Retailers and their preference towards technology within the shopping centre

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Preface

I am proud to present you the result of my graduation thesis. This thesis is the last part of the Master track Real Estate Management & Development at the Eindhoven University of Technology. It was written during a graduation internship at the real estate investor CBRE Global Investors.

The subject of the report: “Retailers’ preferences towards information technology within the shopping centre” turned out to be quite challenging, but nevertheless, quite satisfactory as well. Especially the research regarding preferences of retailers when it comes to information technology has not been conducted in large quantities yet. Most of the studies focus on the consumer, which, in my opinion, provides a biased and one sided view on the subject.

Picking the subject was quite easy for me; retail always exited me, both in my (parttime) jobs as in my study. Therefore, the choice for doing a graduation internship at the Dutch Retail Fund of CBRE Global investors was quite easy as well.

There are a couple of people that helped turning this thesis into the thesis that lies before you right now. I would like to thank Astrid Kemperman, Aloys Borgers, Hilke Nijmeijer and Niels Coolen for their guidance in this research and for keeping me with both feet on the ground, most of the time. In addition, I would like to thank Mandy van de Sande for her her help with the survey.

Naturally, it goes without saying that I would like to thank my family for making studying possible in the first place and for their unconditional support, not just for now, but for the whole length of the study.

Please enjoy reading my master thesis,

Elbert Frantsen

Amsterdam, July 2016

Table of contents


ONLY
Kamppi
Metroasema
Metrostation
Kauppakeskus
Köpcentrum
Linja-autoasema
Busstation

Summary

Research about information technology and its effects on consumers in a retail environment is a popular subject. So, why is it still challenging for the shopping centre investors to develop a comprehensive strategy concerning the use of information technology by shoppers? This is mainly because the tenants within the shopping centre need to support the implementation of new information technologies. The tenants have to see the added value of new technologies that justifies a possible increase of the service costs. Therefore, this study approaches information technology from the eyes of the retailers within the shopping centre. The main question is as follows*: How can shopping centre investors or managers serve the information technological needs of retailers within the shopping centre?*

Information technology is a definition that includes all forms of offline (physical) and online technologies, used to generate, store, exchange, and use information in all possible forms. This study distinguishes information technologies used by retailers within the boundaries of their shop and information technologies that are used by consumers within the shopping centre itself. Within their shop, retailers use information technology for a variety of purposes. This study divides information technology within the boundaries of the retailers' business operations in three main areas, being: supply chain management, customer satisfaction and customer management. In addition, the purposes of information technology within the shopping centre is divided into five different areas, namely: customer tracking and database marketing, entertainment and visual merchandising, information and shopping assistance, communications and data sharing and (Online) services.

The purposes of information technology within the shop and within the shopping centre are identified and the most well-known and widely-used information technologies that represent these main areas are mapped. The presence of the most well-known and widely used information technologies within the shop can be measured and is therefore quantifiable. A retailer scores points for each of the mapped technologies that are present within their shop. A distinction is made between the presence of online channels (purely web-based) and physical present technology within the shop. In addition to the presence of information technology within the shop, the intensity of use is quantified by using channel integration. Channel integration is defined by Cao & Li (2015) as ''a way to use or employ multiple channels or media''. It includes the collaboration of multiple channels in order to reach the customer, or to improve business management and operations. Zhang (2009) categorised channel integration over different channels and divided the channel integration into five synergies. These synergies are: cross-channel customer communication and promotion, leveraging cross-channel information and marketing research from one channel to improve decisions in other channels, cross-channel price comparisons, digitization, and shared common physical assets and operations.

In Q3 of 2015 a survey was held among approximately 1600 retailers within twenty-five shopping centres. A total of 307 respondents filled in the survey completely. The survey was setup in four parts. The first part of the survey is designed to determine the characteristics of the retailers, their shop and the shopping centre. The second part of the survey is designed to determine the presence of information technology within the shop. The third part of the survey is constructed in order to determine the intensity of use of information technology within the shop. The last part of the survey includes a stated choice experiment. This experiment determines the retailers' preferences regarding information technology possibilities within the shopping centre, by making the retailer choose multiple times between two alternatives that both describe different levels of information technology and the accompanying price, or a 'none of both' option. These alternative IT packages are constructed out of seven different variables, being: Website, social media, an app, information kiosks,

advertisement screens, pickup points and the price of the combination of aforementioned technologies. All the variables have three levels, from basic to advanced. Basic is the least expensive option and advanced being the most expensive option. The combinations of these variables are varied based on an experimental design.

Technology presence and intensity of use within the shop (the dependent variables) were explained by means of a multinomial logistic analysis, with characteristics of the retailers as explanatory variables. For the determination of the preferences of retailers when it comes to information technology within the shopping centre, a latent class MNL analysis is used. This analysis determines the significant variables from the seven different technologies used in the stated choice experiment. In addition, it estimates segments of retailers that show similarities in their preference patterns.

This study found that the presence of online channels and in-shop technology has a strong relationship with the intensity of use. The more information technologies are present within the shop, the higher the intensity of use. The amount of information technology is predicted by different characteristics. There are three important characteristics that predict a high presence of information technology within the shop, namely: the shop is a chain store, the amount of floor space is higher than 600 m^2 and the shop lies within a high streethigh street centre.

Because of the strong relationship between the presence of online channels and in-shop technology and the synergies of channel integration, the above mentioned characteristics also predict how intensive the information technology is used. This means that channel integration can be predicted, which leads to the final stage of the research: predicting the preferences of retailers when it comes to information technology within the shopping centre. In order to predict the retailers' preferences of information technology within the shopping centre, segments are constructed. These segments consist out of retailers with similar preferences. The latent class MNL analysis found two segments of retailers. Retailers with a:

- Traditional preference towards information technology within the shopping centre.
- Progressive preference towards information technology within the shopping centre.

Retailers with the traditional preference indicate that they don't want any more information technology within the shopping centre or at least they don't want to pay for it. The retailers that belong to the progressive segment indicate that they are open to more information technology within the shopping centre and they are willing to pay for possible additional service costs. The traditional preference segment does not want anything to do with extra information technology within the shopping centre. For those retailers, none of the seven presented technologies appeared to be of interest. This is different for the progressive segment. Retailers that belong to this segment find two technologies within the shopping centre important: proper information facilities (e.g. information kiosks) and proper advertisement facilities (e.g. advertisement screens). In addition, the retailers in the progressive segment do not want to use any shopping centre related social media (e.g. Facebook, Twitter or Instagram). For both segments, the traditional segment and the progressive segment, the preference has a direct positive relationship with channel integration. Thus, the intensity of use of information technology within the shop and the retailers' preferences for more information technology within the shopping centre have a positive relationship.

Concluding, the shopping centre investor, manager or owner can, based on this study, predict the preference of the retailers in their shopping centre, when it comes to investing in information technologies. In addition, the shopping centre manager or owner now knows what information technologies are preferred. This makes it possible to form a strategy for each shopping centre for

adding information technologies. After all, based on this study, the shopping centre manager or owner can construct pragmatic, concrete proposals for adding information technology within the shopping centre, based on the preferences of the traditional and progressive segment of retailers. By means of this research, a shopping centre investor can now predict how much support the implementation of new information technologies will get from the tenants. This is crucial for determining the success of the new information technology within the shopping centre, because if the retailers are not willing to use it, the exact functioning cannot be measured. This is considered a waste of money and time.


EAST
SOUTH
WEST


THE SMART SCREEN
FOREVER 21
MALL NETWORK

1. Introduction

The present-day's retail market is subject to change. Although the current consumer confidence (CBS, 2016) and purchasing power (CBP, 2014) are higher than they have been in eight years, Dutch retailers are currently still experiencing difficult times. Vacancy in the retail landscape has grown from 6.9 percent on January the 1st , 2014 to 7.4 percent on January 1st , 2016 (Locatus, 2016).

The problem in the retail landscape is two sided. On the supply side, constant expansion of the shopping areas has led to a saturated market. This resulted in a state of high competition between shopping centres (NRW, 2011). Especially large-scale, suburban, shopping centres and centres of medium-sized cities are becoming less popular for consumers (Locatus, 2016). These locations have difficulties competing with the main shopping streets of the larger cities (Locatus, 2015). In addition, the demand side is characterized by fast changing demographics; urbanization and an aging population (PBL, 2011). This is not necessarily a bad thing, but it does mean that retailers have to adapt fast. Also, consumer behaviour is getting more critically towards purchasing because of the high competition and today's society is increasingly individualizing. The combination of these factors leads to competitive retail environment.

In addition, E-commerce and M-commerce are quickly gaining ground in the retail sector as businesses and consumers discover how to control the new technologies and new ways of working. As a result, internet use is still rising; from 80% in 2013 to 83% of the population in 2014 using the internet for shopping purposes (CBS, 2014). Compared to 2013, the use of mobile phones for shopping purpose raised by 80% to 2.7 million shoppers in 2014 (Twinkle, 2014). The rising consumer expectations and growing use of smart phones and tablets is putting a lot of pressure on retailers to keep up with the altering retail atmosphere. Responding to these developments, numerous retailers are increasingly integrating their channels (Rigby, 2011; Verhoef et al. 2015).

Research regarding the possibilities and influence of these new information technologies and their integration on a retail-consumer level is well represented (Bernstein et al, 2008; Walter et al, 2012; Pantano & Vassione, 2014). However, research concerning the influence of information technologies on the shopping centre level is poorly available. This is almost unimaginable in a time where competition is fierce and internet sales are still growing (CBS, 2014). The shopping centre has to stay relevant, drive growth, boost efficiency and, most important, support their tenants to remain competitive (Fantoni et al, 2014).

1.1 Retail challenges

The retail sector is undergoing a fundamental transition phase, which extends to three factors: People, Economy and Technology (PET) (Rabobank, 2014). 'People' comprises the demographic factors and structural changes in consumer behaviour. The population growth is stagnating and the composition of the population is slowly changing. The population is aging and the amount of single households is increasing (CBS, 2015). A part of the population is moving to the (big) cities, often causing a drain of the smaller villages. Furthermore, the mobility has increased (more cars and better public transport) but consumers will be critical with regard to the use of their cars and public transport. This can increase the competition between retailers, because consumers carefully consider their options on where to go to.

'Economy' is more about the long-term prospects. Rabobank (2014) expects a longer period of time of limited growth. The current risks and uncertainties (unemployment, purchasing power, housing, & pensions) continue. In addition, the Dutch consumer, on average, has a high level of mortgage debts

relative to other countries. The debt to income (DTI) ratios is among the highest in Europe (NVB, 2014). A higher percentage of income will therefore be spent on decreasing these mortgage debts, which could negatively influence consumption.

Technology already had a major impact on consumer behaviour and therefore, on the whole retail sector. One of the biggest changes, caused by technological advancements is the shift of sales in physical stores to online stores. This trend will continue (wwwMetrics, 2015). Consumers will increasingly use advanced technology and such technology is getting increasingly easy to obtain.

1.1.2 Information technology in retailing

So it is clear that the consumers' shopping behaviour has changed in the past decade. Nowadays consumers use a variety of new technologies and Internet enabled devices to orientate and/or shop online. Retailers, on the other hand, are responding to these developments by implementing new online channels and technologies within their shops. The general term of all these online and in-shop technologies is 'information technology'. Retailers are integrating existing and new kinds of information technology within their physical stores such as information kiosks, self-checkout counters and digital price labels. Technological developments will also increase their understanding of the market and consumers, which will even increase the competition between retailers. These new market developments influence the consumers' decision-making process. This decision making process is defined as the 'customer journey'. This journey starts at the need recognition of a consumer and ends when a purchase has been made or with the after sale service (Engel, Blackwell & Miniard, 1995) The customer journey is not limited to only one channel; on the contrary, all the channels of the retailers' strategy (online and offline, multi- or omni channel) are involved.

To make the customer journey across multiple channels as convenient and accessible as possible, the online and offline channels should be integrated. To accomplish this, brick and mortar shops are starting to expand their e-commerce capabilities (e.g. Jumbo & Coolcat). Online retailers are moving in exact the opposite direction; they are opening brick and mortar shops (e.g. Amazon & Cool Blue). Retailers do this in order to achieve the perfect mix between offline/online features, so that retailers can present the most appealing options to their customers. To survive, the retailers are constantly adapting to the changing technological, economic and consumer environment, but the physical environment itself sometimes also has to change in order to stay competitive.

1.1.3 Shopping centre challenges

Shopping centres were one of the most thriving land use, property, and retail business concepts of the twentieth century (Beyard & O'Mara, 1999). These days, shopping centres are, just like the abovementioned retailers, experiencing difficult times. On the one hand, shopping centres are facing the same problems as the entire retail sector. For instance, they are often operating in low growth consumer markets, where retail has become a zero-sum game. In addition, the retailers are under constant pressure because of the changing market, as described in the previous section, which results in a record amount of retailers in 2014 and 2015 who went bankrupt (e.g. Macintosh Group & V&D) (CBS, 2015). This directly affects the vacancy rates within the Dutch shopping centres, especially the smaller and suburban ones. (Locatus, 2014)

On the other hand, both technological and online developments, like the e-commerce and m-commerce revolution, the increasingly higher standards of the consumer, the social media trend and the rapid growth of new technological possibilities are putting the market under pressure. The owners and managers of shopping centres often do not have the strategies that explicitly state how to react to these trends and how to support their tenants in this fast changing environment.

1.2 Problem definition and research questions

The importance of conducting a study about the influence of information technology within Dutch shopping centres is explained in the previous section. Shopping centre investors, managers and/or owners want to know what their role is when it comes to implementing new technologies within the shopping centre. This way, a strategy can be formed that can support their tenants within the shopping centre.

1.2.1 Problem definition

Recent developments in information technology, as well as the upcoming, technological shopping trends, can affect the performance of tenants in the shopping centre. The performance of the shopping centres can be negatively influenced. However, it is not clear what the role of the retail property investors, concerning the recent developments, exactly is. There is no integral solution or strategy available for owners and investors of shopping centres that will anticipate the recent technological developments. Investors and managers of shopping centres are struggling with their role when it comes to anticipating and supporting the technological needs of their tenants.

Measuring the effects of new information technologies in a shopping centre is a complex task. The return on investment (ROI) as well as the increased value for the consumer are not (completely) quantifiable and therefore their direct effects are unclear. The investments in information technology will not be recouped by consumers. Therefore, investments in information technology within the shopping centre must be supported by the tenants. After all, the tenants often must be willing to use the information technology and even possibly pay increased service costs. It is not known what the preferences of tenants are for information technology within the shopping centre and how the shopping centre investor can anticipate them.

1.2.2 Research objectives

The objectives of this research follow the introduction. Concisely, there is a lack of research regarding the shopping centre based retailers preference towards information technology within the shopping centre. In addition, the role of the investor or manager and the implementation of information technology within the shopping centre needs to be clarified. Ultimately, this research leads to a better understanding of the different technological needs of shopping centre based tenants and the role that the investors plays in anticipating these needs. The main objectives are as follows:

- Gain insight in information technologies that can be used in a shopping centre.
- Describe and predict the preferences of different shopping centre based retailers for the use of technology within the shopping centre.
- Explain how the shopping centre investor can anticipate these information technology needs.

1.2.3 Research questions

The main research question is formulated by means of the problem definition. In order to the answer this main research question, four sub-questions are constructed. The main research question is formulated as follows:

‘How can shopping centre investors and managers serve the information technological preferences of retailers within the shopping centre?’

In order to answer this research question, the following sub-questions need to be answered.

- What different kinds of information technologies can be distinguished in a retail environment?
- In what manner can the presence and use of information technology by the retailers be measured?
- What retailer segments can be distinguished taking into account retailers' information technological preferences?
- To what extent are investments in information technology within the shopping centre supported by the different retailer segments?

1.2.4 Research structure

This research uses a quantitative study. The study focuses on the preference of the retailer towards information technology within the shopping centre and the role of the shopping centre investor or manager. The research structure is shown in Figure 1, which shows that each chapter of the study documents a different phase. The first part of the study consists of a literature study conducted on new technologies in the retail sector and channel integration. It defines the theoretical scopes of the research and answers sub question one in chapter 2. The second phase of the study entails the data collection. It starts with the research tool in chapter 3.1, which is followed by the operationalisation of the variables and the data collection in chapter 3.2. The data is displayed and analysed in chapter 4. Chapter 5 forms the last part of the study; it summarizes the results, draws conclusions and discusses managerial implications.

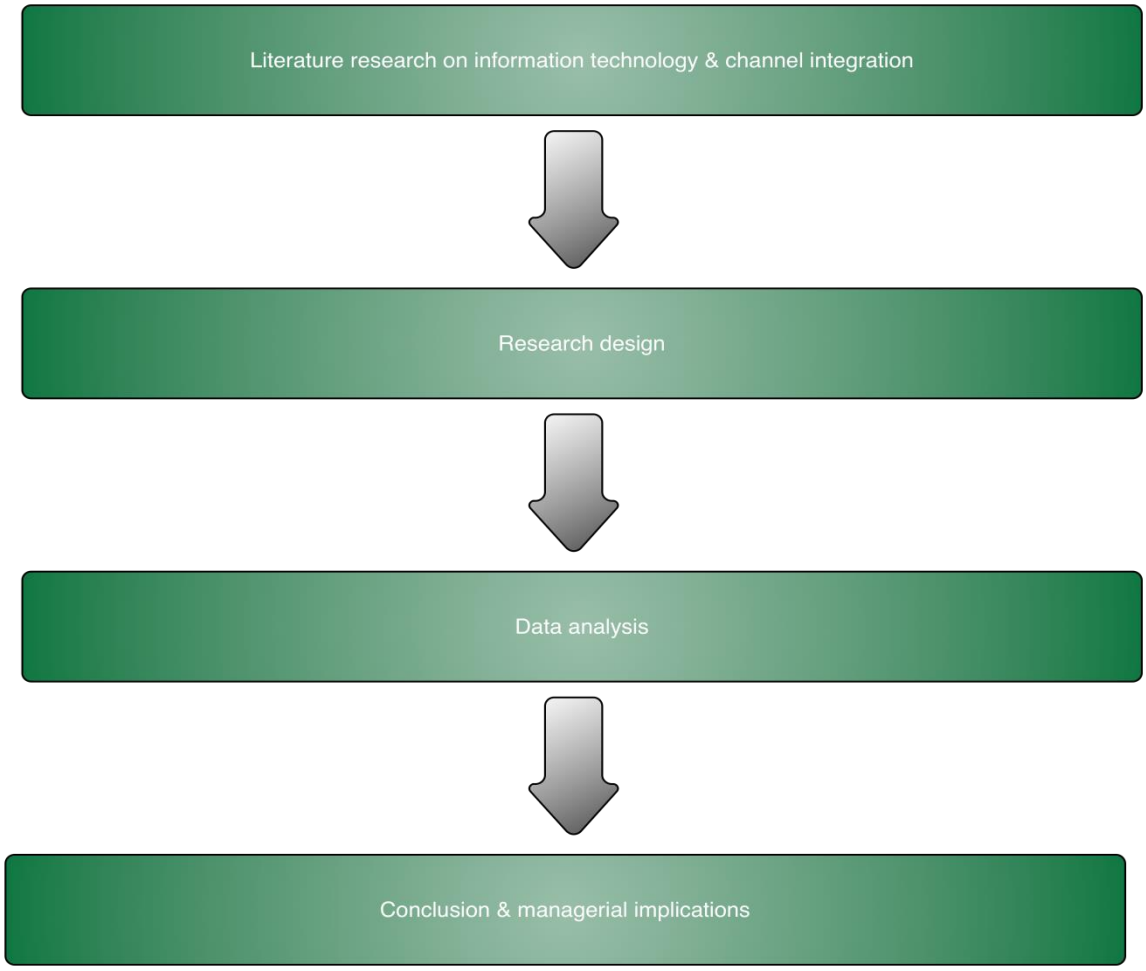

Figure 1: Reading guide

2. Literary research

Information technology in a retail context has no clear definition. For example, the intensity of use and the presence of technology are two completely different things. If a certain shop has a website, it does not have to mean that it is used optimally. Therefore, both the different (new) kinds of information technology in the retail sector and how to use them are discussed in this chapter. New and common used technologies in the retail sector are outlined first in sections 2.1 & 2.2. These sections explain the three main areas that are influenced by (new) technologies in the retail sector. These chapters will not exclude any retail information technology, they are wide in scope. Following, section 2.3 explains how the optimal use of these different information technologies can be realized and what advantages it has for the retailer and the shopping centre. This chapter will give insight in the different kinds of information technologies that can be used by retailers. It narrows the technologies down to the ones that are being used in the study. Chapter 2.4 is the conclusion that answers the first sub question (see section. 1.2.3).

2.1 Retailer technologies

At the present time, retailers are frequently making decisions concerning the implementation of new information technologies in their business strategies (Verhoef et al. 2009). Information technology is a definition that includes all forms of offline (physical) and online technologies, used to generate, store, exchange, and use information in all possible forms. Retailers know that they can gain advantage from the integration of these new online and offline information technologies (Pantano, 2010). They acknowledge that the implementation of new information technologies can enhance firm performance by cost reduction (Grewal et al., 2009) and increase innovation that will lead to increased revenues (Tornhill, 2006) and boost the company's turnover (Koellinger, 2008). In addition, Pantano and Naccarato (2010) state that the competitive market position partly depends on the 'willingness' of the retailers do adopt and use (new) technologies. In contrast to the above-mentioned studies, there are some studies that suggest that there is not enough proof of the benefits of new technologies in the retail sector (Timmor & Rymon, 2007; Gil-Saura et al., 2009; Pantano & Viassone, 2014). In addition, Koellinger (2008) states that innovation by implementing new technologies is not always necessarily associated with higher firm profitability. Setharaman and Parasuraman (2005) support this theorem, by stating that investments in new and innovative technologies not always grant the anticipated returns.

Information technology in retailing can be divided into three main areas: supply chain management, customer satisfaction, and customer management (Renco & Druzijanic, 2014). These three main areas will be discussed in further detail. In addition, the most important and promising technological developments of each area are discussed. Naturally, there are some overlaps between some of the different technologies and their effects on customers.

2.1.1 Supply chain management

Supply chains involve the business activities required to design, produce, distribute and use a product or service. The management of the companies' supply chain activities creates value by maximizing customer value and accomplish a competitive advantage (e.g. efficient consumer response and delivery). On the consumers' side, supply chain management reduces inventory inaccuracy (Power, 2005) and therefore distribution costs and improves the in-store availability of goods (Fleisch & Tellkamp, 2005). This can result in a positive customers experience (Choi et al., 2015). On the retailers' side, supply chain management can increase work efficiency and cut back staff costs, which are the highest operating costs for most retailers (Finne and Sivonen, 2009; Ganesan et al., 2009).

Most of the studies regarding new technologies in supply chain management in a retail environment concern radio frequency identification (RFID), an advanced tagging, product following and categorizing system. Sarac et al. (2009) state that RFID technologies can increase efficiency and speed, improve information accuracy and reduce inventory loss. This is confirmed by Botani et al. (2014), Vlachos (2014) and De Marco et al. (2014). A study done by Wamba (2012) shows that RFID could be used as a facilitator of supply chain integration, to accomplish a higher operational efficiency. In addition, Wong (2012) finds that the RFID system could be used to increase cross channel sales.

2.1.2 Customer satisfaction

Customer satisfaction is an evaluation of the purchase and use of a certain product or service. Attention towards customer satisfaction stems from the influence it has on the customers' intention to repurchase and the retailers' revenue. Researchers have found diverse results concerning new technologies within the retail environment and customer satisfaction. To enhance the customer satisfaction Srinivasan et al. (2002) found that retailers are making greater use of different technologies in both their internal business operations and customer facing business processes. Retail information technology is used to create better service access to the consumer through different channels and to better address consumer demand, which increases consumer satisfaction (Bitner et al., 2002). Nilsson (2007) and Weijters et al. (2007) found that the average customer purchases a higher amount of goods and is more satisfied when using innovative technologies, compared to not using them. In addition Renco & Druzijanic (2014) state that high-tech equipment within the shop leads to customer satisfaction because of higher speed and quality of assistance offered in the shop. Fitzimons & Lehmann (2004) and Reinders et al. (2008) both found that new and innovating technologies in retail also could have negative effects. They state that using new technologies could lead to a negative customer preference towards the store. Ray et al. (2005) indicates that, in spite of the rapid growing use of new technologies in the retail industry, little is known regarding the interaction between retail staff and information technology and their impact on the level of satisfaction of the shopper. A clear image of all the possibilities of the relationship between the customers and the degree of information technology interference is composed by Froehle & Roth (2004) (Fig. 2).

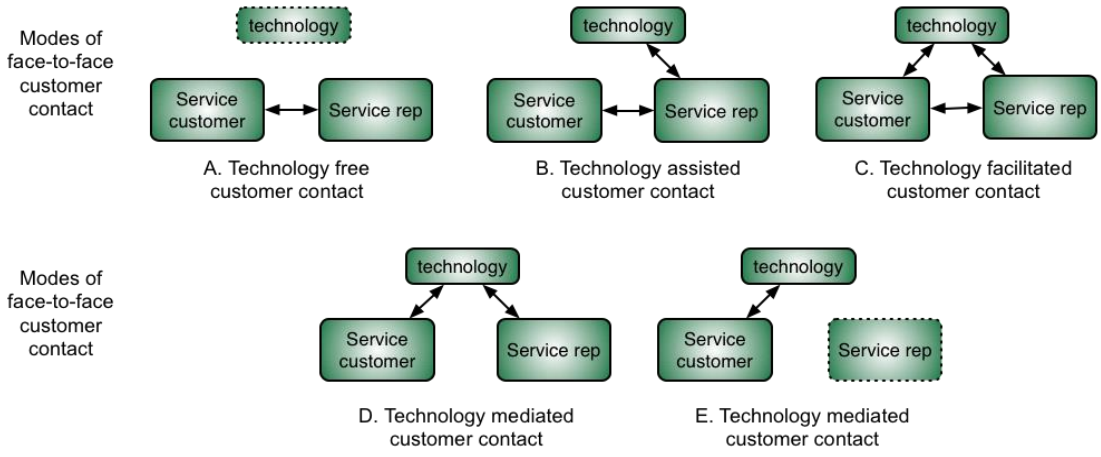

Figure 2. Customer contact and technology. (Froehle & Roth, 2004)

The most studied and widely discussed kind of information technology in retail regarding increasing the satisfaction is the self-serving technology (SST) (Wang, 2012; Chen et al., 2009; Meuter et al., 2003; Lin & Hsieh, 2007). SST is a generic term that stands for all the information technology that makes the sales representative redundant. It is purely an interaction between the customer and 'a screen', categorized as technology generated customer contact (fig. 1E). SST's are used for

automating payments and providing information. SST's regarding the automation of payments are positioned at the point of sale. Patano & Vassione (2014) distinguish three categories in SST's in point of sale: touch screen displays/in-store kiosks, systems for mobile phones (mobile applications: apps), and systems that combine both. Common examples of point of sale SST's are self-checkouts at the grocery store and self-service at the gas station. Providing the customers with information, about the goods, sales etcetera, is mainly done by means of in-store kiosks and advertisement screens (Renko & Druzijanic, 2014). Wang (2012) states that consumer behaviour and customer satisfaction are positively affected by SST's. Chen et al. (2009) found that the perceived usefulness, perceived ease of use, subjective norm, and perceived behavioural control of SST's, all together influence customer satisfaction. Meuter et al. (2003) used a critical incident study to examine the influence of 'technology anxiety' on satisfactory evaluations of SST interactions. In their paper, they found that technology anxiety influenced satisfaction, the intentions to use the SST again and the likelihood of participating in positive evaluation for customers who had an initially satisfying experience. Lin & Hsieh (2007) complement this by mentioning that customer satisfaction with SST's is influenced by the technology readiness of the customer. From a corporate standpoint, Pietro et al. (2015) found that ''self-service technologies influence job performance from the employees' point of view, and are able to increase their satisfaction with benefits for the quality of the final service.''

2.1.3 Customer management

Customer management is a typical all-purpose word. The customer itself is not to be managed. The relationship between the consumer and the brand, retailer and/or, shopping centre can be managed. This is called customer relationship management. Retailers concede that the use of customer relationship management can create customer value, which is the key to increasing the enterprise value (Rogers, 2005). In addition, the customers' experience, when participating in the customer journey can also be managed up to a certain extent, which is called customer experience management.

Customer relationship management

Customer relationship management (CRM) entails all the elements of the entire interaction process that a business has with its clients or customers. CRM can manage a business-customer relationship (B2C), but also business-to-business relationships (B2B). Information that can be collected by a means of a CRM system includes among others: contacts, clients, contract wins and sales leads. CRM systems are currently used to improve customer service, keep hold of current customers and lead to a better understanding about who the customers are. CRM is about gathering customer data about the customers and using it for the good of the company. Therefore, Ryals and Payne (2001) interpret customer relationship management (CRM) as 'information-enabled relationship marketing'. Their interpretation of CRM mainly concerns data analysis (e.g. by counting customers and comparing this to amount of sales) and marketing (e.g. influence of marketing on sales of a certain product/service). In addition, Stone and Woodcock (2001) as cited in Landry et al. (2005) mention "CRM is a term for methodologies, technologies and ecommerce capabilities used by companies to manage customer relationships."

In the past, researchers and practitioners depicted CRM as a self-contained technology instead of taking a more holistic approach. The technology alone cannot lead to successful integration of CRM. Finnegen & Currie (2010), for example, find that CRM consists of four layers: technology, people, culture and process. There are more examples of cases where the implementation of a CRM system went wrong because of the focus on only the technology (Finnegan and Willcocks, 2006). But, due to the nature of this literary study, the focus only lies on the technological aspects of CRM. The technology alone is also called sales force automation (SFA). This technology can be used to execute several CRM strategies. Anderson et al. (2007) found four major categories for determination of these

CRM strategies: marketing purposes, customer data analysis, customer loyalty programs and customer services. The CRM system itself entails the software, hardware and the strategy that stores and processes the collected data. There are several ways to collect this data. The literature concerning CRM systems and SFA, shows growing interest for fingerprint authentication, customer counting and path tracking, interactive kiosks and service delivery, and Web portals and e-tailing (Berman & Evans, 2010; Levy & Weitz, 2012; Walker & Francis, 2010).

Customer Experience Management

In the past decade, the significance of a pleasant experience during the shopping activity increased (Kim, 2001; Kozinets et al., 2002; Bäckström, Johansson, 2006). Retailers acknowledge that better understanding of customers and their experience can enhance customer satisfaction, amount of purchases and, ergo, store performance (Kim and Kim, 2008; Puccinelli et al., 2009). To endure and flourish in the current competitive retail atmosphere, retailers have to improve their customer shopping experience (CSE). CSE refers to the complete customer's interaction with a retail company in every step of the customer journey, which begins with the recognition of need of a consumer and ends when a purchase has been made or with the after sale service. CSE largely overlaps with the customer satisfaction. A bad customer experience can lead to dissatisfaction, where a positive experience can lead to an increased customer satisfaction. The main difference between the shopping experience and customer satisfaction is that experience is being 'experienced' throughout the customer journey, satisfaction is an evaluation of the customer journey, which occurs at the end of the process.

Grewal et al. (2009) developed a model that illustrates the different aspects, which influence customer experience in a retail environment (Fig 3). The model shows that experience is influenced by firm controlled factors and macro factors. Different types of information technology influence both these factors. The literature regarding promotion and information technology mainly focuses on mobile applications (apps), websites and webshops, in-store kiosks, electronic shelf labels, RFID, in-store digital messaging and eye tracking (Renko & Druzijanic, 2014; Grewal et al, 2011). Information technology regarding price experience mostly includes self-services, like self-checkout counters (Verhoef, 2009). Also, price comparison and personalized deals via app or web portals on the customers own internet enabled devices are becoming increasingly important (Liao & Shi, 2009). The influence of information technology on experiences concerning the merchandize itself primarily is about the recommendation systems, evaluation systems and merchandize identification systems (Lo et al., 2010). Information technology that influences the shoppers experience by supply chain management mainly concerns RFID systems (Choi et al., 2015), (chapter 2.1.1). Finally, information technology that impacts the search of a particular location experience is mainly about websites, social media and apps. Popular examples are Google Maps, the retail location finder 'Scoopy' and dedicated retailer websites and apps.

Customer Experience Management (CEM) is an approach to manage customer experiences both on online and offline channels. CEM entails the strategy that centers the processes and operations of a business on the requirements and desires of individual customers. CEM merges the above mentioned firm controlled factors and their associated technologies in a comprehensive strategy (Cherifi, 2015). Customer experience management is often even seen as the successor of customer relationship management. It is the latest step in creating additional value for consumers (Palmer, 2010).

CEM is a comprehensive strategy that has ascended from new technological advances. Instead of passively gathering information regarding the consumer to generate value suggestions as CRM does, CEM actively observes interactions and discloses opportunities. Furthermore, it brings consumer expectations and experiences closer together by actively managing these experiences.

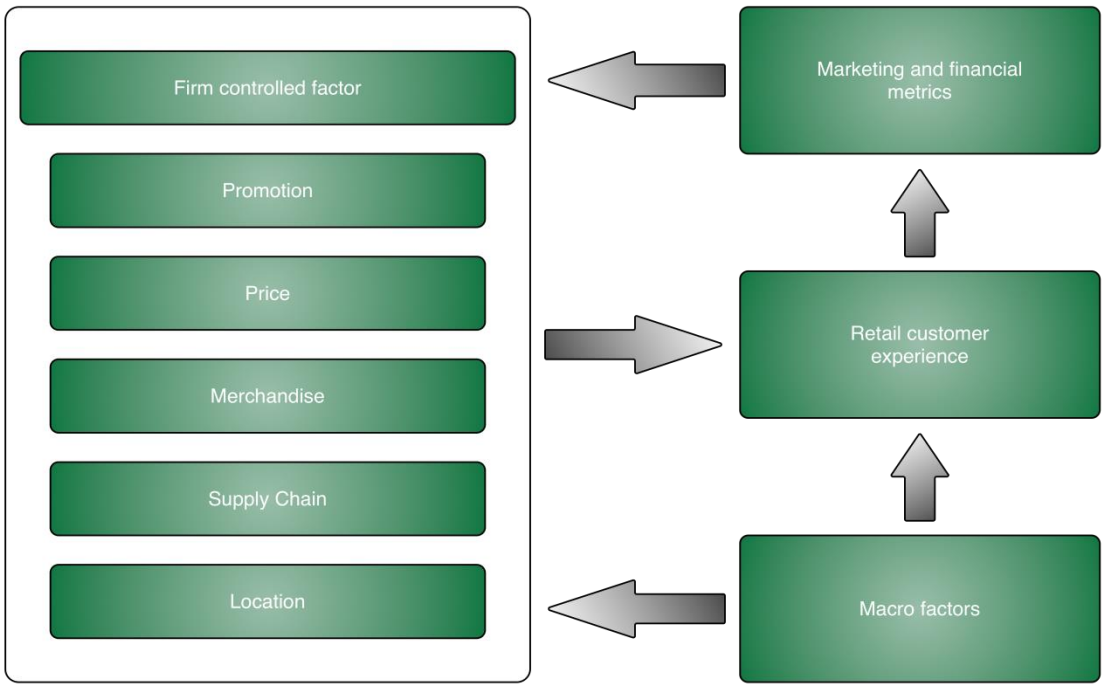

Figure 3: Factors that influence retail customer experience (Grewal et al., 2009)

2.2 Shopping centre technology

Technological advancements are not bound to the retailer and their shops, on the contrary, they are integrated within the modern shopping centre, whether noticeable or not. A study done by Clodfelter and Overstreet (1995) distinguishes nine different general elements of technology within the shopping centre, namely, customer tracking and database marketing, entertainment and visual merchandising, information and shopping assistance, direct broadcast satellite technology, communications and data sharing, energy management, security, (online) services and resource conservation/recycling.

The above mentioned elements are not yet discussed in a pragmatic technological context, so will be put in a more general manner. Database marketing is mainly about customer counting and customer tracking. The modern technology uses Wi-Fi and camera's to track every move of the customer, including the time spent and shops visited within the shopping centre (Bensinger & Dwoskin, 2013). Technology regarding entertainment and visual merchandising mostly consists of (large) advertisement screens. Yue et al (2014) mention the benefits of (large) advertisement screens in society. They emphasize the need of good content to increase engagement. Information and shopping assistance has a slight overlap with the entertainment and visual merchandising. A technology that serves both, is the information/advertisement kiosk, which can be used for both entertainment and informative purposes. In their study about the new generation of kiosks, Slack & Rowley (2001) conclude: "The stage is set for kiosks to make a significant contribution in e-business, and to the use of IT in service delivery in traditional retailing and other service environments". In addition, a website, app and social media could also be used for entertainment, visual merchandising, information provision and shopping assistance. Direct broadcast satellite technology, nowadays, is a common used tool and will not be included in the research. Communication and data sharing technologies are

almost the same as the in-shop versions, namely CRM and CEM systems. Technology for energy management mainly includes 'measuring and responding'. Different kinds of sensors can measure the intensity of light, temperature, movement, air humidity etc. Subsequently, the technology which regulates these systems will adapt to the circumstances. In addition, new more energy friendly technologies as thermal energy storage and LED lights can save money and energy. This study will not include energy management for it has no use in promoting the brand/shop or making sales. New security technology mostly consists of motion sensors and alarms. (Online) services are one of the greatest stumbling blocks of shopping centres. Therefore, this study includes pickup points. Customers can order online and pick the ordered item up at the shopping centre, which could generate increased traffic. Pickup points are not directly an information technology, but are a collection of different technologies. Pickup points are the answer to home delivery (Morganti et al., 2015), which is cost and time intensive and therefore less efficient (Song et al., 2009). Resource conservation and recycling includes the use of sustainable building materials, which is excluded because of the focus of this thesis.

2.3 Channel integration

Increasing the amount of orientation and sales channels generates new opportunities, but also brings a variety of complications for retailers that have to control their various channels properly to avoid channel cannibalization and ultimately accomplish synergy between all the channels (Verhoef, 2012). Zhang et al. (2010) states that either channel cannibalization or the opposite; channel synergy depends on the retailers' aptitude to combine the multiple channels. Therefore, channel integration, which entails strategy formulation regarding how to merge the multiple (online and offline) channels to create synergy between these channels, is an important subject for the retailer (Berry et al., 2010; Verhoef, 2012; Zhang et al., 2010; Avery et al., 2012). A certain degree of channel integration can lead to a certain degree of 'channel shopping'. This can mean multi-channel shopping (Yan et al., 2010; Herhausen et al., 2015), cross channel shopping (Lee & Kim, 2010) and ultimately omni-channel shopping (Verhoef et al., 2015). Research regarding the precise effects of channel integration is limited. In addition, detailed associated technological implementations are not properly defined. There are different interpretations and definitions of channel integration, defining it is therefore the logical first step.

2.3.1 Defining channel integration

As a result of the rising popularity of the subject, numerous efforts have been done to elucidate what channel integration exactly stands for and what it means for the retailers. Regardless of the lack of a standard definition, previous research studies have decomposed the term and identified its fundamental aspects. At first, a decent definition for the phenomenon has to be formulated. Channel integration is defined by Cao & Li (2015) as ''a way to use or employ multiple channels or media'' and as ''the use of more than one channel or medium" by Stone et al. (2002). Both definitions are very general and both have to be specified to gain a full understanding of channel integration. Goersch (2002) formulates channel integration as "employment of web sites and physical storefronts possibly in addition to other channels". The most comperhansive definition is from Payne & Frow (2004) they state that channel integration consists of "utilizing the full range of commercially available channels".

Channel integration specifies two different perspectives: customer and firm focused. Customer focused perspectives emphasizes that channel integration must be extremely customer-oriented (Schramm-Klein & Morschett 2006). Channel integration has to be used as customer management (Stone et al., 2002) and present the customers with benefits (Gulati and Garino, 2000), like improved satisfaction (Grewal et al., 2003) and a more positive shopping experience (King et al., 2004). Firm focused perspectives on the other hand, concentrate on enhancing the business performance like stimulating synergy between channels (Zang, 2010), contribute to economies of scale (Neslin et al.

2006), and eventually improving the firms' revenue and profitability (Steinfield et al., 2002).

The use of multiple channels can be approached in two different ways; broad or narrow. The narrow use of multiple channels is characterized by simultaneous and consistent corporation between the channels (Goersch, 2002). For example, this includes homogenous offerings across all different channels (Cao & Li, 2015). The organization and distribution of information and actions across the different channels is managed by a single entity (Coelho & Easingwood, 2003). Therefore, the narrow approach is typified as an integral system. In contrast to the narrow approach, the broad approach does not necessarily need the channels to be synchronized (Berger et al. 2002) or consistent (Stone et al., 2002). The broad approach holds on to the distinct characteristics and uniqueness of each separate channel. In practice, retailers are never found on each end of the spectrum. Most retailers determine the degree of synchronization and consistency for each retail mix instrument across the different channels. Synergy across channels is studied and categorized by Zhang et al. (2010). The study shows that there are five major types of synergy across different channels:

1. *Cross-channel customer communication and promotion.* Synergy between channels is achieved by using one channel to promote another. For example, when a commercial on TV shows the advantages of downloading the retailers app, or of visiting their website.

2. *Leveraging cross-channel information and marketing research from one channel to improve decisions in other channels.* Multichannel retailers nowadays are collecting as much data about their customers as possible. Using one channel to collect data, for instance a rise in online views of a specific product means that the product is becoming more popular; the offline shop can adjust the procurement policy for the specific product.

3. *Cross-channel price comparisons.* Using online channels and apps to provide the consumer with price references can result in better-informed customers, which make quicker decisions and can uplift their purchase intentions in the offline shop.

4. *Digitization.* The digitalization of products like user manuals, warranty documents, online bills, and registrations using online channels can reduce costs on all channels.

5. *Shared common physical assets and operations.* Distribution of fixed expenses across channels creates synergies, economies of scale and scope. For example, when a retailer builds an online database for accurate price comparison, naturally, the customers can use it, but the retailer can use it as well for its pricing strategies and marketing purposes.

2.3.2 Channel integration by means of new technologies

As explained in the previous section, synergy between channels is an important part of channel integration. The advantages of synergy between the different channels can only be achieved when the retailer is active and thus, is using, different channels (e.g. physical store, website and app). This is called a 'click and brick' or 'click and mortar' retailer. Theorems on competitive advantage lay emphasis on the important role of information technology in achieving these synergies (Steinfield et al., 2003). The different kinds of technology in the retail environment as well as the different synergies that represent channel integration have been discussed in the preceding sections. This section combines the two, displaying the effects of the different kinds of technology on the synergies that define channel integration.

Within the frameworks of channel integration, table 1 and table 2 show the possibilities of information technology use within the store and shopping centre. Appendix I displays the technologies and the authors that mention them. The newest and most innovative technologies are not mentioned for the purpose of keeping the study intelligible for both the retailers and the shopping centre managers; if both the parties are not at least a bit familiar with the technology, the questionnaire could be not properly understood. This can result in flaws in the collected data. Both the tables show the channel integration synergies on the left side and the corresponding technologies on the right side. The information technologies can be online or in-shop (physical). By means of these technologies, the presence of information technology within the shop is measured.

Table 1 shows six different in-shopping centre information technologies, spread over the five synergies of channel integration. If the information technology does not contribute to one of the five synergies of channel integration, it is excluded. *Cross-channel customer communication and promotion* is comprised of online information technology in the form of websites, apps and social media. In addition, advertising can also be done by means of advertisement screens and kiosks. *Leveraging information and marketing research,* is accomplished mostly online these days, just like *Cross channel price comparisons.* Digitalisation to reduce costs can be accomplished by using screens to inform and advertise instead of information points and printed advertisement

Table 1: Shopping centre synergies

Synergy	**Technology**
Cross-channel customer communication and promotion.	Mobile application Website Social media Interactive Kiosk Advertisement screens
Leveraging cross-channel information and marketing research from one channel to improve decisions in other channels.	Mobile application Website Social media Consumer counting
Cross-channel price comparisons.	Mobile application Website
Digitization to reduce costs.	Mobile application Website Advertisement screens
Shared common physical assets and operations.	Mobile application Website Pickup point

Table 2 shows ten different in-store information technologies, spread over the five synergies of channel integration. *Cross-channel customer communication and promotion* is enhanced by seven different technologies. These seven information technologies consist of online channels and if applicable, the accompanying hardware (e.g. touchscreens). They are all suited for communication

and promotion between the shop or brand and the potential customers. The second synergy *leveraging cross-channel information and marketing research from one channel to improve decisions in other channels* is, just like the first synergy, enhanced by seven different technologies. The digital information technologies are also present in this synergy, but use different hardware for the purpose of collecting customer data. The third synergy *Cross-channel price comparison is*, except for the in-store kiosk, all in the online environment. *Digitization to reduce costs* is comprised of digital information technologies that, for instance, can supply digital newsletters. The synergy also consists of hardware that eases the business operations and therefore saves money. The last in-store synergy mainly uses a combination of the online environment and the hardware to *share common physical assets and operations.*

Table 2: Shop synergies

Synergy	**Technology**
Cross-channel customer communication and promotion.	Mobile application Website Web store Social media Interactive Kiosk RFID labels Self-checkout counters
Leveraging cross-channel information and marketing research from one channel to improve decisions in other channels.	Mobile application Website Web store Social media Interactive kiosk Consumer counting Monitoring walkways Loyalty programs
Cross-channel price comparisons.	Mobile application Website Web store Information kiosk
Digitization to reduce costs.	Mobile application Website RFID labels CRM System Electronic shelf labels
Shared common physical assets and operations.	Mobile application Website RFID Self-checkout counters Self-service technology CRM System Web store

2.4 Conclusion

In this literature study, insight is gained in the concepts channel integration and the different information technologies available. The goal of the literature study was to find out what different kinds of information technogies can be distinguished in a retail environment.

Information technology is first divided into technologies that are contained in the shop environment and technologies that are contained in the shopping centre environment. Technologies within the shops' environment are divided by their purpose. The three purposes are supply chain management, customer satisfaction and customer management. These three purposes all have their own associated technologies as well as technologies that serve multiple of those aforementioned three purposes. The most common, well-accepted and widely used technologies are included into this research. The information technologies can be operating purely online or in-shop. Operating online means that the information technology is completely web-based. Operating in-shop means that the information technology can have an online environment but is also physically present in the shop.

Information technology within the shopping centre environment is divided into nine purpose based categories. This study includes five of them, being: customer tracking and database marketing, entertainment and visual merchandising, information and shopping assistance, communications and data sharing, and (online) services. Three of the categories were not included into the research because of the scope of this thesis. The information technology must be accessible for retailers and must be beneficial to the brand and/or shop. Energy management and security are necessary, but do not contribute to the above mentioned goal, as well as recource management and recycling. Direct broadcast satellite technology is standard and therefore not included. The information technology is divided into in-shopping centre and online environment. The online environment of a shopping centre is about the shopping centre, but also about all the shops in it. For instance, a website that gives information about the shopping centre and about the retailers that are based in the shopping centre. The (physical) in-shopping centre technology also benefits the shops that are located within that shopping centre. For instance, retailers have the chance to advertise their shop/brand/product or service on kiosks or large screens to attemt to attract potential customers.

3. Research design & Execution

The purpose of the data collection is to answer the following research question: 'How can shopping centre investors optimally serve the information technological needs of retailers within the shopping centre?' Therefore, this research is designed to find out what the retailers prefer in terms of information technologies within the shopping centre. The previous chapter explains the different information technologies. These technologies are classified by means of the five synergies of channel integration. The technologies form the different options, on which the retailers' preferences are formed. First, the retailers' in-shop information technology presence and use are measured. Next, a stated choice experiment is used to find out the aforementioned retailers preferences for information technology within the shopping centre. Using these preferences, the study forms segments that clarify and connect the retailers and shopping centre characteristics and their preferences. The research question and sub questions mentioned in chapter 1.2.3 provided the basis to accomplish this. This chapter shows the way the data is collected in order to answer these research questions.

3.1 Research Tool

The data collection tool is custom made for this research. It is an important element of this research, because the data collected from the retailers depends on its proper and clear design, easy to understand questioning and content. The data is collected by means of an online questionnaire. Appendix II shows the first part of the questionnaire, Appendix III shows the second part. The key challenge for this study was the operationalization of the variables that define the use of technology within the shopping centre and constructing them in such a way that the variables are measurable and could be easily and clearly understood by the retailers.

3.2 Type of data

The online questionnaire is subdivided in four parts, being: retailer, shop and shopping centre characteristics, presence of in-shop information technology, current and future use of channel integration and future use of in-shopping centre information technology. First, the characteristics of the retailer, shop and shopping centre are registered. Second, the retailers' current and future in-store information technology needs are mapped. To do so, different options about the use of in-store online promotional and sales channels as well the use of in-store technology are presented to the retailers. These are extracted from table 1. Third; the use of channel integration is mapped. This is measured by questioning the retailer about the five synergies of channel integration, as described in chapter 2.3.1. The last part of the questionnaire consists of a stated choice analysis, with questions concerning the future use of information technology within the shopping centre, which is extracted from table 2.

The questionnaire uses three different types of questions. The first two parts of the questionnaire consist of multiple choice questions and 5-point scale questions. With every question, a short description is given. The third part of the questionnaire consists of a stated choice experiment. This is a statistical method where retailers have to make a trade-off between two alternatives consisting of information technology packages within the shopping centre and the associated price. The retailer has to indicate which option is preferred, or choose none of the two options. By doing this multiple times, preferences concerning in-shopping centre information technology of different retailers can be measured. Appendix III, IV and V display an example, the levels and attributes and the design.

3.2.1 Retailers' characteristics

In order to find out if certain characteristics of the shop managers/owners can predict the presence and use of information technology, two characteristics of retailers are included in this study. The two characteristics are age and gender. Age will be divided into five different age groups. The youngest ages are represented by '25 and younger' and the groups increase by 10 years until 56 and older is reached. Gender is a dichotomous variable where 'male' or 'female' are the only two options.

3.2.2 Shop characteristics

This study includes three shop characteristics, namely: type of branch, whether the shop is a chain store or not and amount of floor space. Type of branch is divided into five categories, according to Locatus (Locatus, 2013). These categories are: daily (supermarkets and drugstores), fashion/luxury (clothes, shoes and jewellery), leisure (products for leisure activities and education) home furniture and appliance (everything for in and around the house) and remaining (hospitality- & service industry). The floor space is divided into five categories, which start with 50 or less square meter and end with 600 square meter and more. This also makes it easier for the respondents to make a proper estimation of the total surface area of their shop.

3.2.3 Shopping centre characteristics

All shopping centres have their own catchment area and function within the country, city or neighbourhood. Different shopping centres accommodate different retailers and thus various branch combinations. In order to study the preferences of retailers within different shopping centres, shopping centres are divided based on the characteristics size and position within a city or village. This study distinguishes three different types of shopping centres, located in fun shopping area's with a focus on non-daily shopping, according the definitions of the real estate investor CBRE Global Investors.

Table 3: shopping center types

Property category	Description	GLA
Sub-regional shopping center	A shopping center typically incorporating a full line discount department store, a supermarket and approximately 40 to 100 specialty stores (e.g. 't Loo, Heiloo; Geesterduin, Castricum)	10,000 m² to 30,000 m²
Regional shopping center	A shopping center typically incorporating one full line department store, in most cases a full line discount department store and one or more supermarkets and between 100 and 200 specialty stores (e.g. Woensel XL, Eindhoven)	30,000 m² to 85,000 m²
High street center	A collection of retail premises within an arcade or mall development owned by one party and operated and promoted as one entity within a major central business district. The center is generally dominated by specialty stores, likely to have a frontage to a pedestrian strip or major CBD road, generally do not include a supermarket and often co-exist with a large department store (e.g. Heuvelgalerie, Eindhoven)	Exceeds 1,000 m²

3.2.4 Information technology presence

The information technology presence is divided into two different subjects; the online channels and the in-shop technologies. The questionnaire is designed to determine the amount of information technologies, as found in the literature. First, the presence of online channels is measured by the use of:

- Website;
- Web shop;
- Social media;
- App.

As found in the literature, the presence of information technology within the shop is being measured by the use of technology in order to:

- Count customers;
- Map pathways;
- Enhance product information (e.g. smart labelling);
- Provide product/branch/shop/general information (e.g. in shop kiosk);
- Display prices (e.g. digital shelf labels);
- Automate checkouts (e.g. self-checkout counters);
- Maintain customer relations (e.g. CRM system);
- Reward customer loyalty (e.g. loyalty card).

In addition, the retailers' preferences regarding technologies are mapped. This is accomplished by asking questions about the future use of information technologies within the shop. The above mentioned information technologies (both online and hardware) are displayed again, but the purpose of the question is now altered to find out if the retailers want to start using the information technologies within two years. An indication of the price of the investment is added to the information technologies, to ensure that the retailer is aware of the costs that accompany the acquisition/upkeep of the technology.

3.2.5 Information technology use

Channel integration consists of five major synergies, chapter 2.3.1 explains these synergies. The synergies explicate the combined use of different online and offline in-shop technologies (chapter 2.3.2). Therefore, channel integration indicates the intensity of the retailers' use of technology within the shop. Channel integration is measured by the use of:

- Different channels to promote each other;
- The data that is being collected with one channel to improve another channel;
- Different channels to compare prices and inform consumers;
- Digitalization to reduce costs;
- Distribute expenses across different channels to create synergy.

The possible answers are predefined and designed to measure if the retailer is currently using; is planning to use; cannot afford; does not have the expertise or does not see the added value of the channel integration synergy.

3.2.6 In-shopping centre future information technology use

The last part of the questionnaire consists out of a stated choice experiment. This experiment proposes, per question, two predefined infromation technology packages, consisting out of all the below mentioned shopping centre technologies and the extra option 'none of both'. Per question, the respondent has to choose one of the three options. These individual packages have certain levels of shopping centre technologies. The questionnaire combines the variables on three levels (basic or none, medium and advanced). For instance, information technology package 1 contains a basic level website and package 2 contains an advanced level website, and so on for all the in table 4 mentioned shopping centre technologies.

The more advanced the option, the higher the price in euros per month. Also, extra costs or a discount can be applicable. The information technologies and their levels are combined nine times in a row. This way, the preference for one or a certain combination of information technologies can be determined. The packages consist of the following attributes and their levels:

Table 4: Stated choice levels

Shopping centre Technology	**Level**
Website:	*Informative (basic);* *Informative + Advertisement space (medium)* *Informative + Advertisement space + customer stats (advanced)*
App:	*None* *Informative (basic)* *Informative + Advertisement space + customer stats (advanced)*
Social media:	*None* *Maintained by shopkeepers' association (basic)* *Maintained by SC manager(advanced)*
Information Kiosks:	Information Kiosks*: purely for SC info (basic)* Information Kiosks*: info and adverts in one kiosk(medium)* Information Kiosks: *info and adverts, separate kiosks (advanced)*
Advertisement screens (Screen time)	*1 time every 15 min. (basic)* *3 times every 15 min. (medium)* *3 times every 10 min. (advanced)*
Pickup points:	*None* *pickup point; only for SC based shops (basic)* *Pickup point, web shops included (e.g. Bol.com)(advanced)*
Discount/additional costs	*None* *10% extra costs* *10% discount*
Costs:	*Depend on composition of the above mentioned levels*

The attributes-levels are combined systematically with the use of a fractional orthogonal experimental design. This allows the independent estimation of the influence of each of the attributes and their levels on the preferences of the retailers. Eighteen different alternatives, all consisting of seven variables, were formed. After the alternatives were formed, a random number generator was

used to create five different versions of the questionnaire. This way, favorability for a certain alternative, because of an 'easy to pick combination' (e.g. a high priced alternative versus the least expensive one) is limited. Appendix III shows an example. Furthermore, the three different levels all have a different pricetag, which is displayed in appendix IV. Appendix V shows the design.

3.3 Data collection

The data is collected from a large number of individual retailers in order to gain insight in their technology use and needs. The respondents are all shop managers, marketing managers, technology managers or shop owners. Regular employees or assistant managers are not qualified to answer the questions, because of their low influence and/or knowledge of the business management. The questionnaire is taken in person in several shopping centers in addition to an online questionnaire. The online questionnaire has been sent to both the shop managers and the business management of chain stores.

Data is collected from shops that are located in sub-regional, regional and high street and other shopping centres within the Netherlands. The locations of the centres are displayed in Appendix VI. The appendix also displays a list of all the shopping centres and amount of respondents per shopping centre.

It was possible to perform the questionnaire in person, because of the static shop environment. There would be no difference between the respondent answering at home behind their computer, or from within the shop itself. However, there is one difference between the online questionnaire and the in person questionnaire. The interviewer is able to support the respondent, when, for example, the retailer asks for advice regarding a certain question. This is the reason that the interviewers were not allowed to support the retailer in any manner.

Most of the shopping centre based retailers were contacted by means of an email. This email contained a link to the questionnaire. The email addresses were collected by consulting the websites of the shopping centres. In addition, the retailers were contacted by the research company USP, which executes the CBRE Global Investors retailers' satisfaction study. The data has been collected between August 5th 2015 and October 5th, 2015. A total of 1.500 retailers was approached between the aforementioned dates.

3.4 Conclusion

In order to properly measure the presence and use of information technology by retailers and their preferences for information technology within the shopping centre, a questionnaire is designed (appendix II). The questionnaire is used to collect information on different topics:

- Characteristics (personal & shop) of the retailer
- In-shop information technology presence (online & in-shop)
- In-shop information technology use (channel integration synergies)
- In-shopping centre information technology needs (online & in-shopping centre)

Second, questions are asked regarding the presence of information technology within the retailers' stores. The questions focus only on the amount of different information technologies, not whether and how intensely they are being used. The subject of the questions is solely regarding the amounts of online channels and in-shop technologies in order to find out if they are present. Hereby, retailers could state if they have a certain online channel for brand/shop promotion or product/service sales purposes.

Third, the questionnaire focusses on how intensely the channels are being used. This is performed by using the five synergies of channel integration (Zhang et al, 2010), which can be found in chapter 2. In the questionnaire, the retailers can indicate if they recognise these synergies in their business operations/management and use these synergies for the benefit of their own shop. The synergies are therefore accompanied by clear examples to make them more intelligible.

Finally, the questionnaire uses a stated choice experiment to measure the preferences of retailers when it comes to implementing information technology within the shopping centre. Hereby, two alternative IT packages are presented that both are constructed out of seven variables. Each variable can differ between three levels. In addition, a third option that states 'none of the options' is added. Retailers have to choose the most preferred option. The choice between the two different IT packages is presented nine times in order to find patterns within the answers. This way preferences for certain variables or combination of variables are determined. This is the basis of the segmentation.

The presence of the online and in-shop information technologies can be quantified. It is not possible to count all the technologies that are present in a shop, but it is possible to set a standard. The technologies, mentioned in tables 2 & 3 are used as standard in order to measure the amount of information technologies present. This quantification functions as a score, the more information technology is present in a shop, the higher the score. This is done for both online and in-shop technologies, chapter 3 explains the accompanying variables.

Just measuring the presence of certain information technologies within a shop does not provide a complete image. The way that the retailers use their information technologies is measured as well. This is where channel integration is used. The five synergies of channel integration quantify the intensity of use of the information technologies. This is why the different technologies are linked to the five synergies of channel integration (tables 2 & 3), this way the effects can be measured in terms of these synergies. Technologies that have nothing to do with these channel integration synergies contribute nothing to the intensity of use of multiple channels and are therefore excluded from this research.

4. Analysis & results

This chapter displays, analyses, and implements the result of the data collection, described in the previous chapter. The chapter starts with the data overview: a descriptive section, which displays the respondents', shop- and shopping centre characteristics. It clarifies the types of respondents and displays the different distributions of frequencies. The following section (4.2) elucidates the manners of data analyses. It explains the methods that will be used in this study and divides the analyses into two parts. The first part is the in-shop, online and channel integration part, which displays the presence and use of information technology within the shop. The second part includes the retailers' information technology needs within the shopping centre. The subsequent section (4.3) is about analysing the data to answer which differences can be distinguished between retailers, taking into account their current channel use.

Section 4.4 & section 4.5 will describe what segments can be distinguished for retailers taking into account retailers' information technological preferences. In addition, the sections clearify what investments in information technology within the shopping centre are supported by the different retailer segments.

4.1 The data

The data, collected by the questionnaire described in chapter 3, is analysed by a number of statistical methods. The descriptive analysis will give insight into the data and helps to straightforwardly understand the data. First, bar charts regarding the respondents are shown, followed by shops and shopping centres. This will clarify the distribution of the data used for further analysis.

In total, approximately 1.200 emails have been extracted from shopping centre websites, 150 email addresses from the USP retailers satisfaction study and 150 retailers have been contacted in person. The total survey population existed of 1.500 retailers. Out of this, a sample of 570 retailers filled in the questionnaire from which 320 respondents filled in the questionnaire completely. Only the questionnaires that are filled in completely are used for this study. Lastly, 12 more retailers were excluded from the dataset because they represented a group which was too small to be representative. For the precise amounts, appendix VII, tables I through VII shows the frequency tables of the descriptive section.

Gender & Age

The figures 4 & 5 display the gender and age of the respondents. No regular employees were questioned. The data includes shop managers, owners and technology/marketing managers. The chart shows that gender, compared to all the retailers in the Netherlands (Kenniscentrum Handel, 2013) is divided almost at a 50/50% rate.

Figure 4: Gender compared to the whole retail sector (Kenniscentrum Handel, 2013)

The discrete variable 'age' is divided into five groups, which transforms it into an ordinal variable. The first two age groups differ respectively 30% and 25%.This is because of the fact that only managers are questioned but this is the total retail population, not only managers. People with an age below 30 are less likely to be a shop manager. This explains the difference between the first two age classes. Also, people older than 56, still working in a shop, are expected to appear less frequent, because of retirement and the Dutch population composition (CBS, 2015). Figure 5 shows the comparison.

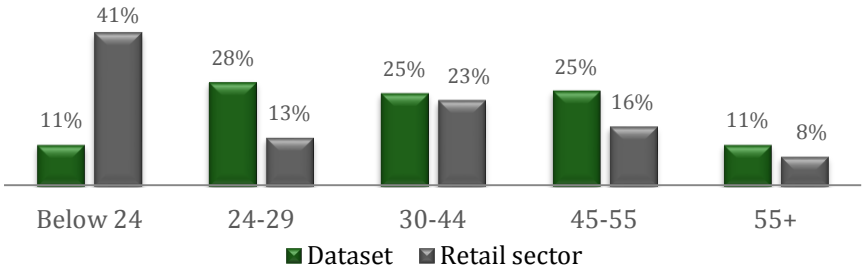

Figure 5: Age compared to the whole retail sector (Kenniscentrum Handel, 2013)

Branch

The nominal variable branch is divided into five groups, according the Locatus classification and shown in figure 6. There are more detailed classifications available, but for the purpose of this research, forming fewer groups as possible, while the groups are still clearly distinguishable is preferred. The presence of branches in the dataset is compared to the presence of branches within shopping centres within the Netherlands of the same type. The comparison with the Netherlands (Locatus, 2015) shows no large deviations.

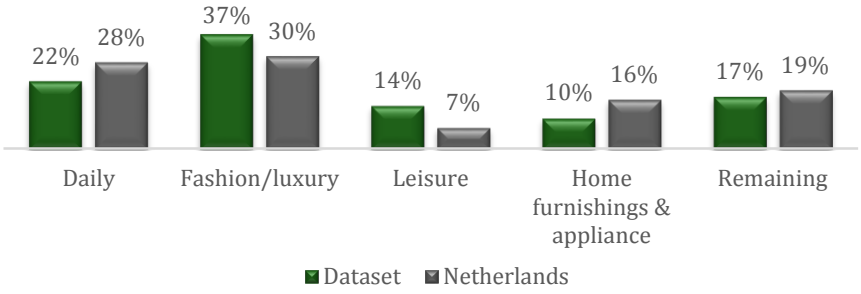

Figure 6: Branches compared to the Netherlands (Locatus, 2015)

Chain stores

This segment shows the amount of chain stores, compared to the Locatus (2015) database. The amount of chain stores is measured using the number of sales points, not retail floor space. Figure 7 shows that the dataset differs 32% from the Locatus data, when it comes to the amount of chain stores in high street centre shopping centres. This is not relevant for answering the research questions.

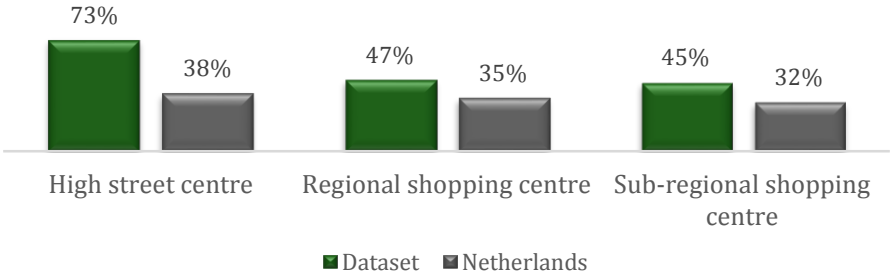

Figure 7: Shopping centres compared to the Netherlands (Locatus, 2015)

Shop Size

The average shop sizes (m^2) are compared to the Locatus database (2015) and shown in figure 8. There are no large deviations visible compared to the shops in the three categories Dutch shopping centres of the same classification.

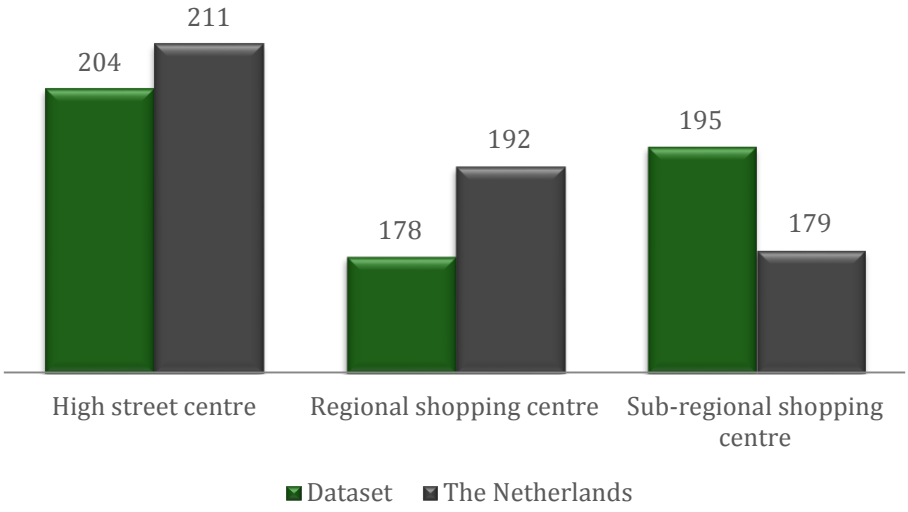

Figure 8: Shop sizes compared to the Netherlands (Locatus, 2015)

Shopping centre types

The dispersion of the retailers based in different shopping centres is not uniform. Figure 9 shows that retailers, based in sub-regional centres, are questioned 110 times versus 78 times for regional centres and 120 times high street centres.

Figure 9: Shopping centre types

4.2 Analysis method

This data will be analysed concerning the presence of online channels and in-shop information technology. Subsequently, online channel presence and in-shop information technology presence are compared to the degree of channel integration, which is a variable for the intensity of online channel and in-shop information technology use. These analyses form the first part of this study and are disclosed in section 4.2.1. The second part of this study consists of an analysis of the retailers preferences, which will, eventually lead to a segmentation of retailers, this is disclosed in chapter 4.2.2.

4.2.1 Logistic regression

For this part of the study, it is required to find out if certain variables are able to explain the value of another variable. This is conducted between the retailers, shop and shopping centre characteristics on the one hand and the online and in-shop information technology score on the other hand.

To understand the relationship between two variables, logistic regression is used. Logistic regression is a statistical analysis technique and is used when the dependent variable is categorical (nominal or ordinal). In this case the dependent variable has more than two discrete outcomes, so multinomial logistic regression is used. In this study, the dependent variable can take three values (Y=1, Y=2, Y=3) To calculate the probability of Y=*i*, which is defined as $P(y = i)$ the following equation for multinomial logistic regression is used:

$$P(y = i) = \frac{e^{g_i}}{e^{g_1} + e^{g_2} + e^{g_3}} \quad (1)$$

$P(y = i)$ stands for the chance of y=*i* occurring. The e in the formula is a mathematical constant; it is the base number of the natural logarithm and is roughly equal to 2.718. The g-component is the outcome of the following equation:

$$g_i = \beta_{i0} + \beta_{i1}x_1 + \beta_{i2}x_2 \ldots + \beta_{in}x_n + \varepsilon \quad (2)$$

And is the functional value for Y being equal to *i*. The larger its value, the higher the probability the score of Y will be equal to *i*. This value is set equal to 0.0 for one of the Y-categories, also called the base or reference category (*y-ref*). The functional values for the other categories are estimated relative to this base-value. In the case Y can take 3 values, the natural logarithm of the odds are equal to:

$$\ln\left(\frac{P(y=i)}{P(y=ref)}\right) = g_i; \;\; i = 1,2 \quad (3)$$

The x_n is the independent variable (e.g. amount of floor space), the β values are the regression weights associated with these variables and β_{i0} is the intercept for the i*th* category. In this formula, ε is the residual expression.

The independent variables are entered in a forward stepwise manner. This way, variables that have no significant relationship with the dependent variable (sig lower than 0.05 with a coincidence interval of 95%), are left out of the model, only the significant variables are entered. In addition, linear regression is performed on the x-variables to rule out multicollinearity. When multicollinearity occurs, two or more predictor variables have a strong linear correlation. In this condition, the outcomes of the multinomial logistic regression can alter unpredictably in reaction to changes in the dataset. This is shown by the variance inflation factor (VIF), which should be lower than two. When the VIF score reaches two or higher, one of the two strong correlating predictor variables is left out.

In order to interpret the results of this analysis, both the b-coefficient and the exp (B) are important. The beta-coefficient is tested by means of the Wald statistic. This shows if the b-coefficient is statistically different from zero. In addition, the exp (B) is used, which indicates by what number the odds will multiply when the independent variable increases with one point. When the independent variable increases one point, the odds are therefore greater, or smaller, which depends on the sign. For the goodness of fit of the model, the pseudo R^2 Cox & Snell (values could range from 0 to approximately 0.7) and Nagelkerke (values could range from 0 to 1) are used. The higher the values, the better the set of observations fit and thus are predicted by the model, Nagelkerke values above 0.2 are preferred.

The Nagelkerke R square is given by the following equation:

$$R^2 = \frac{R_{CS}^2}{R_{Max}^2} \tag{4}$$

R_{Max}^2 is given by the following formula:

$$R_{Max}^2 = 1 - \big(L(0)\big)^{\frac{2}{n}} \tag{5}$$

And the R_{CS}^2 is given by the following formula:

$$R_{CS}^2 = 1 - \frac{L(0)}{L(model)}^{\frac{2}{n}} \tag{6}$$

L(o) is the likelihood of the model with just the intercept. L(model) is the likelihood of the estimated model.

$$L(0) = \prod_{\mathrm{r}} \mathrm{P}_{0,\mathrm{r}} \ (\mathrm{r} = 1, \dots, \mathrm{n}) \tag{7}$$

$$L(model) = \prod_{\mathrm{r}} \mathrm{P}_{\mathrm{model,r}} \ (\mathrm{r} = 1, \dots \mathrm{n}) \tag{8}$$

n is the size of the sample. $\mathrm{P}_{0,\mathrm{r}}$ from formula 7 is the probability, which is predicted by the model, with just the intercept for the observed class for the respondent r. $\mathrm{P}_{\mathrm{model,r}}$ from formula 8 is the probability predicted by the model with both the intercept and the predictors for the observed class for the respondent r.

4.2.2 Multinomial Logit model

As described in chapter 3, a stated choice experiment is used to collect the data. This experiment includes the multifaceted process of retailers, deciding if a certain combination of in-shopping centre technologies is preferred over another combination of information technologies. In order to analyse the data, the multinomial logit model is used.

In order to understand the MNL model, the basics will be explained first. The foundation of the MNL model lies with the random utility theory (Manski, 1977). Utility is a concept in econometrics, which explains the intangible measurement of the amount of 'objective attainment' or 'want satisfaction' provided by a service or product (Alchian, 1953). In general, utility cannot be measured absolutely, but characteristics of the different information technologies (levels of attributes e.g. website), observations of the individual (retailers' choice) and the choice situation (the composition of the set of alternatives) can help to predict a choice. This is described in the following formula:

$$U_{ni} = V_{ni} + \varepsilon_{ni} \tag{9}$$

The overall utility U_{ni} is provided by the alternative *i* for the individual *n*. V_{ni} is the structural utility of alternative *i* for individual *n*. ε_{ni} is the error term (random utility). V_{ni} is calculated by the below mentioned formula, in which β_k represents the weight of attribute *k* and X_{nik} is the associated attribute variable.

$$V_{ni} = \sum_{k=1}^{K} \beta_k X_{nik} + \varepsilon_{ni} \quad (10)$$

The error term ε_{ni} is never observed. Therefore, a statistical distribution is assumed for each error term. The probability P_{ni} that person *n* chooses an information technology *i* from a set of different information technologies, is formulated as:

$$P_{ni} = pr(U_{ni} > V_{ni};\ \forall j \neq i) \quad (11)$$

The most common used model is the multi logit model (MNL). MNL is so often used because of its simplicity. In contradiction to most other analysis methods, the error terms ε_{ni} are assumed to be distributed independently and identically, according the double exponential (Gumbel type 2) distribution (3):

$$F_{\varepsilon}(\varepsilon_n) = exp\ (e^{-\varepsilon_n}) \quad \& \quad f_{\varepsilon}(\varepsilon_n) = e^{-\varepsilon_n} \cdot exp\ (e^{-\varepsilon_n}) \quad (12)$$

This assumption leads to the following formula for MNL (5):

$$P_{ni} = \frac{e^{V_{ni}}}{\sum_{j=1}^{J} e^{V_{nj}}} \quad (13)$$

V_{ni} is the structural utility of alternative *i* for individual *n* and can be calculated using formula 5. The β-parameters can be estimated using so-called log-likelihood estimation given a sufficient set of observed choices.

Finally, if the multiple choices per individual have been observed, individuals can be pooled given their preference structure while the parameters of the model are estimated. This results is classes or clusters of individuals. This type of model is called Latent class MNL. Actually, a latent class MNL estimates a set of β-parameters for each cluster of individuals plus the probability that each individual belongs to each of the clusters. The goodness of fit for the latent class MNL model is displayed by McFadden's Rho^2. The Rho^2 can vary from 1, which is a perfect fit, to 0, which means that there is no fit at all. A Rho^2 between 0.2 and 0.4 are considred (very) good model fits (Louviere et al., 2000). Rho^2 is defined as follows:

$$Rho^2 = 1 - \frac{Ln\ L(model)}{Ln\ L(0)} \quad (14)$$

L(0) is the likelihood of the model with all parameters equal to zero. *L*(*model*) is the likelihood of the estimated model.

4.3 Online presence

In this study, the presence of online channels to promote the retailers brand or store and sell the products or services, is measured in order to designate the progressiveness of a retailer. In this section displays the distribution of retailers' scores, which are distinguished by the amount of channels retailers have in possession. Finally, a conclusion is given regarding how to predict online channel presence by means of retailer, shop and shopping centre characteristics.

First, the presence of websites, social media and apps is displayed. A distinction has been made between presence of online channels for promotional and sales purposes. Promotion includes showing the product or service online for regular shop and brand promotion, discount promotion, prize contests, and price comparisons. The exact frequency tables can be found in Appendix VIII, tables VIII to XII .

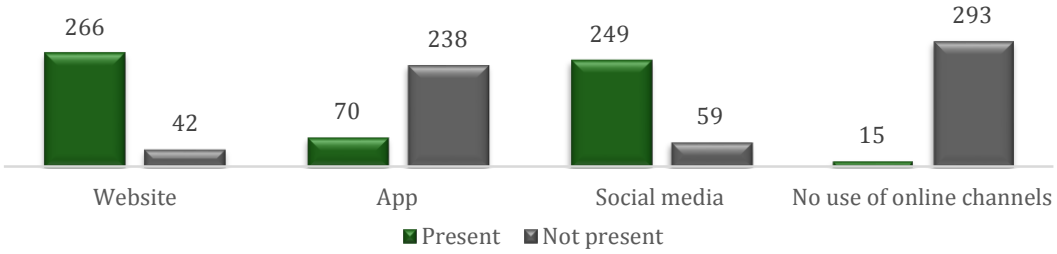

Figure 10: Presence of online channels for promotion

The table shows that 86% of the retailers is in possession of a website, only 23% has an app and 81% has social media for brand and/or shop promotion purposes. Only 4.9% does not have any channel to promote their store or brand. The distribution of these results is roughly as expected, after all, the app is the most costly of the three and social media is still rising in popularity.

The sale of products via online channels is, after promotion, the second part of online presence. Sales channels include web shops and apps in which products can be ordered online, without any direct (face to face) contact between the selling and buying parties. Direct sales through social media are (except for the newest sales possibilities on Facebook) not (yet) possible. But it is possible to, for example, place links to the social media page on where the customer can pay for the product or service. In that case, the social media platform is used to sell a product or service.

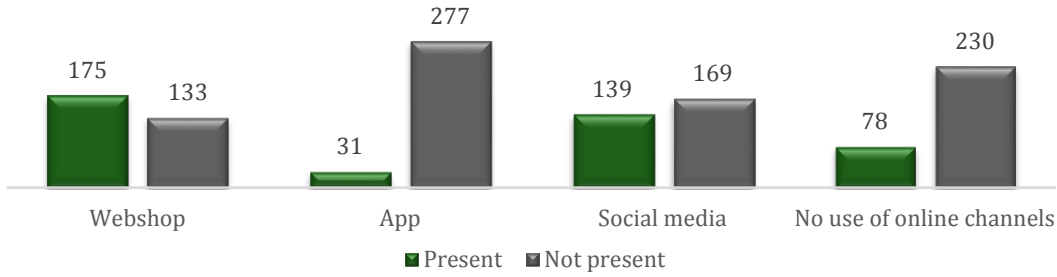

Figure 11: Presence of online channels for sales

The results show that 56% of the retailers is in possession of a web shop, only 10% uses an app to sell their products and 45% has social media platforms as an addition to their web shop or app. 25% of the retailers does not have online channels to sell their products or services. These results are also roughly as expected. It is more time consuming, complex and expensive to sell products or services online, than promoting them. That is why the amount of retailers who use online channels in order to sell their products is lower compared to merely the promotion. Furthermore, the online sales

channels are also showing that the app is the least favourite and social media and web shops do not differ much from each other.

In order to transform the aforementioned amounts of online channels into one grade of 'online presence', the presence of both channels with sales purposes and promotional purposes is combined into a score. The score is constructed by adding the amount of online channels to each other. The score is dichotomous and ranges from zero to one, where zero means that there is a low amount (1 - 3) of, or even no online channels available. A score of '1' means that there is a high amount (4 or higher) of channels available. The score can vary from 0 to 6 because the promotional and sales scores are added to each other. Figure 12 shows the distribution of the score. Appendix VIII, tables VIII to X shows the exact frequencies and percentages.

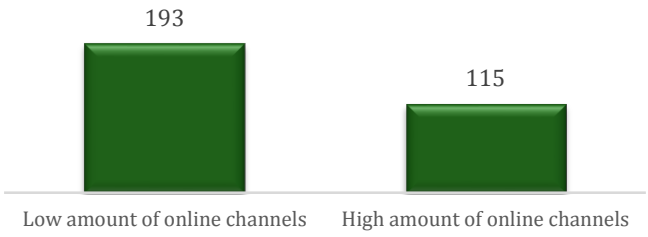

Figure 12: Online presence

The results show that 63% of the retailers possess less than four online channels. 37% of the retailers possess four or more online channels. Chapter 4.3.4 will discuss the implications and the effect of multiple retailer, shop and shopping centre characteristics on this score for online presence.

4.3.1 Predicting online channel presence

Gender

Table 5 shows that a slightly larger part of the female respondents scores high on the amount of present channels. The male respondents roughly show the same behaviour, less males score high on the amount of present channels. This difference between the amounts of males and females is not large enough to be significant though. Therefore, it can be safely concluded that being male or female does not influence the amount of online channels present for product, brand or shop promotion and sales. A Chi squared test confirms this with a score of 0.302. Appendix VII, table XIII shows the complete Chi square test.

Table 5: Online presence & gender

	Average	Female	Male
Low presence of online channels (n=193)=70	64%	60%	66%
high presence of online channels (n=115)	37%	40%	34%

Age

Table 6 shows that three out of five age groups score low on online channel presence. Only more than 50% of the age group under 25 scores high on online channel presence. This group is different from the other groups, which is confirmed by the score of 0.041 of the significance level of the Chi squared test (Appendix VII, table XVI).

Table 6: Online presence & age

	Average	Under 25	26 - 35	36 - 45	46 - 55	56 and older
Low presence of online channels (n=193)	62%	44%	69%	57%	64%	74%
high presence of online channels (n=115)	38%	56%	31%	43%	36%	26%

4.3.2 Online channel presence and shop characteristics

Branch

Only the branch fashion stands out from the rest. 50% of the fashion shops score high on online presence. As a logical result, a Chi square test scores 0.004 on significance level, which shows that there is a relation between branch and online presence score. The random distribution between percentages is explained by the fact that there is no natural order between branches, it is a nominal variable. (Appendix VII, table XVII).

Table 7: Online presence & branch

	Average	Daily	Fashion/luxury	Leisure	Home furnishings & appliance	Remaining
Low presence of online channels (n=193)	66%	75%	50%	74%	63%	67%
high presence of online channels (n=115)	34%	25%	50%	26%	38%	33%

Chain store

A low score on online presence seems to occur on non-chain stores more often than the chain stores. There is also a big difference between chain stores and non-chain stores when it comes to a high score. Therefore, there is a significant relation between the fact that the store is a chain store and the presence of online technology, which is confirmed by a 0.00 significance level score of the Chi squared test. (Appendix VII, table XIX)

Table 8: Online presence & chain store

	Average	Non chain store	Chain store
Low presence of online channels (n=193)	64%	76%	53%
high presence of online channels (n=115)	36%	24%	47%

Floor space

The higher the amount of squared meters of floor space the shops has, the higher the share of high presence of online technology. The low presence of online channels occurs mainly at the smaller shops, while the high presence rises when amount of floor space rises. This means that there is a significant relationship between online channel presence and floor space. The Chi squared test confirms this with a score of 0.003 for the significance level (Appendix VII, table XXI).

Table 9: Online presence & floor space

	Average	1 - 50 m2	51 - 150 m2	151 - 300 m2	301 - 600 m2	600+ m2
Low presence of online channels (n=193)	59%	79%	68%	60%	56%	32%
high presence of online channels (n=115)	41%	21%	32%	40%	44%	68%

4.3.3 Online channel presence and shopping centre characteristics

Shopping centre type

Low and high online presence are roughly equally divided between the three different types of shopping centres. There is a slight rise of high presence of online channels, but it is not enough to form a significant relationship between shopping centre type and online presence. This is confirmed by a Chi squared test that scores 0.203 on significance (Appendix VII, table XXIII).

Table 10: Online presence & shopping centre type

	Average	Sub-regional centre	Regional centre	High street centre
Low presence of online channels (n=193)	62%	69%	60%	58%
high presence of online channels (n=115)	38%	31%	40%	42%

4.3.4 Predicting online channel presence

The aforementioned characteristics show that all the shop characteristics and age have a significant relationship with the presence of online channels in a store. The multinomial analysis will enter the variables on a stepwise manner. This way the contribution of significance of the different variables is measured. The multinomial model has an acceptable Cox and Snell pseudo R- square of 0.124 and a Nagelkerke pseudo R-square of 0.170. Appendix VII, tables XXV through XXXI show the complete multinomial logistic regression analysis, the goodness of fit of the model, the pseudo R squared of the variables and the parameter estimates, this chapter discusses the results. The multinomial logistic regression found that three of the independent variables have a strong relation with the dependent variable online presence. These independent variables are chain store (yes/no), Floorspace (0- 50, 51-150, 151-300, 301-600 and 600+) and branch (daily, fashion/luxury, leisure, home furnishings & appliance and remaining). The multinomial regression found that the amount of floor space and the branch have no significant relation with online channel presence.

Chain store

The multinomial logistic regression shows that, compared to the chain stores, the non-chain stores approximately have 2½ as much chance to score low on online presence. Therefore, chain stores are more likely to score high on online presence, compared to non-chain stores.

Floorspace

The chance of scoring 'low online presence', compared to 'high online presence', relative to the highest amount of floor space, roughly decreases when the floorsize increases. The low amounts have a higher chance of scoring low on online presence. The chance of scoring high on online presence increases when the amount of floorspace increases. This means, a higher amount of floorspace means a higher likelihood of presence of online channels.

Branch

Relative to the category of other stores, the daily shops tend to score lower on using online channels. However, this effect is only significant at the 0.11 level.

4.4 In-shop technology

In addition to the online channel presence, the in-store technology presence is used as an indication for the technological progressiveness of a retailer. First, the presence of in-shop technology is displayed. Second, a score is assigned to the amount of different information technologies that are used within the shop. Finally, a conclusion is given regarding how to predict in-shop technology presence by means of retailer, shop and shopping centre characteristics.

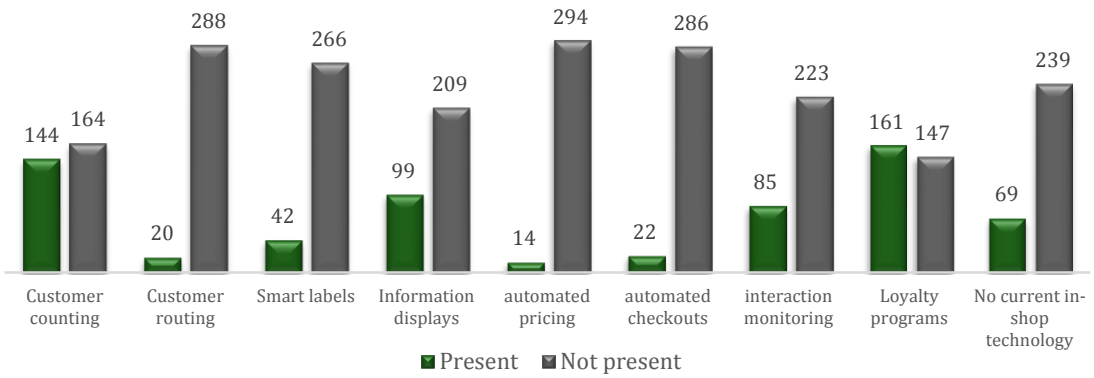

Figure 13: In-shop technology amounts

Figure 13 shows that technology for customer counting and technology that enhances customer loyalty programs are the most popular among retailers. This is followed by the information displays and the technology for interaction monitoring (e.g. CRM systems).

The amount of in-shop technologies is rated and transformed into a score. The score is composed by adding the amount of in-shop technologies to each other. A three point scale divides the score into low amount of in-shop technology (0 – 2 in-shop technologies), medium amount of in-shop technology (3 – 5 in-shop technologies) and high amount of in-shop technology (6 or more in-shop technologies). This rating represents the in-shop technology presence. Figure 14 shows the distribution of the score. The score consists out of three levels instead of two, because of the high amount of in-shop technology that were presented. A two level score would have been too generic. Appendix IX, tables XXXII trough XXXIV shows the exact frequencies and percentages.

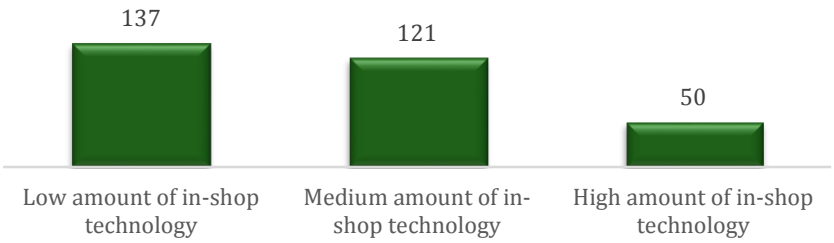

Figure 14: In-shop technology presence

The results show that 45% of the retailers possess two or less in-shop technologies. 39% of the retailers possess three to five in-shop technologies and 16% of the retailers have six or more in-shop technologies. Chapter 4.4.4 will discuss the implications and the effect of multiple retailer, shop and shopping centre characteristics on this score for in-shop technology presence.

4.4.1 In-shop technology presence and retailer characteristics

Gender

There is no significant difference between males and females when it comes to information technology presence within the shop. Table 11 shows that the presence of information technology within the shop is divided quite evenly among males and females. Hence, there is no significant relationship, which is proved by a Chi squared score of 0.220 on significance level. Appendix VIII, table XXXVI shows the exact figures.

Table 11: In-shop technology score & gender

	Average	Male	Female
Low amount of in-shop technology (n=137)	45%	43%	46%
Medium amount of in-shop technology (n=120)	39%	43%	35%
High amount of in-shop technology (n=50)	16%	14%	19%

Age

Table 13 shows that the score that corresponds with high amount of in-shop technology is decreasing slightly but steadily, when reaching older ages. The chi square test (0.608) found no significance though. This is likely caused by the low and medium amount of in-shop technology classes, that both show no clear relationship with age. Appendix VIII, table XXXVIII shows the complete Chi square test.

Table 12: In-shop technology score & age

	Average	Under 25	25 - 35	36 - 45	46 - 55	56 and older
Low amount of in-shop technology (n=137)	44%	32%	42%	53%	42%	49%
Medium amount of in-shop technology (n=120)	40%	47%	38%	33%	44%	40%
High amount of in-shop technology (n=50)	16%	21%	20%	14%	14%	11%

4.4.2 In-shop technology presence and shop characteristics

This section shows the influence of the shops' characteristics branch, chain store or non-chain store and retail floor space on the in-shop technology score. The characteristics that are significant will be included into the following multinomial logistic regression analysis. The (normalized) distribution is shown to clarify the relationship between the variables.

Branch

Table 13 shows a lot of similarities with table 8 for online score and branch. The same thing happens at both online and in-shop technology score: fashion/luxury scores, compared to the other branches, the most medium and high amount of in-shop technologies. This indicates that branch and in-shop technology have a significant relationship, which is confirmed by a chi squared test (0.00) shown in Appendix VIII, table XXXX.

Table 13: In-shop technology score & branch

	Average	Daily	Fashion/ luxury	Leisure	Home furnishings /appliance	Remaining
Low amount of in-shop technology (n=137)	50%	43%	29%	50%	59%	67%
Medium amount of in-shop technology (n=120)	36%	40%	47%	38%	28%	29%
High amount of in-shop technology (n=50)	14%	17%	24%	12%	13%	4%

Chain store

Compared to non-chain stores, chain stores score higher on the amount of in-shop technologies. With a score of 0.00, the chi square test shows that there is a significant relationship between whether if the shop is a chain store and how much in-shop technology is present within the shop. Appendix VIII, table XXXXIII shows this.

Table15: In-shop technology score & chain store

	Average	Non-chain store	chain store
Low amount of in-shop technology (n=137)	47%	69%	26%
Medium amount of in-shop technology (n=120)	38%	29%	46%
High amount of in-shop technology (n=50)	15%	2%	28%

Retail floor space

Table 15 shows that the medium and high amount of in-shop technology scores occur more often when approaching the 151-300 square meters. When the floor space increases further, the medium and high scores occur less often. The chi square test scores 0.00 (Appendix VIII, table XXXXV). This means that there is a significant relationship between retail floor space and the presence of in-shop technology.

Table 15: In-shop technology score & retail floor space

	Average	1 - 50m^2	51 - 150m^2	151 - 300m^2	301 - 600m^2	600+m^2
Low amount of in-shop technology (n=137)	51%	55%	49%	37%	48%	67%
Medium amount of in-shop technology (n=120)	36%	35%	43%	42%	30%	29%
High amount of in-shop technology (n=50)	13%	10%	8%	22 %	22%	4%

4.4.3 In-shop technology presence and shopping centre characteristics

Shopping centre type

The different types of shopping centres all have different distributions when it comes to low, medium and high amount of in-shop technology. The sub-regional centres show the least presence of in-shop technology and the high street centres show the most use of in-shop technology. This can be explained by the fact that the high street centres accommodate a higher amount of chain stores and more fashion and luxury retailers. Nevertheless, shopping centre types and the presence of in-shop technology have a significant relationship with a Chi square score of 0.00 (Appendix VIII, table XXXXVII) and thus will be included into the multinomial logistic regression analysis. Table 16 shows the in-shop technology score of the different shopping centre types.

Table 16: In-shop technology score & shopping centre type

	Average	Sub-regional centre	Regional centre	High street centre
Low amount of in-shop technology (n=137)	46%	58%	53%	27%
Medium amount of in-shop technology (n=120)	38%	34%	32%	49%
High amount of in-shop technology (n=50)	16%	8%	15%	24%

4.4.4 Predicting in-shop technology presence

The aforementioned characteristics show that all the shop characteristics and shopping centre types have a significant relationship with the presence of online channels of a store. The multinomial model has a high Cox and Snell pseudo R-square of 0.297 and a Nagelkerke pseudo R-square of 0.341. Appendix VIII, tables XXXXVIII trough LIV show the complete multinomial logistic regression analysis, the goodness of fit of the model, the pseudo R squared of the variables and the parameter estimates,this chapter discusses the results. The multinomial regression analysis found that three independent variables have a significant relationship with in-shop technology presence. The three variables are: shopping centre type (sub-regional centre, regional centre and high street centre), chain store (yes/no) and retail floor space (0- 50, 51-150, 151-300, 301-600 and 600+).

Chain store

The multinomial logistic regression analysis shows that not being a chain store has a high chance of scoring 'low presence of in-shop technology' compared to scoring 'high presence of in-shop technology' relative to being a chain store. The chance that not being a chain store scores 'medium presence of in-shop technology' compared to 'high presence of in-shop technology' is also higher than a chain store. This indicates that chain stores are more likely to have a higher amount of in-shop technologies compared to non-chain stores.

Retail floor space

The chance of scoring 'low presence of in-shop technology', compared to 'high presence of in-shop technology', relative to the highest amount of floor space, is highest for the two categories of small shops (less than 150m^2) For the medium sized shop (151-300m^2), the chance of scoring 'low presence of in-shop technology' decreases, but raises again for the 301-600 m^2 category. Large shops (600 and more squared meters) have the lowest probability of scoring high on low presence of in-shop channels. When comparing the 'medium and high presence of in-shop technology' score, all amounts of floor spaces, especially in the 51-150 m^2 category, have a higher chance of scoring 'medium presence of in-shop technology' relative to the highest amount of floor space. But still, there is only

one value of floorspace that has a higher chance of scoring high compared to low, which is 600 square meters, or more.

Shopping centre type

The multinomial regression analysis shows that a sub-regional shopping centre has a higher chance of scoring 'low presence of in-shop technology' compared to scoring 'high presence of in-shop technology' relative to a high street shopping centre. The same applies, to a lesser extent, to regional shopping centres. Both sub-regional as regional shopping centres have a higher chance of scoring 'medium presence of in-shop technology', compared to scoring 'high presence of in-shop technology' relative to the high street shopping centre. Thus, the retailers situated in a high street shopping centre are more likely to have a higher amount of in-shop technologies compared to sub-regional and regional shopping centres. Retailers situated in regional centres are, on their turn, more likely to have a higher amount of in-shop technologies compared to sub-regional shopping centres.

4.5 Channel integration

The previous chapters (4.4 & 4.3) measured the presence of information technology (amount of online channels and in-shop technologies). This chapter measures the intensity of use of information technology. First, the use of the different channel integration synergies is displayed. Second, a score is assigned to the amount of different channel integration synergies that are used by the different retailers. Finally, a conclusion is given regarding how to predict channel integration by means of the presence of online channels and in-shop technology.

Figure 15 shows the quantities of retailers, which use, or not use the synergies of channel integration. Because of the different complexities of the channel integration synergies, the first (left) synergy is considered the easiest to attain. The last (right-most) synergy is considered the hardest to attain. In addition, Appendix IX, tables LVI through LVII show more detailed stats.

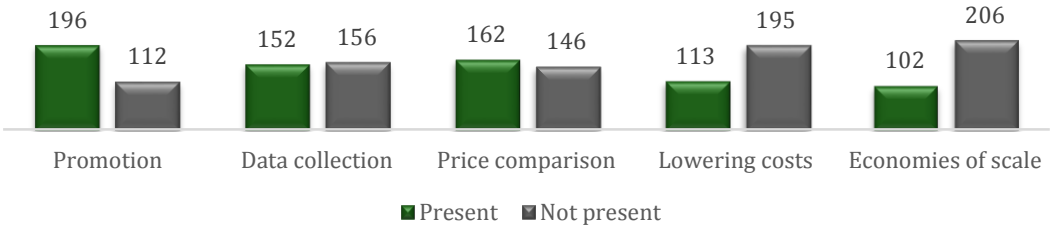

Figure 15: Channel integration quantities

From these quantities, a score is constructed by adding the amount of synergies, for all the retailers. A distinction is made between three score levels: low use of channel integration (0 - 1 synergy), medium use of channel integration (2 - 3 synergies) and high use of channel integration (4 - 5 synergies). Figure 16 shows approximately that the higher the amount of channel integration synergies, the fewer retailers make use of them. Low use of channel integration is scored by 36.4% of the retailers, medium use of channel integration is scored by 36% of the retailers and high use of channel integration is scored by 28% of the retailers.

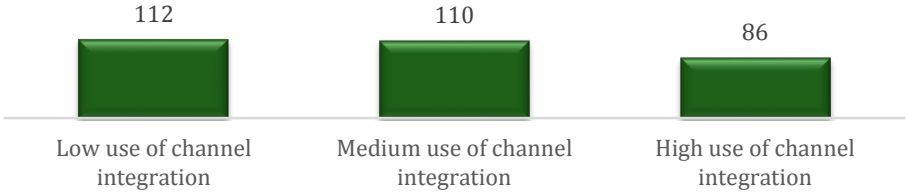

Figure 16: Channel integration score

4.5.1 Channel integration & online channel presence

This section shows the influence of the online channel presence on the amount of channel integration synergies. If the presence of online channels is significant, it will be included into the following multinomial logistic regression analysis. The (normalized) distribution is shown to clarify the relationship between the variables.

The distribution of the scores is shown by table 17. The distribution between low and high amount of channels is nearly evenly divided, but in reversed order. Low use of channel integration mainly occurs at the low amount of online channels. High use of channel integration mainly occurs at high amount of online channels. This implies that there is a strong connection between channel integration and the amount of online channels present. A chi squared test confirms this by reaching very high significance score of 0.00 (Appendix IX, table LVII).

Table 17: Channel integration & online channel presence

	Average	Low amount of online channels	High amount of online channels
Low use of channel integration (n=112)	34%	46%	21%
Medium use of channel integration (n=110)	36%	36%	36%
High use of channel integration (n=86)	30%	18 %	43%

4.5.2 Channel integration & in-shop technology

This section shows the influence of the in-shop technology presence on the amount of channel integration synergies. If the presence of in-shop technologies is significant, it will be included into the following multinomial logistic regression analysis. The (normalized) distribution is shown to clarify the relationship between the variables.

The distribution of the scores is displayed in table 18. The table shows that low amount of in-shop technology scores the lowest on use of channel integration. The medium amount of in-shop technology is almost evenly distributed between 30% and 36% and the high amount of in-shop technology scores the highest on high use of channel integration. The chi squared test confirms the connection between the two variables by reaching a score of 0.00, which represents a very high significance (Appendix IX, table LIX).

Table 18: Channel integration & in-shop technology

	Average	Low amount of in-shop technology	Medium amount of in-shop technology	High amount of in-shop technology
Low use of channel integration (n=112)	31%	52%	30%	10,0%
Medium use of channel integration (n=110)	34%	39%	35%	30,0%
High use of channel integration (n=86)	35%	10%	35%	60,0%

4.5.3 Predicting channel integration

Both the presence of online channels (low/high score) and in-shop technologies (0 for low presence, 1 for medium presence and 2 for high presence of in-shop technology) have significant connections with channel integration. The multinomial model has a high Cox and Snell pseudo R-square of 0.216 and a Nagelkerke pseudo R-square of 0.244. Appendix LV, tables LX trough LXVI shows the multinomial logistic regression analysis, the goodness of fit of the model, the pseudo R squared of the variables and the parameter estimates, this chapter discusses the results.

Online channel presence

Relative to high amount of online channels, a low amount of on online channels is more likely to score 'low' on channel integration. The low amount of online channels is more likely to score 'medium' on channel integration, compared to high amount of online channels. There is a significant relationship between the amount of online channels present and channel integration. Ergo, the more online channels are present, the higher the chance of using them optimally.

In-shop technology presence

Relative to high amount of in-shop technologies, low amount of in-shop technologies is more likely to score 'low' on channel integration. The low amount of in-shop technologies is also, although to a lesser extent, more likely to score 'medium' on channel integration, compared to a high amount of in-shop technologies. There is a significant relationship between the amount of in-shop technologies and channel integration. Thus, it can be stated that the more in-shop technologies are present within a shop, the higher the chance of using them optimally.

4.6 Segmenting retailers

Now it is known how retailers are coping with their information technologies. The independent variables that predict the presence and intensity of use of information technology are determined. The next step in the process of determining retailers' needs when it comes to information technology within the shopping centre is forming clusters. These clusters are formed using the stated choice analysis, in which retailers had to choose between different alternatives of information technology packages within the shopping centre. After the clusters are formed, they are compared to different retailer, shop and shopping centre characteristics, as well as the online, in-shop technology score and channel integration.

4.6.1 Forming clusters

In order to form the clusters, two of the analysis methods, mentioned in chapter 4.2 are used. The clusters are formed with the data from the stated choice experiment. For this, the MNL method is used. The MNL analysis found almost no significant parameters. McFadden's Rho2 is used to prove goodness of fit of the model. Rho^2 values between 0.20 and 0.40 are regarded as good fit (Louviere et al., 2000). Unfortunately, the Rho^2 value of the MNL is 0.011, which is a lot lower than the minimal value of 0.20. Next, the latent class model is estimated. The latent class analysis resulted in two clusters. The Rho^2 of this analysis is 0.3178, which means that the model can give a good estimation of choice behaviour of retailers, when it comes to information technology preferences within the shopping centre. Appendix XI shows the latent class analysis and explanatory graphs. The classification of the clusters is as follows:

Cluster 1

The retailers that are categorized in cluster 1, are the ones that are estimated to choose the base alternative. Approximately 37% of the retailers are estimated to represent this group. The base alternative is the 'none of both' option in the questionnaire, were the retailer does not like either 'real' alternatives. There is only one attribute in the model that has a significant effect on the choice

of information technology. It is the medium level of the attribute advertisement screens (with a p-value of 0.0038; Appendix XI). The negative score shows that the retailers in this group do not prefer this medium level compared to the other levels of the advertisement screens attribute. Although not significant at the 5% level, the 10% extra costs level is significant at the 10% level. Retailers attach a negative utility to this attribute, as may be expected. The exact reason for why retailers were often inclined to choose this 'none' option, is not clear. A possible explanation could be the high costs that are already involved with information technology.

Cluster 2

The retailers that are categorized into cluster 2, are the ones that are estimated to choose one of the 'real' alternatives. Approximately 63% of the retailers represent this group. The real alternatives are the ones that are constructed by the attributes with three levels each. In this case, there are three parameters that have a significant relation with the choice for one of the two alternatives. The first significant parameter (with a p-value of 0.013; Appendix XI) is related to the social media attribute. Retailers tend to choose one of the real alternatives that offers basic or advanced social media options. This means that retailers find social media an important information technology for a shopping centre.

The second significant variable (with P-values of 0.036 and 0.029) is interactive information and advertisement kiosks within the shopping centre. Retailers find the presence of these kiosks important and are more likely willing to pay extra for the basic level of information services. The basic level just shows information about the shopping centre and shops, so no advertisement possibilities. The retailers do not prefer the medium level, which is an interactive kiosk that gives information regarding the shopping centre and shops and shows advertisements. Retailers are rather indifferent regarding the high level which represents different interactive kiosks.

The last significant variable (with a P-value of 0.0006;) is large advertisement screens within and on the outside of the shopping centre. Retailers in cluster 2 find the presence of large advertisement screens and the possibility to advertise on them important. Especially the basic level of advertising, which is 1 time 10 seconds per 15 minutes. The advertisement screens are one of the most expensive options and it is the basic level which retailers in this segment prefer most. Even though it is the most expensive attribute, that fact does not seem to stop the retailers from preferring the alternative that contains this specific information technology.

Just naming the segments 'cluster 1' and 'cluster 2' would be confusing and rather dull. Therefore, from now on, cluster 1 is will be called 'traditional retailers'. The retailers in this cluster are not open to the idea of more technology, or at least paying for it, within the shopping centre. Continuation thereof leads to naming Cluster 2 'progressive retailers'. Retailers in this cluster are excited about the idea of increasing technology within the shopping centre and are (more or less) willing to pay for it.

4.6.2 Combining clusters & channel integration

The clusters themselves only state the preferences of groups of retailers. However, it is not known which retailers belong to which group. The characteristics of the retailers, their shop and the shopping centre are not used to accomplish this. The channel integration score already predict online channel presence and in-shop technology presence. This is why the channel integration score is linked to the clusters.

Channel integration

The table below shows that there is a very clear connection between channel integration and the two clusters. The traditional cluster, with the retailers that were not interested in the real alternatives, shows that the percentages that belong to that cluster drops when the use of channel integration rises. The progressive cluster, with the retailers that were influenced by social media, information and advertisement possibilities, shows a rise in use of channel integration, from low to medium and it levels out at a high score. This is also reflected by the Chi squared test, which shows a very high significance of 0.00 (appendix XII, tables LXVIII to LXX). In order to determine the kind of relationship between the two clusters and channel integration, a multinomial logistic regression is performed.

Table 19: clusters & channel integration

	Average	Traditional cluster	Progressive cluster
Low use of channel integration (n=107)	39%	53%	26%
Medium use of channel integration (n=108)	36%	34%	37%
High use of channel integration (n=83)	25%	13%	37%

4.6.3 Predicting the clusters

The multinomial logistic regression shows that channel integration and the two clusters have a significant relationship. In addition, the model predicts quite well, with Pseudo R scores of 0.170 for Cox and Snell and 0.232 for Nagelkerke. (Appendix XII, tables LXXI to LXXVI) The chance of a retailer, who scores low on channel integration, relative to a high channel integration score, is classified as cluster 1, is greater than being classified as cluster 2. A medium score on channel integration, relative to a high score, still has a chance that is approximately 6 times larger to be classified as cluster 1. Simply put, if a retailer scores high on channel integration, it is more likely that this retailer will be classified as cluster 2. If the retailer scores low on channel integration, it is more likely that the retailer is classified as cluster 1. If a retailer scores medium on channel integration, the retailer is still more likely to be classified as cluster 1, but not as likely as retailers who score low on channel integration.

4.7 Conclusion

This chapter showed, analysed and implemented all the data, mentioned in chapter 3. The purpose of this chapter was to answer what segments can be distinguished for retailers taking into account retailers' information technological needs.

This study distinguishes two segments, being the traditional preference segment and the progressive preference segment of the retailers. The traditional segment is more likely to prefer no investments in information technology within the shopping centre. The progressive preference segment has a higher chance of preferring investments in information technology and is more likely of willing to pay for it. The retailers in progressive segment prefer no social media channels on shopping centre level. They do prefer information kiosk for just the providence of information. In addition they do prefer advertisement possibilities, once every 15 minutes, 10 seconds screen time, which is the cheapest version, proposed in the study.

These segments should not be considered as rock hard classifications of different retailers. This is not the purpose of the segmentation. The purpose is to predict whether a certain retailer tends to have a traditional or progressive preference towards information technology within the shopping centre. Whether a retailer belongs to one of the two segments, is estimated by the predictors of channel integration. The predictors of channel integration measure information technology presence, being online presence and in-shop technology. The predictors of the information technology presence are shop characteristics and shopping centre characteristics. It turned out that the amount of floor space, whether the shop is chain store or not and the shopping centre type are the predictors for information technology presence. So, the presence of information technology predicts the intensity of use, which predicts the preferential segments. Figure 17 shows the predictors of the two segments.

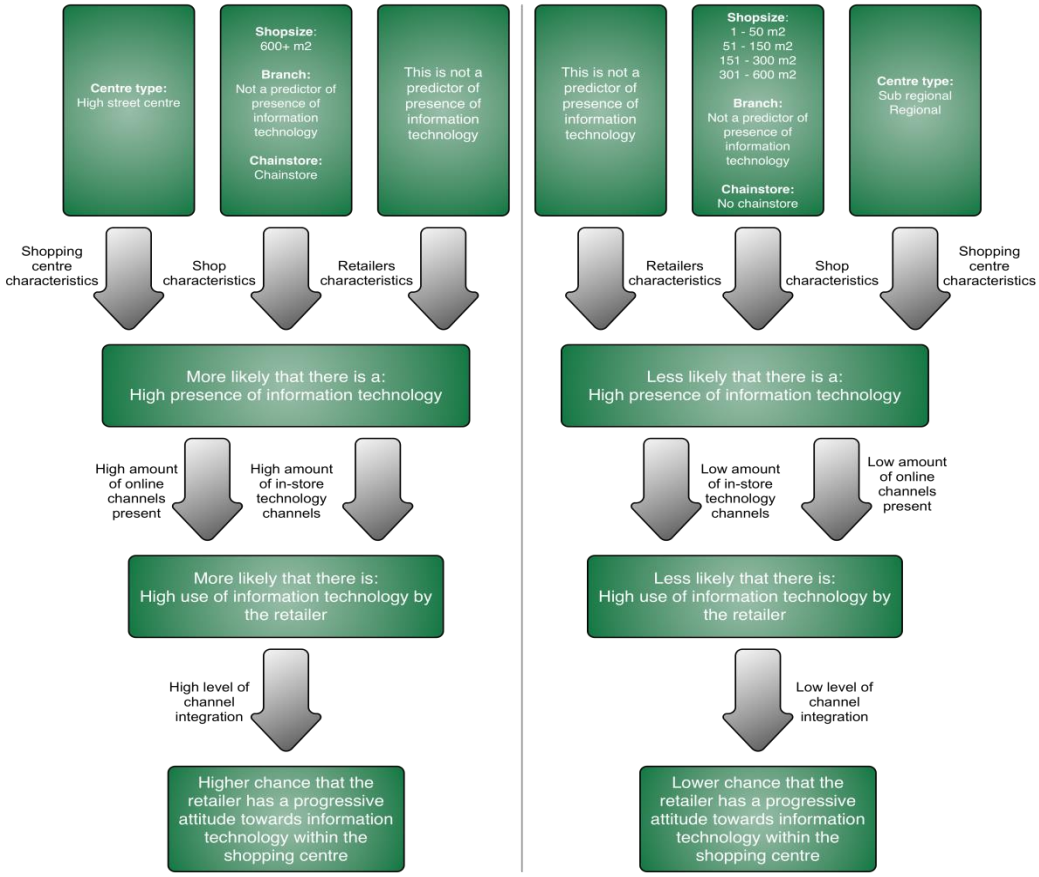

Figure 17: Predicting retailers' preferences towards information technology

The variables, or characteristics of the shops and shopping centres are summed up in the first row. These are the predictors of the second row, which is the predictor of the third row. On the right-hand side, the traditional segment is displayed and on the left, the progressive segment is displayed. The figure is filled with the characteristics that predicted online and in-shop technology presence.

In order to answer the last subquestion (section 1.2.3), pricing is an important aspect. The traditional segment is just not in for investment in information technology within the shopping centre. Information technology in the shopping centre could be too expensive, too time-consuming to make use of it, or maybe the retailers already think they have enough information technology in their shop. For the progressive segment, there are three important 'reasons' for being classified as a retailer with a progressive preference towards information technology within the shopping centre. The first is the presence of social media. The retailers in the progressive segment do not want to participate in social media activity on a shopping centre level.

The second reason why retailers would prefer investments in information technology within the shopping centre is the presence of disclosure of information within the shopping centre. This study takes interactive information kiosks as information technology to achieve this. Interactive information kiosks are quite expensive, retailers in the progressive preference segment indicated that they preferred the least expensive option; interactive information kiosks that are not used for advertising, but for instance used to help the consumer find their shop within the shopping centre.

The last, and most significant, reason why the progressive retailers would prefer investments in information technology within the shopping centre, is the possibility to properly advertise within and on the outside of the shopping centre. This study uses (large) advertisement screens to achieve this. The screens will be placed in strategic positions within and on the outside of the shopping centre. Retailers can buy advertisement time on these screens. Even though the retailers preferred the least expensive option, (10 seconds of screen time every 15 minutes), it is still the most expensive information technology that the questionnaire proposed, but retailers based a great deal of their preference on this option nevertheless.

Hence, investments in information technology are supported by approximately 2/3 of the retailers to a certain extent. As long as the shopping centre manager invests in the three above mentioned technologies, these retailers are more likely to be willing to pay additional service costs. Apparently, the retailers are not interested in investments in a website, mobile application (app) and pickup points. In addition, giving a 10% discount on the costs does not make a difference either.


SAMSUNG
VISA
GROVE
KIA


Upgrade Your Trip
To The Mall
Get the latest deals
Find your favorite stores
Attend our special events
SIMON
MALLS
more choices

5. Conclusion & discussion

Research regarding Information technology within the retail sector is done quite extensively already. Even studies regarding shopping centres, information technology and the effect on consumers are easy to find. However, in this field of research, hardly any study looked through the eyes of the real estate investor, nor through the eyes of the retailers, when it comes to information technology within the shopping centre. This study was designed to gain understanding about this subject and to give real estate investors and managers practical handles, whereby a strategy can be formed. Section 5.1 briefly explains the study and answers the main research question. Section 5.2 discusses the problems that were faced conducting the research and shortcomings of this study. Next, the practical suggestions and recommendations for the implementation of this research are discussed in sector 5.3; managerial implications. Finally, sector 5.4 gives recommendations for further research.

5.1 Summary of the results

The first chapter of this study formulates one main research question and four sub-questions. The goal of these questions is to comprehend retailers and their preferences when it comes to investing in information technology within the shopping centre. For a retail property investor or manager it is important to know this, because information technology is not recapped by means of the consumer, but by means of their tenants. Therefore, it is important to start this research with finding out how far retailers themselves are with using information technology.

The study starts with a literature study that covers most of the information technologies that are important for the retail sector. A selection is made of the most well-known and widely used information technologies. These technologies are: mobile applications, websites, web stores, social media, interactive kiosks, RFID labels, consumer counting, monitoring walkways, loyalty programs, CRM System, electronic shelf labels, self-checkout counters.

These information technologies function as a measurement tool in order to find out how much information technology is present within the shops of the tenants. Next, the five synergies of channel integration are used as an indication of how intensive these technologies are used. These synergies are:

1. *Cross-channel customer communication and promotion*
2. *Leveraging cross-channel information and marketing research from one channel to improve decisions in other channels.*
3. *Cross-channel price comparisons*
4. *Digitization*
5. *Shared common physical assets and operations*

After operationalising the variables from the literature study, a research tool was developed especially for this study in the form of an online questionnaire, including a stated choice experiment. The data was collected from retailers based within sub-regional-, regional- and high street centres in the Netherlands. A total of 308 respondents answered the questionnaire completely. All the respondents are tenants of the aforementioned types of shopping centres. With the literature study functioning as a framework and the collected data, the four sub-questions are answered and finally, the main research question can be answered.

5.2 Conclusion

'How can shopping centre investors serve the information technological needs of retailers within the shopping centre?'

To come to the conclusion the following sub-questions were answered:

- What different kinds of information technologies can be distinguished?
- In what manner can a score be constructed, in order to determine the retailers' level of information technology?
- What segments can be distinguished for retailers taking into account retailers' information technological preferences?
- To what extend are investments in information technology within the shopping centre supported by the different retailer segments?

All the ingredients for answering the main question are available. First, it is discussed what the technological needs of retailers are within the shopping centre. Next, it is discussed how the shopping centre investor can serve the retailers information technological needs.

Based on their preference for information technology within the shopping centre, retailers can be divided into two segments: traditional preference and progressive preference. These two segments are constructed by means of the preferences that the different retailers have when it comes to information technology within the shopping centre. The first segment embodies the traditional view of the retailers' preferences; they do not want any more information technology within the shopping centre. This study found relationships between shop, shopping centre characteristics and the traditional preference towards information technology. The first characteristic is the size of the shop. Shops with less than 600 square meter of floor space, have a higher chance of having a traditional preference towards information technology within the shopping centre. This also applies to retailers within the shopping centre who operate non-chain stores. This study also found the relationship between retailers within sub-regional and regional shopping centres and a traditional preference towards information technology within the shopping centre.

The second segment embodies the progressive preferences of the retailer; they have a higher chance of seeing added value of information technology within the shopping centre and they are more willing to pay for it (to a certain extent). This study found relationships between characteristics of the shop, the shopping centre and the progressive preference towards information technology within the shopping centre. The first characteristic is the size of the shop. Shops with an amount of floor space above 600 square meters are more likely to have a progressive preference towards information technology within the shopping centre. This also applies for chain stores. This study also found a relationship between retailers who operate in shopping centres that lie within the high street centre and a positive preference towards information technology.

These two segments are both characterized by different preferences. Where the preferences of the traditional segment are quite clear (no new technology, quite simple), there are some information technologies that tipped the scales for retailers in the progressive segment. Retailers in this segment have three information technological needs: social media, proper information facilities and proper advisement facilities within the shopping centre. According to the retailers, the retailers in this segment do not want to participate with a social media platform for the shopping centre. The reason for this is probably the fact that 81% of the retailers in the population of this study already have its own social media account. In addition, information facilities in the form of information kiosks should be present within the shopping centre. The retailers do not mind paying additional costs for extra advertisement kiosks. The last need is in the form of good advertisement possibilities. This study

proposed large advertisement screens on the inside and outside. This was received well by the retailers, even considering the fact that this is an expensive option.

So, now that the preferences of the different segments and the characteristics of the retailer within these two segments are clear, the shopping centre investor can act on it. After all, the retailers can now be recognized and their preferences can be estimated. For the shopping centre investor/ manager, it is all about the mix of retailers within a shopping centre. Determining what retailers are present within the shopping centre can determine the overall preference of the retailers and thus the support for investments in information technology. If the majority of the retailers has the characteristics of the traditional preference towards information technology within the shopping centre, this study recommends that investments in information technology get reconsidered. Maybe there are better options, as in shopping centres with a higher amount of retailers with a progressive preference. This way, the real estate investor can develop concrete, pragmatic solutions for investments in information technology that have higher chances of being supported by the retailers, on a shorter basis. Chapter 5.3, 'managerial implications' discusses this subject further.

5.3 Managerial implications

Investing in new information technology often requires relatively large investments, often without knowing the direct/indirect returns or the precise added value. This study presumes that if the retailers see the added value, the technology has a higher chance of becoming a success. Unfortunately, not every retailer knows what he or she wants. They cannot all be, or afford to be, early adopters of new or even present-day technology.

When the shopping centre investor wants to implement a new technology within the shopping centre, the retailers have to start using it. It could be an expensive mistake if the technology does not become popular among retailers, who evidently are not willing to start using it. There is another problem, if the retailers are not using the new technology, the investor cannot measure exactly what went wrong, except for the fact that the retailers do not see the added value. The shopping centre investor benefits from a better understanding of which information technology is more likely to be used in what shopping centre. Also, the shopping centre investor could be more proactive in informing the retailers about information technology and how it is perceived by other retailers. To do so, this study offers the handles that can predict in which shopping centre it is more likely that the information technology will be actually used by the retailers located in the shopping centre.

The investor is able to distinguish the characteristics that can predict the retailers' preferences when it comes to information technology within the shopping centre. The investor can distinguish retailers with traditional or progressive preferences when it comes to information technology. The more retailers are classified as being more likely to have a traditional preference when it comes to information technology, the less likely it is that the information technology will be used. The more retailers are classified as being more likely to have a progressive preference when it comes to information technology, the more likely it is that the information technology will be used. It is of course never the case that a shopping centre consists out of solely traditional or solely progressive segments of retailers; it is always a mix of the both.

In addition, when the investor is in the position of having to choose between two or more potential tenants, a choice can be based on the characteristics of the potential tenants' shop and the cluster is belongs to. For instance, the investor can rent out retail spaces in shopping centre to soley retailers who belong to the progressive segment to create a better base for the implementation of information technology within the shopping centre.

5.4 Possibilities for further research

This research forms a good basis for further research in the field of information technology within the shopping centre. Three main areas for further research are distinguished. First of all, this study does not measure the actual added value of information technology. What is the added value of information technology according to the retailers? Why do or do they not like to use it? This could be dealt with in two different ways; trying to answer the questions using visitor amounts, customer satisfaction turnover figures etc. of retailers before and after implementing the technology and try to isolate the precise impact on amount of visitors, customer satisfaction or turnover figures. Or it could be in the same methodology of this study; giving them alternatives and choices of what they consider information technologies that add value.

Second, this study only deals with retailers, not with the actual consumer. What do they want to see in a shopping centre? What makes them happy, stay longer, visit more shops or be more satisfied with their visit? Similar studies have been done already for, the atmosphere, location of the shopping centre, amount of leisure activities etc., but never for the information technologies themselves. Consumer behaviour is always a difficult subject to study, but it could be very rewarding for the shopping centre investors and for the retailers. They both want to know how to enhance the competitiveness of the shopping centre and/or their shop.

Third and last, the success factors of implementing technology within the shopping centre should be studied by means of analysing best practices in the Netherlands or even looking abroad the borders of our country. How do best practices perform? How do shopping centres deal with information technology in different countries? Why are the state of the art Westfield shopping centres so popular? Naturally, it will not be solely information technology, but what part does it play and how can investors in the Netherlands learn from it and eventually enhance the competitiveness of their shopping centres?

5.5 Limitations

This study has a couple of limitations. We start with the most important one; the practical end result. The practical end result was supposed to be a pragmatic tool which a shopping centre investor could fill in, to find out the amount of retailers with a certain preference within the shopping centre. Unfortunately, the construction of such a tool in Excel could not fit into the timeline. The formulas in chapter 4.2 must be incorporated into the model, which is, in this stage too time consuming.

In addition, the cost aspect is underexposed. The costs are included into the research and form an attribute with three levels (10% discount, 10% extra costs or nothing). The costs are composed from the other attributes, which does not make it an attribute that stands on its own. It is the result of the combined costs from the attributes. Looking back on this study, this could have been done differently, in a way that the costs are a completely separate attribute with three levels, for instance €150.-, €250,- and €400.-. This way the effects of the price can be measured instead of the aspect of a discount or increase of the costs.

The last limitation was that this study does not incorporate any reasons for the choices that retailers make. This study found out what the retailers prefer when it comes to information technology within the shopping centre, but not why they prefer it.

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APPENDICES

Retailers and their attitude towards technology within the shopping center

APPENDICES

Retailers and their attitude towards technology within the shopping center

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Table of contents

Appendix I: Most mentioned information technologies

Synergy	Technology	Author
Cross-channel customer communication and promotion	Mobile application Website Webstore Social media Interactive Kiosk RFID Self-checkout counters	Grewal et al, 2011; Renko & Druzijanic, 2014; Chen et al., 2009 Wang, 2012; Meuter et al., 2003; Lin & Hsieh, 2007; Verhoef, 2009
Leveraging cross-channel information and marketing research from one channel to improve decisions in other channels.	Mobile application Website Webstore Social media Interactive kiosk Consumer counting Monitoring walkways Loyalty programs	Berman & Evans, 2010; Levy & Weitz, 2012; Walker & Francis, 2010; Anderson et al., 2007;Ryals and Payne, 2001
Cross-channel price comparisons.	Mobile application Website Webstore Information kiosk	Grewal et al, 2011; Chen, 2007; Renko & Druzijanic, 2014;
Digitization	RFID Self-service technology RFID Labels CRM System Electronic shelf labels	Sarac et al., 2009; Botani et al., 2014; Vlachos, 2014; De Marco et al., 2014; Wamba, 2012; Agrawal & Sharda, 2012; Wong 2012; Wang, 2012; Chen et al., 2009; Meuter et al., 2003; Lin & Hsieh, 2007; Verhoef, 2009; Finnegen & Currie, 2010; Finnegan and Willcocks, 2006; Anderson et al., 2007
Shared common physical assets and operations.	RFID Pickup points Self-checkout counters Self-service technology CRM System Mobile application Website Webstore	Sarac et al., 2009; Botani et al., 2014; Vlachos, 2014; De Marco et al., 2014; Wamba, 2012; Agrawal & Sharda, 2012; Wong 2012 ; Wang, 2012; Chen et al., 2009; Meuter et al., 2003; Lin & Hsieh, 2007; Verhoef, 2009; Morganti et al, 2015; Finnegen & Currie, 2010; Finnegan and Willcocks, 2006; Anderson et al., 2007; Grewal et al, 2011; Renko & Druzijanic, 2014;

Appendix II: Questionnaire

0. General

What is your gender?

- Male
- Female

What is your date of birth?

DD/MM/YEAR

What is the branch that you are operating in?

- Daily (supermarkets and drugstores),
- Fashion/luxury (clothes, shoes and jewellery),
- Leisure (products for leisure activities and education)
- Home furniture and appliance (everything for in and around the house)
- Remaining (hospitality- & service industry)

Is your store a chain store?

- Yes
- No

What is the size of your shop in square meters?

- 0-50 M2
- 51-150 M2
- 151-300 M2
- 301-600 M2
- 600+ M2

1. Current and future **in shop** online channel presence

a. Which online channels do you, as a retailer, use to promote your store and/or brand to reach potential customers?

- Website
- Mobile (app)
- Social media (Facebook, Twitter, Instagram etc.)
- Other:……
- None

b. Which online channels do you, as a retailer, plan on using within the next two years to promote your store and/or brand to reach potential customers?

- Website
- Mobile (app)
- Social media (Facebook, Twitter, Instagram etc.)
- Other: ……
- None

c. *When it comes to implementing online technology (like the above mentioned) in your business model, would you like to collaborate with the shopping center owner to realize the best solution for your business?*

- Yes
- No
- I don't know

d. If yes, what online technology would it be? (multiple answers possible)

- Website
- Mobile (app)
- Social media (Facebook, Twitter, Instagram etc.)
- Other: ……
- None.

2. Current and future **in shop** technology presence

a. *Which information technologies do you, as a retailer, use to enhance your business?*
   - In shop customer counting
   - In shop customer path tracking
   - RFID Labels
   - Interactive Kiosk
   - Electronic shelf labels
   - Self-checkout counters
   - Customer relationship management system
   - Other:……
   - None.

b. *Which information technologies do you, as a retailer, plan on using within the next three years to enhance your business?*
   - In shop customer counting
   - In shop customer path tracking
   - RFID Labels
   - Interactive Kiosk
   - Electronic shelf labels
   - Self-checkout counters
   - Customer relationship management system
   - Other:……
   - None.

c. Which information technology, for the enhancement of your business, do you think will recoup itself? (more answers possible)
   - In shop customer counting (1.500 euro) (IDT Electronics, 2015)
   - In shop customer path tracking (5.000 euro) (path intelligence, 2015)
   - RFID Labels (0,30 euro per tag) (Barcoding, 2015)
   - Interactive Kiosk (8.000 euro) (Wirespring, 2015)
   - Electronic shelf labels (6 euro per piece) (Alibaba, 2015)
   - Self-checkout counters (30.000 euro per piece) (Washington post, 2015)
   - Customer relationship management system (230 euro per month) (CRM Switch, 2015)
   - Other:……
   - None.

d. *When it comes to implementing information technology in your shop, would you like to collaborate with the shopping center owner to realize the best solution, specific for your business?*
   - Yes
   - No
   - I don't know

e. *If yes, what information technology would it be? (multiple answers possible)*
   - In shop customer counting
   - In shop customer path tracking
   - RFID Labels
   - Interactive Kiosk
   - Electronic shelf labels
   - Self-checkout counters
   - Customer relationship management system
   - Other:……
   - None.

3. Current and future channel integration (use)

a. Do you currently synchronize your offline and online strategies? (check the boxes that apply to your situation)

I use different channels to promote each other.
(E.g. advertising in my store to download my app or advertising on television to visit the website)

- o I am using it
- o I am planning on using it within the next three years
- o I want to use it but I don't know how
- o I want to use it but I can't afford the investment
- o I don't see the additional value
- o I have never heard of this possibility

I use the data that is being collected with one channel to improve another channel.
(E.g. when online popularity for a product growths, I start promoting it in my shop more intense)

- o I am using it
- o I am planning on using it within the next three years
- o I want to use it but I don't know how
- o I want to use it but I can't afford the investment
- o I do not want to use it
- o I have never heard of this possibility

I use different channels to compare prices and inform consumers.
(E.g. inform potential customers by website that prices of a certain product are the lowest in your store to persuade them to make a purchase)

- o I am using it
- o I am planning on using it within the next three years
- o I want to use it but I don't know how
- o I want to use it but I can't afford the investment
- o I do not want to use it
- o I have never heard of this possibility

I use digitalization to reduce costs
(E.g. digital user manuals, online bills, warranty and registrations save paper)

- o I am using it
- o I am planning on using it within the next three years
- o I want to use it but I don't know how
- o I want to use it but I can't afford the investment
- o I do not want to use it
- o I have never heard of this possibility

I distribute expenses across different channels to create economies of scale.
(E.g. a loyalty program yields a customer database, which can be used by different departments like sales and marketing. They don't have to invest in a customer database anymore)

- I am using it
- I am planning on using it within the next three years
- I want to use it but I don't know how
- I want to use it but I can't afford the investment
- I do not want to use it
- I have never heard of this possibility

APPENDIX III: Stated choice example

Based on your preference, which option would you pick? (Please pay close attention, the differences between the choices could be minimal)

	Option A	**Option B**	**None**
Shopping center website	Informative (basic)	Informative + advertisement space (medium)	
Shopping center app	None	Informative (basic)	
Shopping center social media	Owner maintained (advanced)	Retailer maintained (basic)	
Interactive information kiosks	Information kiosk and separate advertisement kiosks (advanced)	Just information kiosks (basic)	
Shopping center advertisement screens	3 times 10 seconds every 15 minutes (advanced)	1 time 10 seconds every 15 minutes (basic)	
Shopping center pickup points	Pickup points for shops in the shopping center only (basic)	Pickup point for every shop possible (advanced)	
Discount/extra costs	10% extra costs	10% discount	
Price	EUR 220	EUR 173	
Preference	○	○	○

APPENDIX IV: All the possible levels and accompanying costs:

Shopping center Technology	Level
Website:	*Informative (basic) (€15);* *Informative + Advertisement space (medium) (€25)* *Informative + Advertisement space + customer stats (advanced) (€25)*
App:	*None (€0)* *Informative (basic) (€20)* *Informative + Advertisement space + customer stats (advanced) (€40)*
Social media:	*None(€0)* *Maintained by shopkeepers' association (basic) (€5)* *Maintained by SC manager(advanced) (€10)*
Information Kiosks:	Information Kiosks*: purely for SC info (basic) (€10)* Information Kiosks*: info and adverts in one kiosk(medium) (€15)* Information Kiosks: *info and adverts, separate kiosks (advanced) (€20)*
Advertisement screens (Screen time)	*1 time every 15 min. (basic) (€40)* *3 times every 15 min. (medium) (€85)* *3 times every 10 min. (advanced) (170)*
Pickup points:	*None (€0)* *pickup point; only for SC based shops (basic) (€70)* *Pickup point, web shops included (e.g. Bol.com)(advanced) (€90)*
Discount/additional costs	*None* *10% extra costs* *10% discount*
Costs:	*Depend on the above mentioned levels*

APPENDIX V: Stated choice design

Level code

0 Medium
1 None/Basis
2 Advanced

Level combinations

0	0	0	0	0	0	0	**1**
0	1	1	2	1	1	1	**2**
0	2	2	1	2	2	2	**3**
1	0	1	1	1	2	0	**4**
1	1	2	0	2	0	1	**5**
1	2	0	2	0	1	2	**6**
2	0	2	2	1	0	2	**7**
2	1	0	1	2	1	0	**8**
2	2	1	0	0	2	1	**9**
0	0	2	1	0	1	1	**10**
0	1	0	0	1	2	2	**11**
0	2	1	2	2	0	0	**12**
1	0	0	2	2	2	1	**13**
1	1	1	1	0	0	2	**14**
1	2	2	0	1	1	0	**15**
2	0	1	0	2	1	2	**16**
2	1	2	2	0	2	0	**17**
2	2	0	1	1	0	1	**18**

1	**2**	**3**	**4**	**5**	**6**	**7**	
Medium	Medium	Medium	Medium	Medium	Medium	Medium	**1**
Medium	Basis	Basis	Geavanceerd	Basis	Basis	Basis	**2**
Medium	Geavanceerd	Geavanceerd	Basis	Geavanceerd	Geavanceerd	Geavanceerd	**3**
Basis	Medium	Basis	Basis	Basis	Geavanceerd	Medium	**4**
Basis	Basis	Geavanceerd	Medium	Geavanceerd	Medium	Basis	**5**
Basis	Geavanceerd	Medium	Geavanceerd	Medium	Basis	Geavanceerd	**6**
Geavanceerd	Medium	Geavanceerd	Geavanceerd	Basis	Medium	Geavanceerd	**7**
Geavanceerd	Basis	Medium	Basis	Geavanceerd	Basis	Medium	**8**
Geavanceerd	Geavanceerd	Basis	Medium	Medium	Geavanceerd	Basis	**9**
Medium	Medium	Geavanceerd	Basis	Medium	Basis	Basis	**10**
Medium	Basis	Medium	Medium	Basis	Geavanceerd	Geavanceerd	**11**
Medium	Geavanceerd	Basis	Geavanceerd	Geavanceerd	Medium	Medium	**12**
Basis	Medium	Medium	Geavanceerd	Geavanceerd	Geavanceerd	Basis	**13**
Basis	Basis	Basis	Basis	Medium	Medium	Geavanceerd	**14**
Basis	Geavanceerd	Geavanceerd	Medium	Basis	Basis	Medium	**15**
Geavanceerd	Medium	Basis	Medium	Geavanceerd	Basis	Geavanceerd	**16**
Geavanceerd	Basis	Geavanceerd	Geavanceerd	Medium	Geavanceerd	Medium	**17**
Geavanceerd	Geavanceerd	Medium	Basis	Basis	Medium	Basis	**18**

APPENDIX VI: Locations of data collection

City	Amount of respondents
Alblasserdam	1
Alkmaar	1
Almere	6
Amersfoort	2
Amsterdam	23
Apeldoorn	1
Arnhem	4
Assen	3
Beverwijk	2
Bovenkarspel	4
Boxmeer	1
Breda	19
Capelle aan den IJssel	3
Castricum	11
Delft	1
Den Bosch	2
Den Haag	3
Dordrecht	2
Ede	1
Eindhoven	46
Emmen	1
Enschede	31
Etten-leur	1
Groningen	1
Haarlem	5
Heerhugowaard	1
Heiloo	4
Hellevoetsluis	5
Helmond	2
Krimpen aan den IJssel	3
Leiden	1
Leiderdorp	3
Lelystad	1
Maastricht	3
Hoofdkantoor	10
Nijmegen	4
Oirschot	1
Oss	1
Papendrecht	3
Purmerend	1
Ridderker	1
Rijen	3

City	Amount of respondents
Rijswijk	2
Roosendaal	3
Rotterdam	24
Schagen	5
Tilburg	3
Utrecht	38
Valkenswaard	1
Veenendaal	3
Veldhoven	1
Venlo	3
Volendam	2
Zoetermeer	1

APPENDIX VII: General frequency tables

Table I: Statistics general

		Branch_Locatus	Age groups	Gender	Chainstore	Shopping center type (SC type)	Retail floor space
N	Valid	308	308	308	308	308	308
	Missing	0	0	0	0	0	0

Table II: Frequency Branch Locatus

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Daily	67	21.8	21.8	21.8
	Fashion/luxury	115	37.3	37.3	59.1
	Leisure	42	13.6	13.6	72.7
	Home furnishings / appliance	32	10.4	10.4	83.1
	Remaining	52	16.9	16.9	100.0
	Total	308	100.0	100.0	

Table III: Frequency Age groups

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Under 25	34	11.0	11.0	11.0
	26 - 35	85	27.6	27.6	38.6
	36 - 45	76	24.7	24.7	63.3
	46 - 55	78	25.3	25.3	88.6
	56 and older	35	11.4	11.4	100.0
	Total	308	100.0	100.0	

Table IV: Frequency Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Women	157	51.0	51.0	51.0
	Man	151	49.0	49.0	100.0
	Total	308	100.0	100.0	

Table V: Frequency Chainstore

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	133	43.2	43.2	43.2
	Yes	175	56.8	56.8	100.0
	Total	308	100.0	100.0	

Table VI: Frequency Shopping center type (SC type)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sub-regional shopping center	110	35.7	35.7	35.7
	Regional center	78	25.3	25.3	61.0
	High street center	120	39.0	39.0	100.0
	Total	308	100.0	100.0	

Table VII: Frequency Retail floor space

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 - 50 m2	29	9.4	9.4	9.4
	51 - 150 m2	145	47.1	47.1	56.5
	151 - 300 m2	82	26.6	26.6	83.1
	301 - 600 m2	27	8.8	8.8	91.9
	600+ m2	25	8.1	8.1	100.0
	Total	308	100.0	100.0	

APPENDIX VIII: Online channels

Table VIII: General

Statistics

		Online_score_dichotome	Online_score
N	Valid	308	308
	Missing	0	0

Table IX: Frequency

Online score

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	13	4.2	4.2	4.2
	1	28	9.1	9.1	13.3
	2	69	22.4	22.4	35.7
	3	83	26.9	26.9	62.7
	4	79	25.6	25.6	88.3
	5	17	5.5	5.5	93.8
	6	19	6.2	6.2	100.0
	Total	308	100.0	100.0	

Table X: Frequency

Online score dichotome

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Low use of online channels	193	62.7	62.7	62.7
	High use of online channels	115	37.3	37.3	100.0
	Total	308	100.0	100.0	

Table XII: Frequency

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Online_score_dichotome * Branch_Locatus	308	100.0%	0	0.0%	308	100.0%
Online_score_dichotome * Age groups	308	100.0%	0	0.0%	308	100.0%
Online_score_dichotome * Gender	308	100.0%	0	0.0%	308	100.0%
Online_score_dichotome * Chainstore	308	100.0%	0	0.0%	308	100.0%
Online_score_dichotome * Shopping center type (SC type)	308	100.0%	0	0.0%	308	100.0%
Online_score_dichotome * Retail floor space	308	100.0%	0	0.0%	308	100.0%

Table XIII: Crosstab

Online score & Gender

			Gender		
			Women	Men	Total
Online_score_dichotome	Low use of online channels	Count	94	99	193
		% within Gender	59.9%	65.6%	62.7%
	High use of online channels	Count	63	52	115
		% within Gender	40.1%	34.4%	37.3%
Total		Count	157	151	308
		% within Gender	100.0%	100.0%	100.0%

Table XIV: Chi-Square Test

Online score & Gender

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.065[a]	1	.302		
Continuity Correction[b]	.836	1	.361		
Likelihood Ratio	1.066	1	.302		
Fisher's Exact Test				.346	.180
Linear-by-Linear Association	1.062	1	.303		
N of Valid Cases	308				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 56.38.

b. Computed only for a 2x2 table

Table XV: Crosstab

Online score & Age groups

			Under 25	26 - 35	36 - 45	46 - 55	56 and older	Total
Online_score_dichotome	Low use of online channels	Count	15	59	43	50	26	193
		% within Age groups	44.1%	69.4%	56.6%	64.1%	74.3%	62.7%
	High use of online channels	Count	19	26	33	28	9	115
		% within Age groups	55.9%	30.6%	43.4%	35.9%	25.7%	37.3%
Total		Count	34	85	76	78	35	308
		% within Age groups	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table XVI: Chi-Square Test

Online score & Age groups

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.945[a]	4	.041
Likelihood Ratio	9.883	4	.042
Linear-by-Linear Association	2.526	1	.112
N of Valid Cases	308		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 12.69.

Table XVII: Crosstab

Online score & Branch Locatus

			Branch_Locatus					
			Daily	Fashion/ luxury	Leisure	Home furnishings / appliance	Remaining	Total
Online_score _dichotome	Low use of online channels	Count	50	57	31	20	35	193
		% within Branch_Locatus	74.6%	49.6%	73.8%	62.5%	67.3%	62.7%
	High use of online channels	Count	17	58	11	12	17	115
		% within Branch_Locatus	25.4%	50.4%	26.2%	37.5%	32.7%	37.3%
Total		Count	67	115	42	32	52	308
		% within Branch_Locatus	100.0 %	100.0%	100.0%	100.0%	100.0%	100.0%

Table XVIII: Chi-Square Test

Online score & Branch Locatus

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.241[a]	4	.004
Likelihood Ratio	15.327	4	.004
Linear-by-Linear Association	.106	1	.744
N of Valid Cases	308		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 11.95

Table XIX: Crosstab

Online score & Chain store

			Chainstore		
			No	Yes	Total
Online_score_dichotome	Low use of online channels	Count	101	92	193
		% within Chainstore	75.9%	52.6%	62.7%
	High use of online channels	Count	32	83	115
		% within Chainstore	24.1%	47.4%	37.3%
Total		Count	133	175	308
		% within Chainstore	100.0%	100.0%	100.0%

Table XX: Chi-Square Test

Online score & Chain store

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	17.638[a]	1	.000		
Continuity Correction[b]	16.653	1	.000		
Likelihood Ratio	18.099	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	17.581	1	.000		
N of Valid Cases	308				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 49.66.

b. Computed only for a 2x2 table

Table XXI: Crosstab

Online score & Retail Floorspace

			Retail floor space					
			1 - 50 m2	51 - 150 m2	151 - 300 m2	301 - 600 m2	600+ m2	Total
Online_scoredichotome	Low use of online channels	Count	23	98	49	15	8	193
		% within Retail floor space	79.3%	67.6%	59.8%	55.6%	32.0%	62.7%
	High use of online channels	Count	6	47	33	12	17	115
		% within Retail floor space	20.7%	32.4%	40.2%	44.4%	68.0%	37.3%
Total		Count	29	145	82	27	25	308
		% within Retail floor space	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table XXII: Chi-Square Test

Online score & Retail Floorspace

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.863[a]	4	.003
Likelihood Ratio	15.781	4	.003
Linear-by-Linear Association	14.677	1	.000
N of Valid Cases	308		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 9.33.

Table XXIII: Crosstab

Online score & Shopping center type

			Shopping center type (SC type)			
			Sub-regional shopping center	Regional center	High street center	Total
Online_score_dichotome	Low use of online channels	Count	76	47	70	193
		% within Shopping center type (SC type)	69.1%	60.3%	58.3%	62.7%
	High use of online channels	Count	34	31	50	115
		% within Shopping center type (SC type)	30.9%	39.7%	41.7%	37.3%
Total		Count	110	78	120	308
		% within Shopping center type (SC type)	100.0%	100.0%	100.0%	100.0%

Table XXIV: Chi-Square Test

Online score & Shopping center type

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.097[a]	2	.213
Likelihood Ratio	3.135	2	.209
Linear-by-Linear Association	2.791	1	.095
N of Valid Cases	308		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 29.12.

Table XXV: Nominal regression

Online score Case Processing Summary

		N	Marginal Percentage
Online_score_dichotome	Low use of online channels	193	62.7%
	High use of online channels	115	37.3%
Branch_Locatus	Daily	67	21.8%
	Fashion/luxury	115	37.3%
	Leisure	42	13.6%
	Home furnishings / appliance	32	10.4%
	Remaining	52	16.9%
Chainstore	No	133	43.2%
	Yes	175	56.8%
Retail floor space	1 - 50 m2	29	9.4%
	51 - 150 m2	145	47.1%
	151 - 300 m2	82	26.6%
	301 - 600 m2	27	8.8%
	600+ m2	25	8.1%
Valid		308	100.0%
Missing		0	
Total		308	
Subpopulation		45[a]	

a. The dependent variable has only one value observed in 16 (35.6%) subpopulations.

Table XXVI: Nominal regression

Online score Step Summary

Model		Action	Effect(s)	Model Fitting Criteria	Effect Selection Tests		
				-2 Log Likelihood	Chi-Square[a,b]	df	Sig.
Step 0	0	Entered	Intercept	154.212	.		
Step 1	1	Entered	Chainstore	136.113	18.099	1	.000
Step 2	2	Entered	Branch_Locatus	123.399	12.714	4	.013
Step 3	3	Entered	Retail_Floor_space	113.278	10.121	4	.038

Stepwise Method: Forward Stepwise

a. The chi-square for entry is based on the likelihood ratio test.

b. The chi-square for removal is based on the likelihood ratio test.

Table XXVII: Nominal regression

Online score Model Fitting Information

Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	154.212			
Final	113.278	40.934	9	.000

Table XXVIII: Nominal regression

Online score Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	41.206	35	.218
Deviance	47.191	35	.082

Table XXIX: Nominal regression

Online score Pseudo R-Square

Cox and Snell	.124
Nagelkerke	.170
McFadden	.101

Table XXX: Nominal regression

Online score Likelihood Ratio Tests

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	113.278[a]	.000	0	.
Retail_Floor_space	123.399	10.121	4	.038
Branch_Locatus	125.498	12.220	4	.016
Chainstore	124.338	11.060	1	.001

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

Table XXXI: Nominal regression

Online score Parameter Estimates

Online_score_dichotome[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
Low use of online channels	Intercept	-1.085	.539	4.049	1	.044			
	[Retail_Floor_space=1]	1.769	.656	7.279	1	.007	5.867	1.623	21.216
	[Retail_Floor_space=2]	1.376	.488	7.952	1	.005	3.959	1.521	10.304
	[Retail_Floor_space=3]	1.247	.514	5.887	1	.015	3.479	1.271	9.524
	[Retail_Floor_space=4]	1.302	.620	4.409	1	.036	3.678	1.091	12.403
	[Retail_Floor_space=5]	0[b]	.	.	0	.	.	.	.
	[Branch_Locatus=1]	.702	.439	2.560	1	.110	2.019	.854	4.773
	[Branch_Locatus=2]	-.453	.379	1.424	1	.233	.636	.302	1.338
	[Branch_Locatus=3]	.446	.488	.839	1	.360	1.563	.601	4.063
	[Branch_Locatus=4]	-.177	.499	.126	1	.723	.838	.315	2.227
	[Branch_Locatus=5]	0[b]	.	.	0	.	.	.	.
	[Chainstore=1]	.897	.274	10.717	1	.001	2.453	1.433	4.198
	[Chainstore=2]	0[b]	.	.	0	.	.	.	.

a. The reference category is: High use of online channels.

b. This parameter is set to zero because it is redundant.

APPENDIX IX: In shop technology

Table XXXII: General:

Statistics

		In_shop_score	In shop score groups
N	Valid	308	308
	Missing	0	0

Table XXXIII: Frequency

In shop score

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	70	22.7	22.7	22.7
	1	67	21.8	21.8	44.5
	2	72	23.4	23.4	67.9
	3	49	15.9	15.9	83.8
	4	30	9.7	9.7	93.5
	5	16	5.2	5.2	98.7
	6	1	.3	.3	99.0
	7	1	.3	.3	99.4
	8	2	.6	.6	100.0
	Total	308	100.0	100.0	

Table XXXIV: Frequency

In shop score groups

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Low use of in-shop channels	137	44.5	44.5	44.5
	Medium use of in-shop channels	121	39.3	39.3	83.8
	High use of in-shop channels	50	16.2	16.2	100.0
	Total	308	100.0	100.0	

Table XXXV: Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
In shop score groups * Branch_Locatus	308	100.0%	0	0.0%	308	100.0%
In shop score groups * Age groups	308	100.0%	0	0.0%	308	100.0%
In shop score groups * Gender	308	100.0%	0	0.0%	308	100.0%
In shop score groups * Chainstore	308	100.0%	0	0.0%	308	100.0%
In shop score groups * Shopping center type (SC type)	308	100.0%	0	0.0%	308	100.0%
In shop score groups * Retail floor space	308	100.0%	0	0.0%	308	100.0%

Table XXXVI: Crosstab

In shop score groups & Gender

		Gender		
		Women	Men	Total
In shop score groups	Low use of in-shop channels	43.3%	45.7%	44.5%
	Medium use of in-shop channels	43.3%	35.1%	39.3%
	High use of in-shop channels	13.4%	19.2%	16.2%
Total		100.0%	100.0%	100.0%

Table XXXXVII: Chi-Square Test

In shop score groups & Gender

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.031[a]	2	.220
Likelihood Ratio	3.040	2	.219
Linear-by-Linear Association	.173	1	.678
N of Valid Cases	308		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 24.51.

Table XXXVIII: Crosstab

In shop score groups & Age Groups

		Age groups					Total
		Under 25	26 - 35	36 - 45	46 - 55	56 and older	
In shop score groups	Low use of in-shop channels	32.4%	42.4%	52.6%	42.3%	48.6%	44.5%
	Medium use of in-shop channels	47.1%	37.6%	32.9%	43.6%	40.0%	39.3%
	High use of in-shop channels	20.6%	20.0%	14.5%	14.1%	11.4%	16.2%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table XXXIX: Chi-Square Test

In shop score groups & Age Groups

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.305[a]	8	.613
Likelihood Ratio	6.353	8	.608
Linear-by-Linear Association	2.163	1	.141
N of Valid Cases	308		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.52.

Table XXXX Crosstab

In shop score groups & Branch Locatus

		Branch_Locatus					Total
		Daily	Fashion/ luxury	Leisure	Home furnishings / appliance	Remaining	
In shop score groups	Low use of in-shop channels	43.3%	28.7%	50.0%	59.4%	67.3%	44.5%
	Medium use of in-shop channels	40.3%	47.0%	38.1%	28.1%	28.8%	39.3%
	High use of in-shop channels	16.4%	24.3%	11.9%	12.5%	3.8%	16.2%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table XXXXI: Chi-Square Test

In shop score groups & Branche locatus

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	28.991[a]	8	.000
Likelihood Ratio	30.739	8	.000
Linear-by-Linear Association	16.811	1	.000
N of Valid Cases	308		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.19.

Table XXXXII: Crosstab

In shop score groups & Chain store

		Chainstore		
		No	Yes	Total
In shop score groups	Low use of in-shop channels	68.4%	26.3%	44.5%
	Medium use of in-shop channels	29.3%	46.9%	39.3%
	High use of in-shop channels	2.3%	26.9%	16.2%
Total		100.0%	100.0%	100.0%

Table XXXXIII: Chi-Square Test

In shop score groups & Chain store

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	64.249[a]	2	.000
Likelihood Ratio	71.552	2	.000
Linear-by-Linear Association	63.614	1	.000
N of Valid Cases	308		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 21.59.

Table XXXXIV: Crosstab

In shop score groups & Retail floor space

		Retail floor space					
		1 - 50 m2	51 - 150 m2	151 - 300 m2	301 - 600 m2	600+ m2	Total
In shop score groups	Low use of in-shop channels	55.2%	49.0%	36.6%	48.1%	28.0%	44.5%
	Medium use of in-shop channels	34.5%	43.4%	41.5%	29.6%	24.0%	39.3%
	High use of in-shop channels	10.3%	7.6%	22.0%	22.2%	48.0%	16.2%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table XXXXV: Chi-Square Test

In shop score groups & Retail floor space

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	32.281[a]	8	.000
Likelihood Ratio	28.922	8	.000
Linear-by-Linear Association	16.025	1	.000
N of Valid Cases	308		

a. 3 cells (20.0%) have expected count less than 5. The minimum expected count is 4.06.

Table XXXXVI: Crosstab

In shop score groups Shopping center type (SC type)

		Shopping center type (SC type)			
		Sub-Regional center	Regional center	High street center	Total
In shop score groups	Low use of in-shop channels	58.2%	52.6%	26.7%	44.5%
	Medium use of in-shop channels	33.6%	32.1%	49.2%	39.3%
	High use of in-shop channels	8.2%	15.4%	24.2%	16.2%
Total		100.0%	100.0%	100.0%	100.0%

Table XXXXVII: Chi-Square Test

In shop score groups & Shopping center type (SC type)

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	28.344[a]	4	.000
Likelihood Ratio	29.582	4	.000
Linear-by-Linear Association	24.736	1	.000
N of Valid Cases	308		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 12.66.

Table XXXXVIII: Nominal regression

Case Processing Summary

		N	Marginal Percentage
In shop score groups	Low use of in-shop channels	137	44.5%
	Medium use of in-shop channels	121	39.3%
	High use of in-shop channels	50	16.2%
Branch_Locatus	Daily	67	21.8%
	Fashion/luxury	115	37.3%
	Leisure	42	13.6%
	Home furnishings / appliance	32	10.4%
	Remaining	52	16.9%
Chainstore	No	133	43.2%
	Yes	175	56.8%
Shopping center type (SC type)	Sub-Regional center	110	35.7%
	Regional center	78	25.3%
	High street center	120	39.0%
Retail floor space	1 - 50 m2	29	9.4%
	51 - 150 m2	145	47.1%
	151 - 300 m2	82	26.6%
	301 - 600 m2	27	8.8%
	600+ m2	25	8.1%
Valid		308	100.0%
Missing		0	
Total		308	
Subpopulation		99[a]	

a. The dependent variable has only one value observed in 52 (52.5%) subpopulations.

Table XXXXIX: Nominal regression

In shop technology groups Step Summary

Model		Action	Effect(s)	Model Fitting Criteria	Effect Selection Tests		
				-2 Log Likelihood	Chi-Square[a,b]	df	Sig.
Step 0	0	Entered	Intercept	386.955	.		
Step 1	1	Entered	Chainstore	315.403	71.552	2	.000
Step 2	2	Entered	SC_type	300.497	14.907	4	.005
Step 3	3	Entered	Retail_Floor_space	278.621	21.876	8	.005

Stepwise Method: Forward Stepwise

a. The chi-square for entry is based on the likelihood ratio test.

b. The chi-square for removal is based on the likelihood ratio test.

Table L: Nominal regression

In shop technology groups model Fitting Information

Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	386.955			
Final	278.621	108.335	14	.000

Table LI: Nominal regression

In shop technology groups goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	187.214	182	.380
Deviance	171.834	182	.694

Table LII: Nominal regression

In shop technology groups pseudo R-Square

Cox and Snell	.297
Nagelkerke	.341
McFadden	.172

Table LIII: Nominal regression

In shop technology groups Likelihood Ratio Tests

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	278.621[a]	.000	0	.
Chainstore	327.953	49.332	2	.000
SC_type	294.268	15.647	4	.004
Retail_Floor_space	300.497	21.876	8	.005

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

Table LIV: Nominal regression:

In shop technology groups Parameter Estimates

In shop score groups[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B) Lower Bound	95% Confidence Interval for Exp(B) Upper Bound
Low use of in-shop channels	Intercept	-1.833	.590	9.658	1	.002			
	[Chainstore=1]	3.113	.638	23.824	1	.000	22.483	6.442	78.468
	[Chainstore=2]	0[b]	.	.	0	.	.	.	.
	[SC_type=1]	1.558	.499	9.742	1	.002	4.750	1.786	12.638
	[SC_type=2]	.977	.489	3.997	1	.046	2.657	1.019	6.926
	[SC_type=3]	0[b]	.	.	0	.	.	.	.
	[Retail_Floor_space=1]	1.852	.887	4.363	1	.037	6.375	1.121	36.256
	[Retail_Floor_space=2]	1.893	.638	8.817	1	.003	6.641	1.903	23.174
	[Retail_Floor_space=3]	.609	.639	.908	1	.341	1.839	.525	6.434
	[Retail_Floor_space=4]	1.239	.777	2.543	1	.111	3.451	.753	15.820
	[Retail_Floor_space=5]	0[b]	.	.	0	.	.	.	.
Medium use of in-shop channels	Intercept	-1.083	.555	3.810	1	.051			
	[Chainstore=1]	1.817	.639	8.086	1	.004	6.156	1.759	21.542
	[Chainstore=2]	0[b]	.	.	0	.	.	.	.
	[SC_type=1]	.595	.477	1.551	1	.213	1.812	.711	4.619
	[SC_type=2]	.068	.459	.022	1	.882	1.070	.435	2.634
	[SC_type=3]	0[b]	.	.	0	.	.	.	.
	[Retail_Floor_space=1]	1.820	.856	4.520	1	.034	6.172	1.153	33.049
	[Retail_Floor_space=2]	2.323	.614	14.327	1	.000	10.209	3.066	33.996
	[Retail_Floor_space=3]	1.279	.602	4.509	1	.034	3.592	1.103	11.690
	[Retail_Floor_space=4]	1.074	.755	2.023	1	.155	2.926	.666	12.846
	[Retail_Floor_space=5]	0[b]	.	.	0	.	.	.	.

a. The reference category is: High use of in-shop channels.

b. This parameter is set to zero because it is redundant.

APPENDIX X: Channel integration

Table LV:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Channel_integration_Groups * Online_score_dichotome	308	100.0%	0	0.0%	308	100.0%
Channel_integration_Groups * In shop score groups	308	100.0%	0	0.0%	308	100.0%

Table LVI Crosstab:

Channel integration & online score dichotome

		Online_score_dichotome		
		Low use of online channels	High use of online channels	Total
Channel_integration_Groups	Low use of channel integration	45.6%	20.9%	36.4%
	Medium use of channel integration	35.8%	35.7%	35.7%
	High use of channel integration	18.7%	43.5%	27.9%
Total		100.0%	100.0%	100.0%

Table LVII: Chi-Square Test:

Channel integration & online score dichotome

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	28.022[a]	2	.000
Likelihood Ratio	28.405	2	.000
Linear-by-Linear Association	27.742	1	.000
N of Valid Cases	308		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 32.11.

Table LVIII: Crosstab

Channel integration & in shop score groups

		In shop score groups			
		Low use of in-shop channels	Medium use of in-shop channels	High use of in-shop channels	Total
Channel_integration_Groups	Low use of channel integration	51.8%	29.8%	10.0%	36.4%
	Medium use of channel integration	38.7%	34.7%	30.0%	35.7%
	High use of channel integration	9.5%	35.5%	60.0%	27.9%
Total		100.0%	100.0%	100.0%	100.0%

Table LIX: Chi-Square Test

Channel integration & in shop score groups

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	58.458[a]	4	.000
Likelihood Ratio	62.375	4	.000
Linear-by-Linear Association	55.252	1	.000
N of Valid Cases	308		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 13.96.

Table LX: Nominal regression

Channel integration Case processing summary

		N	Marginal Percentage
Channel_integration_Groups	Low use of channel integration	112	36.4%
	Medium use of channel integration	110	35.7%
	High use of channel integration	86	27.9%
Online_score_dichotome	Low use of online channels	193	62.7%
	High use of online channels	115	37.3%
In shop score groups	Low use of in-shop channels	137	44.5%
	Medium use of in-shop channels	121	39.3%
	High use of in-shop channels	50	16.2%
Valid		308	100.0%
Missing		0	
Total		308	
Subpopulation		6	

Table LXI: Nominal regression

Channel integration Step Summary

Model		Action	Effect(s)	Model Fitting Criteria	Effect Selection Tests		
				-2 Log Likelihood	Chi-Square[a.b]	df	Sig.
Step 0	0	Entered	Intercept	122.477	.		
Step 1	1	Entered	In_shop_score_groups	60.103	62.375	4	.000
Step 2	2	Entered	Online_score_dichotome	47.363	12.740	2	.002

Stepwise Method: Forward Stepwise

a. The chi-square for entry is based on the likelihood ratio test.

b. The chi-square for removal is based on the likelihood ratio test.

Table LXII: Nominal regression

Channel integration model fitting information

Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	122.477			
Final	47.363	75.114	6	.000

Table LXIII: Nominal regression

Channel integration Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	2.422	4	.659
Deviance	2.430	4	.657

Table LXIV: Nominal regression:

Channel integration Pseudo R-Square

Cox and Snell	.216
Nagelkerke	.244
McFadden	.112

Table LXV: Nominal regression

Channel integration Likelihood Ratio Tests

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	47.363[a]	.000	0	.
Online_score_dichotome	60.103	12.740	2	.002
In_shop_score_groups	94.073	46.710	4	.000

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

Table LXVI: Nominal regression

Channel integration Parameter Estimates

Channel_integration_Groups[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
Low use of channel integration	Intercept	-2.290	.518	19.515	1	.000			
	[Online_score_dichotome=0]	1.211	.345	12.294	1	.000	3.358	1.706	6.610
	[Online_score_dichotome=1]	0[b]	.	.	0	.	.	.	.
	[In_shop_score_groups=0]	3.131	.582	28.979	1	.000	22.894	7.322	71.576
	[In_shop_score_groups=1]	1.364	.545	6.255	1	.012	3.912	1.343	11.394
	[In_shop_score_groups=2]	0[b]	.	.	0	.	.	.	.
Medium use of channel integration	Intercept	-.882	.337	6.864	1	.009			
	[Online_score_dichotome=0]	.565	.313	3.255	1	.071	1.760	.952	3.252
	[Online_score_dichotome=1]	0[b]	.	.	0	.	.	.	.
	[In_shop_score_groups=0]	1.925	.453	18.086	1	.000	6.856	2.823	16.647
	[In_shop_score_groups=1]	.552	.391	1.995	1	.158	1.737	.807	3.737
	[In_shop_score_groups=2]	0[b]	.	.	0	.	.	.	.

a. The reference category is: High use of channel integration.

b. This parameter is set to zero because it is redundant.

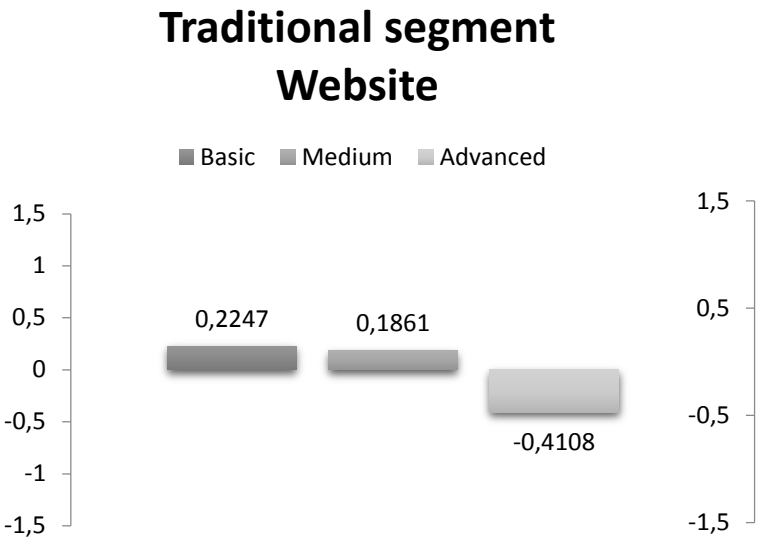
APPENDIX XI: MNL Latent class results

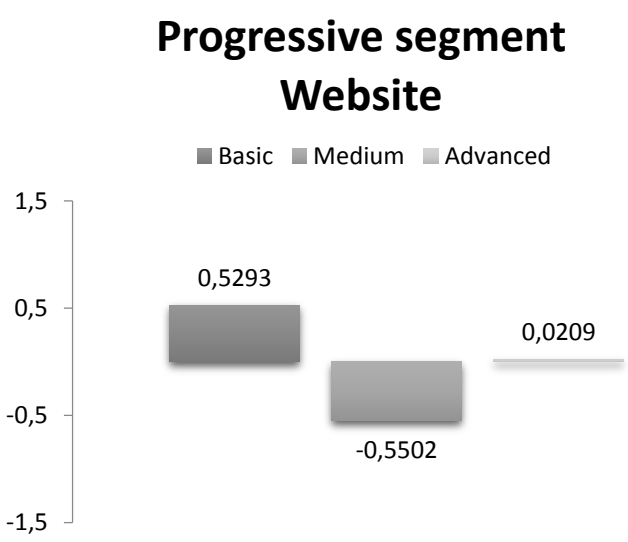
Table LXVII: MNL Latent class Results

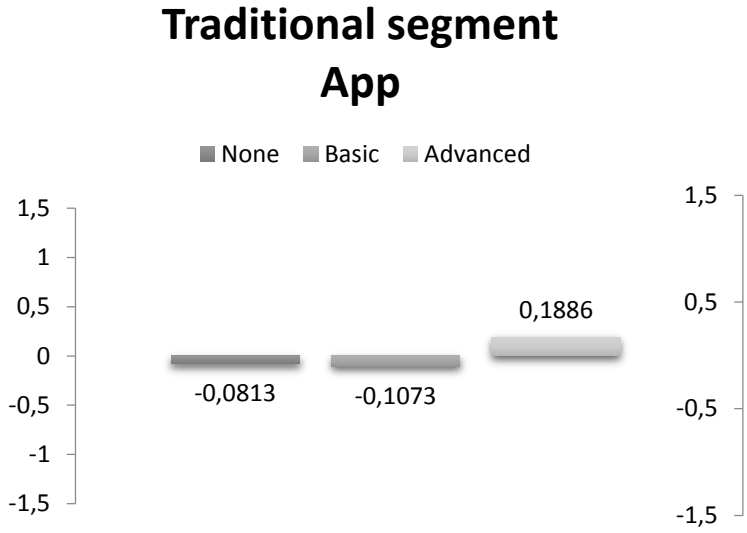
Log likelihood function	-2006.96261
Restricted log likelihood	-2942.08371
Chi squared [31](P= .000)	1870.24221
Significance level	.00000
McFadden Pseudo R-squared	.3178431

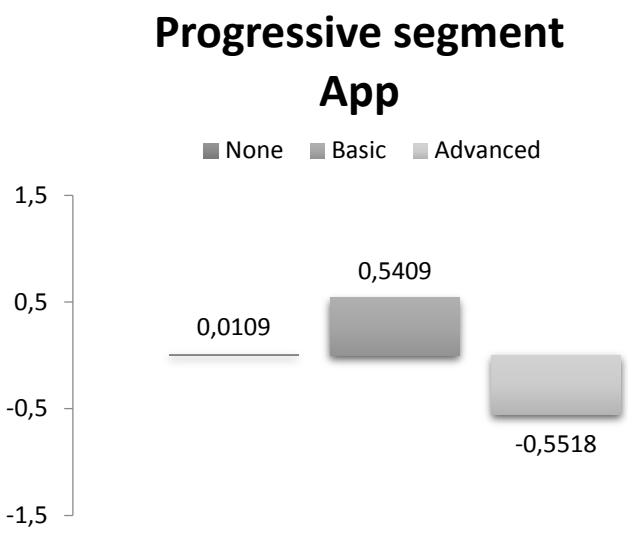
Shopping center Technology	Level	SEGMENT 1		SEGMENT 2	
		β	p	β	p
Constant	-	-3.4231	0.0000	1.7740	0.000
Website:	*Basic*	0.2247	0.2723	0.5293	0.2827
	Medium	0.1861	0.4047	-0.5502	0.2824
	Advanced	-0.4107	-	0.0209	-
App:	*None*	-0.8138	0.7237	0.0109	0.8722
	Basic	-0.1073	0.6423	0.5409	0.3178
	Advanced	0.1886	-	-0.5518	-
Social media:	*None*	0.01484	0.9420	1.3857	0.0130
	Basic	0.8966	0.6698	-0.3576	0.4395
	Advanced	0.0748	-	-1.0281	-
Information Kiosks:	Basic	-0.2998	0.1716	0.1104	0.0356
	Medium	0.2051	0.2824	-0.1199	0.0288
	Advanced	0.2793	-	0.0095	-
Advertisement screens	*Basic*	0.2145	0.2992	0.2187	0.0006
(Screen time)	*Medium*	-0.7738	0.0038	-0.4085	0.4431
	Advanced	0.5592	-	0.1899	-
Pickup points:	*None*	-0.1192	0.5682	0.3658	0.5241
	Basic	0.1733	0.9340	0.4155	0.4102
	Advanced	0.1019	-	-0.7813	-
Discount/additional costs	*None*	-0.2653	0.2295	-0.4274	0.4055
	10% extra costs	-0.3958	0.0799	-0.6246	0.1639
	10% discount	0.3958	-	1.0520	-

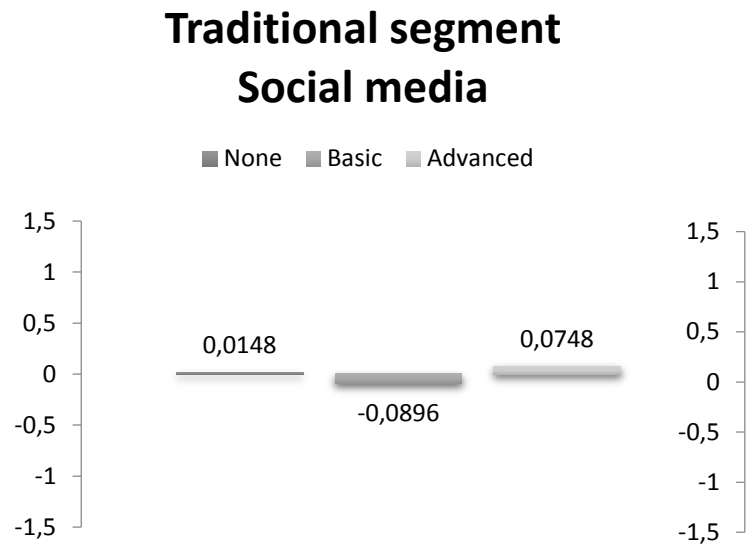
APPENDIX XII: MNL Latent class Graphs

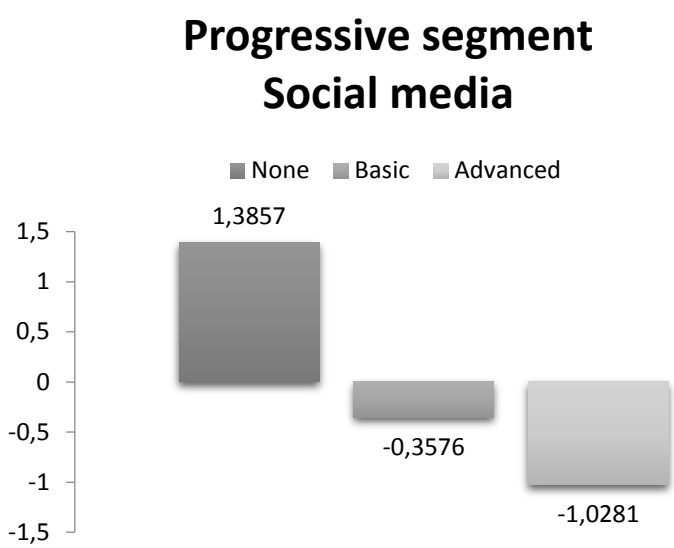


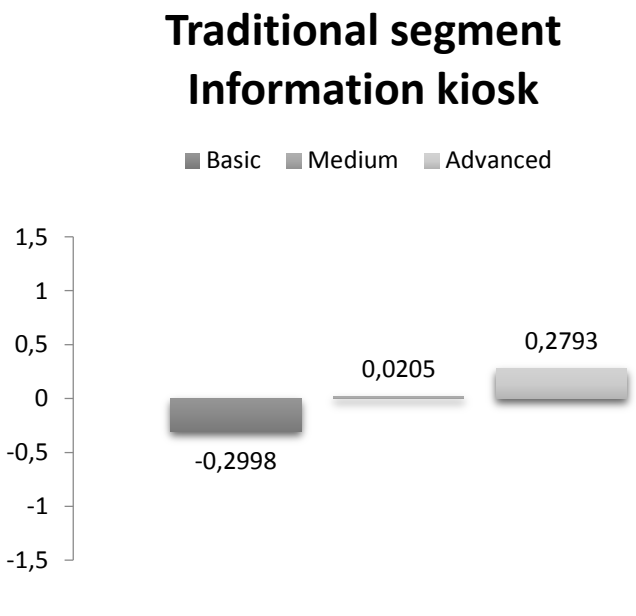








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Information kiosk
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Medium
Advanced
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0
-0,5
-1
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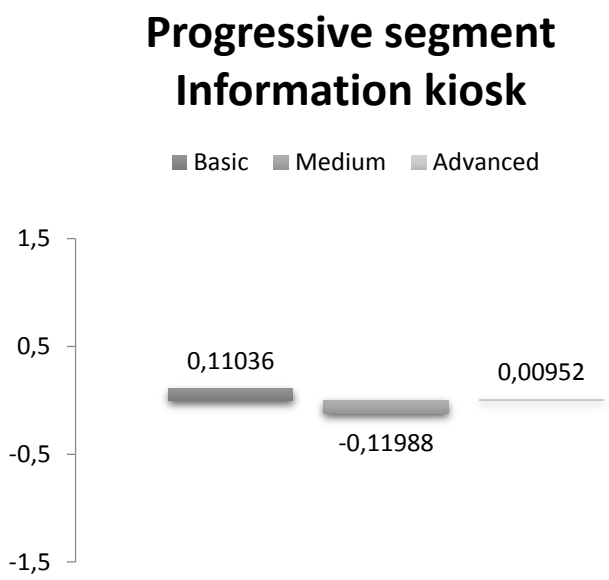
0,2793
-0,2998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Information kiosk
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Medium
Advanced
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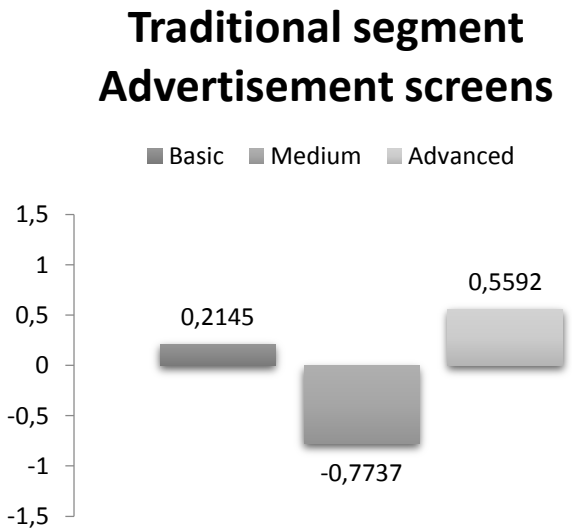
Traditional segment
Advertisement screens
Basic
Medium
Advanced
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-1
-1,5
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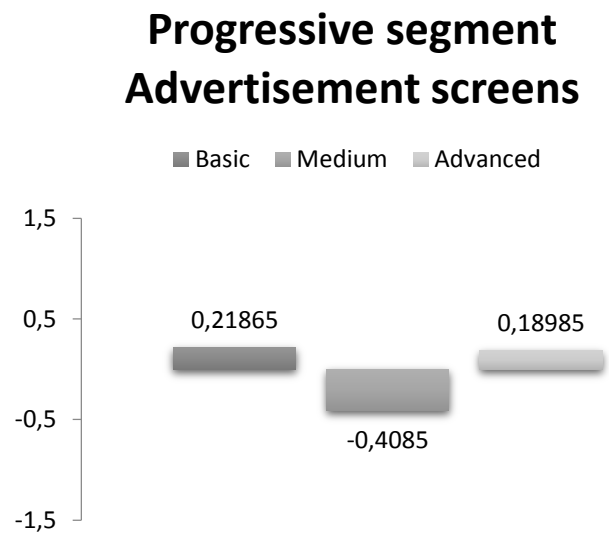
0,5592
-0,7737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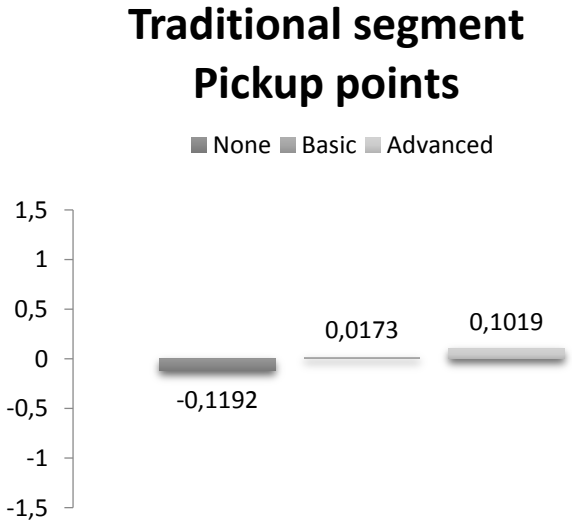
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Pickup points
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Advanced
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0
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-1
-1,5
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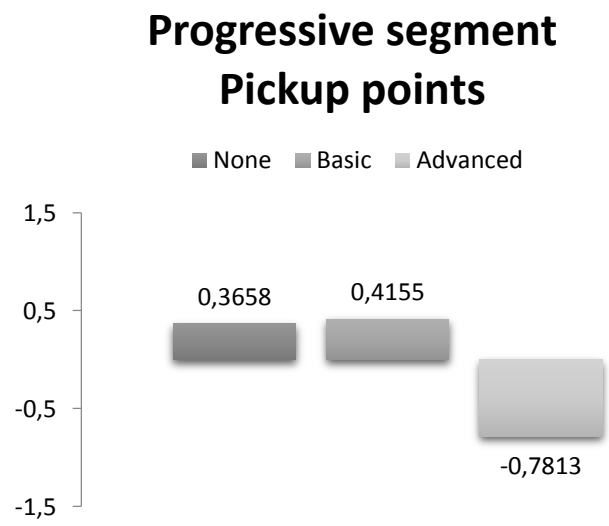
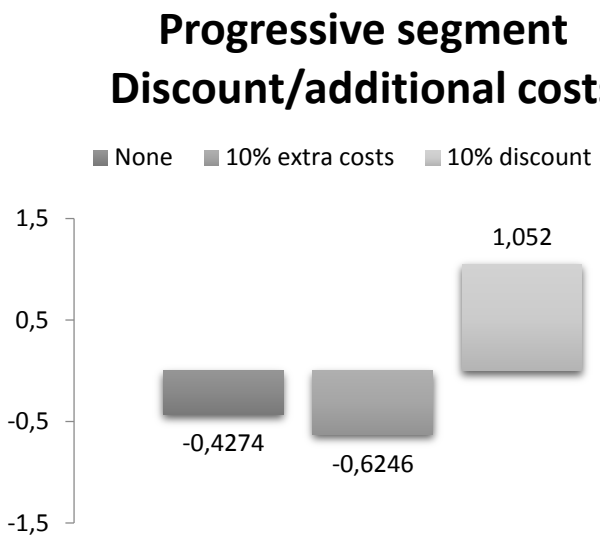
0,1019
-0,1192


Progressive segment
Pickup points
None
Basic
Advanced
1,5
0,5
-0,5
-1,5
0,3658
0,4155
-0,7813


Traditional segment
Discount/additional costs
None
10% extra costs
10% discount
1,5
1
0,5
0
-0,5
-1
-1,5
0,661
-0,2652
-0,3958


Progressive segment
Discount/additional costs
None
10% extra costs
10% discount
1,5
0,5
-0,5
-1,5
1,052
-0,4274
-0,6246

APPENDIX XIII: Clusters

Table LXVIII:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Channel_integration_Groups * Clusters_combined	298	96.8%	10	3.2%	308	100.0%

Table LXIX Crosstab:

Channel integration & online score dichotome

		Online_score_dichotome		
		Low use of online channels	High use of online channels	Total
Channel_integration_Groups	Low use of channel integration	45.6%	20.9%	36.4%
	Medium use of channel integration	35.8%	35.7%	35.7%
	High use of channel integration	18.7%	43.5%	27.9%
Total		100.0%	100.0%	100.0%

Table LXX: Chi-Square Test:

Channel integration & online score dichotome

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	28.022[a]	2	.000
Likelihood Ratio	28.405	2	.000
Linear-by-Linear Association	27.742	1	.000
N of Valid Cases	308		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 32.11.

Table LXXI: Nominal regression

Clusters Case Processing Summary

		N	Marginal Percentage
Clusters_combined	1.00 (traditional attitude)	108	36.2%
	2.00 (progressive attitude)	190	63.8%
Channel_integration_Groups	Low use of channel integration	107	35.9%
	Medium use of channel integration	108	36.2%
	High use of channel integration	83	27.9%
Valid		298	100.0%
Missing		10	
Total		308	
Subpopulation		3	

Table LXXII: Nominal regression

Clusters Model Fitting Information

	Model Fitting Criteria	Likelihood Ratio Tests		
Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	69.230			
Final	13.882	55.348	2	.000

Table LXXIII: Nominal regression

Clusters Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	.000	0	.
Deviance	.000	0	.

Table LXXIV: Nominal regression:

Clusters Pseudo R-Square

Cox and Snell	.170
Nagelkerke	.232
McFadden	.142

Table LXXV: Nominal regression

Clusters Likelihood Ratio Tests

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	13.882[a]	.000	0	.
Channel_integration_Groups	69.230	55.348	2	.000

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

Table LXXVI: Nominal regression

Clusters Parameter Estimates

Clusters_combined[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
1.00	Intercept	-2.385	.395	36.454	1	.000			
	[Channel_integration_Groups=0]	2.705	.441	37.654	1	.000	14.959	6.304	35.495
	[Channel_integration_Groups=1]	1.814	.443	16.781	1	.000	6.137	2.576	14.619
	[Channel_integration_Groups=2]	0[b]	.	.	0	.	.	.	.

a. The reference category is: 2.00.

b. This parameter is set to zero because it is redundant.