients**

The Squared Multiple Correlations values of Y1 (0.1) and Y2 (0.6) appear to be very low, which means that only the exogenous variables X1 and X2 explain variance in the ‘willingness to pay for HD’ and the ‘willingness to use HD’ constructs to any great degree. Looking at the standardized estimates of the model the coefficients (g11-g22) are very low between all constructs (see Figure 3).

Interestingly the construct ‘general attitude’, i.e. the rating of the overall perceived inconvenience of grocery shopping, affects the willingness to pay and use HD negatively. In summary, the constructs ‘assessment of shopping’ and ‘general attitude’ do not have a significant



or strong positive impact on ‘willingness to pay for HD’ and ‘willingness to use HD’. Proposition 3 can therefore clearly be rejected.

**Place Figure 3 here**

**Figure 3: Standardized Estimates**

## **Conclusion and Outlook**

### *Synopsis*

This paper examined the consumer side of CD logistics services according to three research propositions which were empirically tested. The results are summarized in Table 11.

**Place Table 11 here**

**Table 11: Synopsis of research propositions**

The findings showed that there is a discrepancy between CD research and practice, when it comes to listening to the voice of the consumer as most CD research concentrates on technical issues of how to solve the last mile by assuming a high consumer appreciation as a given factor. Here we believe that Stock’s (2002) myopia notions can be supported. This study has shown that consumers are logistical experts in time and space, but amateurs in cost consciousness. They are willing to pay for HD as the logistical core of CD but their preferred payment seems not to represent their real cost and/or physical burden in their shopping behavior.

### *Managerial implications*

From a managerial point of view the results of the empirical study show that the delivery service within the concept of CD can not be considered as a strategic competitive advantage in grocery retail markets. This is due to the fact as consumers are (still) not able to perceive an important

difference between home delivery and traditional grocery shopping. Other marketing issues like pricing, assortment, personnel etc. still affects consumers' choice of retail formats substantially. This may lead to the conclusion that current home delivery providers should either appeal to niche markets and/or offer additional differential criteria compared to traditional suppliers. Managers, who invest into home delivery systems, have to consider to explicitly showing their customers sustainable, important and perceivable advantages of this specific logistics offering. We also suggest that retail managers, who are thinking of integrating HD into their existing channels, will first have to convince consumers about supplementary and costly activities, and secondly will have to identify rationalization possibilities within their HD concept.

#### *Limitations and directions for further research*

Since the retail sector can be seen as a local activity (Omar, 1999) we have to limit our results and findings to retail markets having a similar structure like the Austrian retail sector, i.e. high concentration and high outlet density. Nevertheless the success of 'Tesco.com' in the UK cannot be explained by our findings. Another limitation is our approach of focusing on the service HD and treating all other retail mix criteria, such as assortment, price and other services, as being similar to all other store-based retail formats. All these 'ceteris paribus' assumptions should be seen as starting points for further research. We suggest examining the consumer side of HD in larger distance grocery environments as well as among consumers with more extensive distance shopping experience. We also propose to test our model in different country markets in order to identify certain differences and similarities in international and global consumer behavior when shopping over the Internet. Furthermore the perception of consumer logistics tasks within households which can be seen as the 'dark side of shopping' (Babin *et al.*, 1994) should be

focused more in following research endeavors in order to understand the perceived value of CD services in more detail.

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## **APPENDIX**

Place Table 12 here

Place Table 13 here

Place Table 14 here

Place Table 15 here



<b>CD consumer group</b>	<b>Characterization</b>	<b>CD attractiveness</b>
Shopping avoider/ passive shoppers	Dislike grocery shopping, who lack time but are technology-friendly	High
Necessity users	Unable to go to the store	High
New technologists/ modern responsables	Young and technologically interested, have no time for shopping	Medium
Time starved	Dual income household with kids, time pressed	Medium/high
Responsibles	Have time but shopping is part of their 'job'	Low
Traditional shoppers	Technology avoiders, enjoy shopping, mainly housewives, high shopping frequency	Low

**Table 1: Typology of CD target groups (Orler and Friedman, 1998; Corbae and Balchandani, 2001)**

Characterization	Applied Design	
Research topic	Shopping in grocery stores vs. HD of groceries from the consumers' point of view	
Research method	Web-based survey	
Research design	Standardized questionnaire including open and closed questions	
Population	Current Students (N=409)	Alumni (N=2581)
	of the Vienna University of Economics and Business Administration (VUEBA)	
Sample size (n)	144	384
Sampling method	Census	
Analysis software	SPSS 12.0 & Amos 5.0	
applications	uni-, bi- and multivariate analyses	

**Table 2: Research design**

<b>What is the share (%) of grocery shopping that you buy for your household?</b>		
	<b>new technologists</b>	<b>time starved</b>
Mean	71.03	71.51
Std. dev.	29.28	27.57
Min	3.00	3.00
Max	100	100
n	143	379
<b>How often do you buy groceries? (per month)</b>		
Mean	11.93	9.85
Std. dev.	5.29	5.54
Min	1.00	0.08
Max	26.09	26.09
n	142	379
<b>How much do you spend on average for groceries per shopping trip?</b>		
Mean	21.50	43.15
Std. dev.	11.98	45.01
Min	5	5
Max	80	600
n	139	368

**Table 3: Shopping behaviour**

<b>Have you ever had groceries delivered to your home? (%)</b>		
	<b>new technologists</b>	<b>time starved</b>
Yes	13.19	28.91
No	86.81	71.09
n	144	384
<b>How often did you have groceries delivered to your home? (per month)</b>		
Mean	0.55	1.01
Std. dev.	0.86	2.00
Min	0.04	0.04
Max	3	13.045
n	19	107
<b>What is the share of all grocery purchases that you have had delivered to your home? (%)</b>		
Mean	5.42	12.66
Std. dev.	9.06	20.50
Min	0	0
Max	40	90
n	19	106

**Table 4: Experience with HD of groceries**

<b>What is the distance (in meters) between the (this) supermarket (where you frequently buy groceries) and your home?</b>		
	<b>new technologists</b>	<b>time starved</b>
Quartile 1.	100	200
Quartile 2.	300	700
Quartile 3.	1,000	2,000
Modus	100	2,000
Min	2	2
Max	30,000	50,012
n	132	350
<b>How many minutes does it take to get home from the (this) supermarket (where you frequently buy groceries)?</b>		
Quartile 1.	2	3
Quartile 2.	4	5
Quartile 3.	6	10
Modus	3	5
Min	1	1
Max	20	45
n	140	371

**Table 5: Estimation of distances between stores and household in meters and minutes**

Please try to estimate the costs (in EUR) occurring when you do grocery shopping. Think of costs in terms of time and space!		
	new technologists	time starved
Quartile 1.	0	0.775
Quartile 2.	1	3
Quartile 3.	3	10
Modus	0	0
Min	0	0
Max	20	200
n	108	276

**Table 6: Estimated logistical costs of shopping**

<b>How much (in EUR) are you willing to pay for having groceries delivered home?</b>		
	<b>new technologists</b>	<b>time starved</b>
Quartile 1.	2	2
Quartile 2.	2	3
Quartile 3.	3	5
Modus	2	5
Min	0	0
Max	15	20
n	133	349

**Table 7: Willingness to pay for outsourcing of shopping groceries**

Correlations (Spearman's rho)		Time (minutes)	Distance (meters)	Average Shopping expenditures (in EUR)
<b>Estimated costs of shopping in stores (EUR)</b>	new technologists	0.22*	0.29**	0.19*
	time starved	0.37**	0.41**	0.3**
<b>Willingness to pay for home delivery services (EUR)</b>	new technologists	0.03	0.03	0.25**
	time starved	0.15**	0.09	0.17**
Caption: *...p<0.05; **...p<0.01				

**Table 8: Correlations between logistical dimensions and directly/indirectly estimated costs of shopping**



<b>Are you (still) going to have groceries delivered home in the future?</b> (1=yes certainly, 6=certainly not)		
	<b>new technologists</b>	<b>time starved</b>
Mean	4.48	3.74
Std. dev.	1.59	1.62
n	143	371

**Table 9: Prospective chances of the Internet used as a media to carry out grocery shopping**

Parameter	Parameter value (unstandardized)	p
g11	-0.321	0.266
g12	0.145	0.693
g22	0.052	0.696
g21	-0.156	0.134
g23	0.099	<0.05

**Table 10: Estimates of structural equation coefficients**

<b>Research proposition</b>	<b>Characterization</b>	<b>Accept/Reject</b>
P1. Consumer Logistics awareness proposition	A consumer is aware of his/her shopping logistics in terms of spatial and timely distance and the related costs.	Partly accept – all consumers were aware of their logistics efforts in terms of spatial and timely distances, but unable to convert their efforts into costs.
P2. Consumer logistics willingness to pay proposition	A consumer is willing to outsource the shopping logistics and to pay for this service.	Partly accept – consumers were willing to pay a price for HD although undertaken shopping logistics do not influence the observed degree of willingness. Most of respondents are not likely to have groceries delivered in the future.
P3. Consumer Logistics inconvenience proposition	Perceived inconvenience of shopping groceries in stores has a positive influence on the willingness to pay for and use of HD of groceries.	Rejected – neither negative attitudes towards shopping groceries in stores nor the assessment of most frequently carried out shopping processes affect the willingness to pay for HD and the future use of HD.

**Table 11: Synopsis of research propositions**

<b>Age</b>		
	<b>new technologists</b>	<b>time starved</b>
Mean	23.8	35.8
Std. dev.	2.7	8.8
Min	19	20
Max	32	72
n	144	382
<b># of persons in householdes</b>		
Mean	2.3	2.1
Std. dev.	1.1	1.1
Min	1	1
Max	6	7
n	144	384
<b>Gender (%)</b>		
Male	35.4	44.5
Female	64.6	55.5
n	144	384
<b>Household income before taxes (EUR)</b>		
Mean	2,296.7	4,773.7
Std. dev.	2,307.2	2,870.5
Min	220	500
Max	12,000	20,000
n	91	259

**Table 12: Socio-demographic description of the samples**

Exogenous Factors ' <b>General Attitude</b> ' (X1)
Right at the beginning of the questionnaire we confronted our respondents with several statements about (negative) attitudes towards grocery shopping. They had to assess how they agree with these statements on a six point rating scale (1 – totally agree; 6 – totally disagree). Out of twenty one items we extracted those three indicators which provide reliable measures for perceived inconvenience of grocery shopping on an overall level. These are: Compared to other things you could do instead of shopping groceries – shopping groceries is rather a pleasant activity for you. (x1, Scale rotated); Shopping is really fun. It makes you forget everyday life and troubles for a short moment. (x2; Scale rotated); x3: You are delighted when shopping is over quickly.
Exogenous Factor ' <b>Assessment of Shopping</b> ' (X2)
In next step all respondents were led through their typical shopping process regarding groceries. At the end they had to assess shopping in their preferred store on a semantic differential (six point rating scale ranging, see Figure 1) including twenty diverging pairs of attributes. Out of those we chose three capable to represent reliable indicators for the perceived inconvenience. They are: x4 – convenient - inconvenient; x5 – relaxing - stressful and x6 – likeable – dislikeable.
Endogenous Factor ' <b>Willingness to Pay</b> ' (Y1)
This factor was measured by two indicators: After having confronted our respondents with their logistical endeavors when shopping groceries we asked them how much they were willing to pay (in EUR) another person carrying out this task on behalf of them (without considering tips) (y1). Following questions dealt with the alternative way to procure groceries, i.e. HD. At the end we again asked our respondents what (fixed) fee they were willing to pay for HD services at a maximum (in EUR) given that the prices of products are the same as those offered in stores (y2; see Table 7). In fact both indicators seem to be similar from a superficial point of view but must be distinguished with regard to the consciously used spill over effects within the survey process.
Endogenous Factor ' <b>Willingness to Use</b> ' (Y2)
This factor is represented by only one factor already described in Table 9. We had to change, i.e. rotate, the scale of the question whether respondents are (still) willing to use HD in the future' in order to adjust it to the meaning within the model.

**Table 13: Description of constructs**

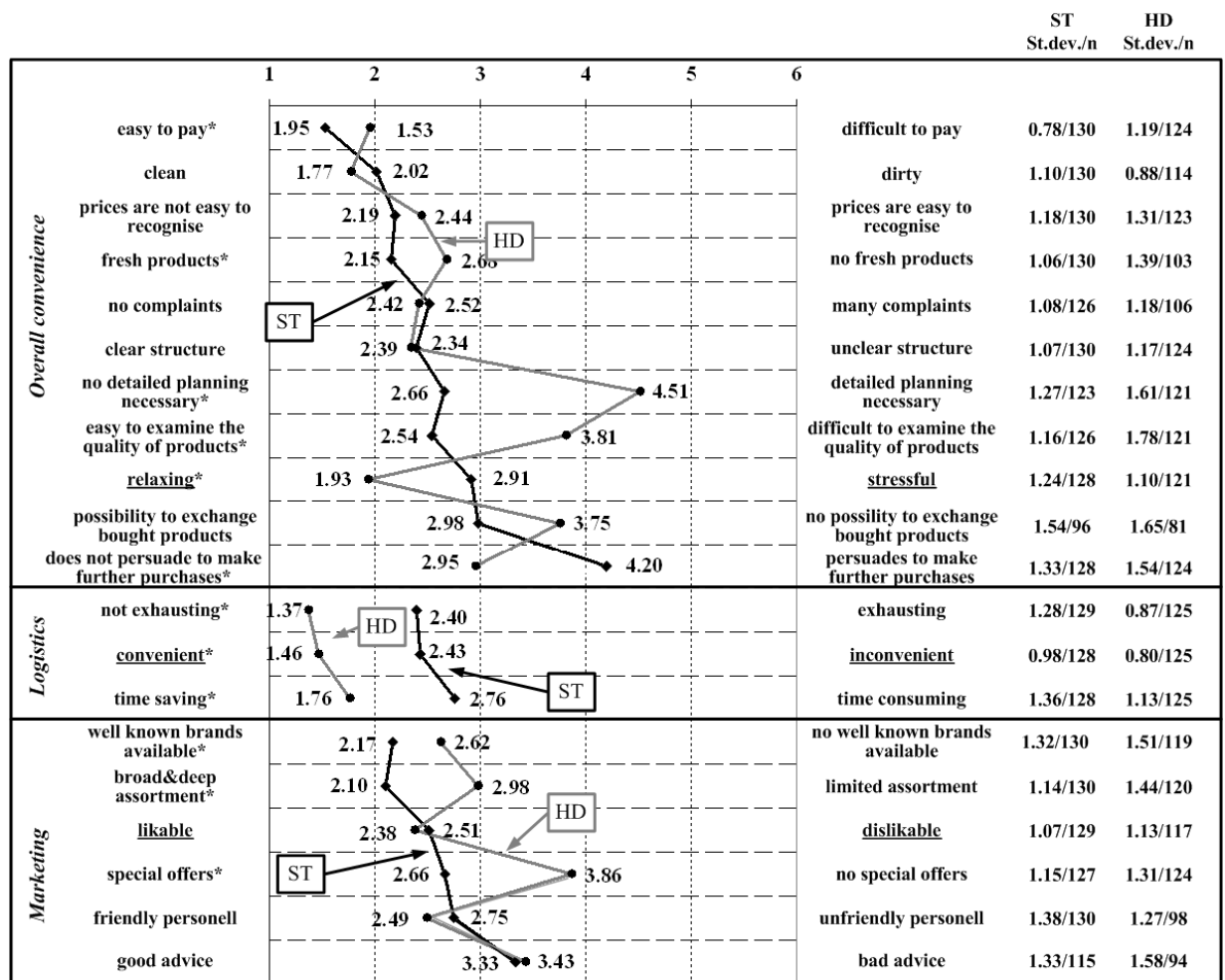
Factors	Indicator	Indicator reliability (>0.4)*	Significance of t-values (<0.05)*	Factor reliability (>0,6)*	Fornell-Larcker-Ratio (<1)*
General attitude	X1 [No fun]	0.42	--	0.75	0.04
	X2 [Not pleasant]	0.49	<0.05		
	X3 [Over quickly]	0.63	<0.05		
	X4 [Inconvenient]	0.44	--		
Assessment	X5 [Stressful]	0.48	<0.05	0.76	0.04
	X6 [dislikeable]	0.61	<0.05		
W2Pay	Y1 [W2Pay - Service]	0.58	<0.05	0.71	0.1
	Y2 [W2P – Fee]	0.55			

\*....recommended by Anderson and Gerbing, 1988; Arbuckle and Wothke, 1999; Fornell, 1983; Loehlin, 1998; Steenkamp and van Trijp, 1991; Schumacker and Lomax, 2004;

**Table 14: Local fit measures**

Index	Empirical value	Recommended Values*
Chi2 (df; p)	39.806 (22; 011)	p<0.05
Normed Chi2 (CMIN/df)	1.809	1.0 =perfect up to 1.5 very good up to 2 good up to 3 it depends
GFI (Goodness of Fit)	0.979	>0.9
AGFI (Adjusted ...)	0.958	>0.9
NFI (Normed Fit Index)	0.952	>0.9
TLI (Tucker-Lewis-Index)	0.963	>0.9
RMSEA (Root mean spare error of approximation)	0.044	<0.08
RMR (Root Mean Square Residual)	0.094	<0.08
*... see Anderson and Gerbing, 1988; Arbuckle and Wothke, 1999; Loehlin, 1998; Steenkamp and van Trijp, 1991; Schumacker and Lomax, 2004;		

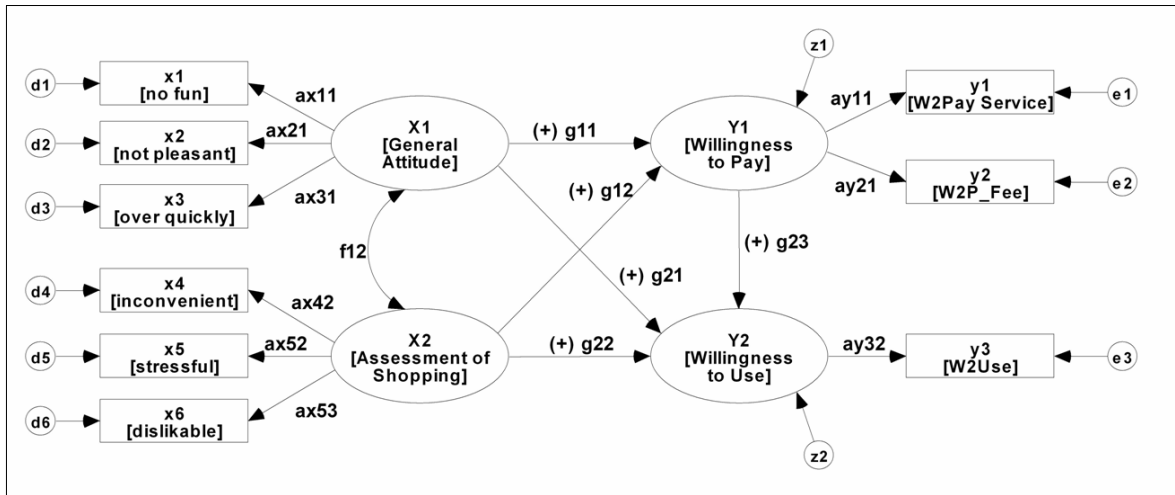
**Table 15: Global fit measures**



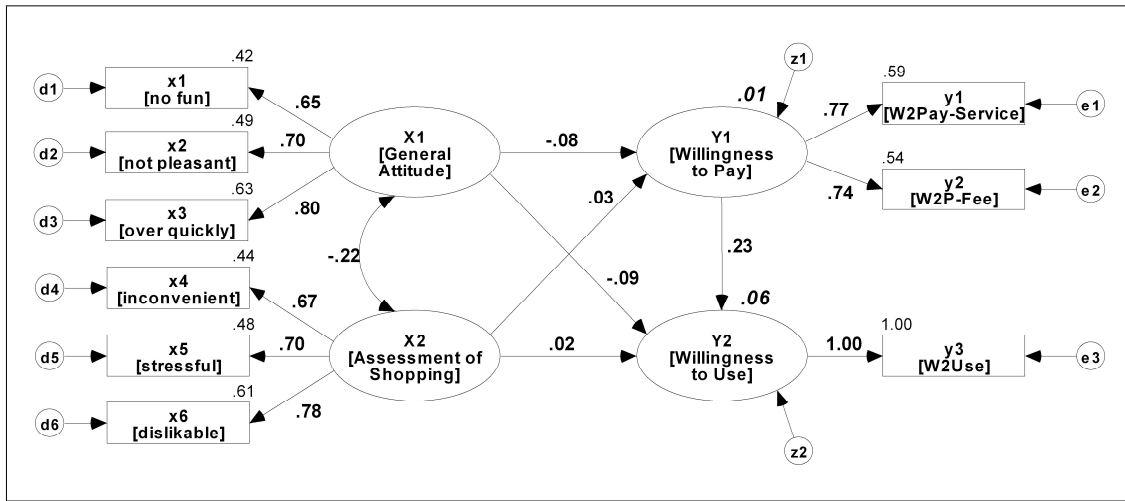
Caption:  
 ST...Assessment of purchasing groceries in the store  
 HD...Assessment of having groceries delivered home  
 \*...significant difference (Wilcoxon-Test,  $p < 0.05$ )  
 xxx...variables used in the model (see Figure 2 and 3; see appendix one)

**Figure 1: Assessment of store- vs. non store shopping**





**Figure 2: Proposed structural model**



**Figure 3: Standardized estimates**