How to Improve Online B2C Sales?

A Conversion Rate Study

Master Thesis Business Administration – Service Management

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ABSTRACT

The goal of this study is to enrich the research field of conversion rate optimization (CRO) by adapting the Information System Success Model of DeLone and McLean (2003) to the context of conversion rate optimization of online shops. The results explain and help predict the effects of multiple factors influencing conversion rates. The paper presents multiple-item measurements for the following determinants; content quality, system quality, and layout quality. These measurements were turned into a rating instrument which is based on an extensive literature review. A sample of 43 online shops was rated and analyzed based on web analytics retrieved from databases of the online shops themselves and a third party database. In order to uncover major dimensions underlying the set of items, categorical principal component analysis was executed. The results provide two dimensions for conversion rate optimization: professionalism and convenience. These dimensions were further analyzed by conducting categorical regression analysis for each dimension as well as the individual factors of both dimensions. Four items were found to have statistical significant positive impact on conversion rates: an easy to scan online shop, good quality of product representation, high initial access speed of the homepage, and the option to create a personal account.

KEYWORDS

Conversion Rate Optimization, Online Shop, Information Systems Success Model, Quality Web Site Content, E-Commerce, Web Analytics

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1. INTRODUCTION

Business-to-Consumer (B2C) e-commerce is defined as business transactions between a company and a consumer in the online environment. B2C e-commerce has experienced explosive growth the last decade (Eurostat[1]). The Netherlands are positioned in the top of European countries regarding online shopping during 2011. In 2011 sixty-nine percent of the Dutch consumers between 16-75 years old used the internet for their purchase (Akkermans, 2012). It also appeared that online shopping is still growing. During the period between 2006-2011 the amount of Dutch online shoppers increased with over twenty percent (Akkermans, 2012).

This growth offers retailers opportunities to expand their online business activities. However, to convince consumers to buy online is more complicated than the shopping process in traditional brick stores. The purchases in online shops are mainly based on the online appearance of the shop because the products or services offered are intangible. Online shops experience also more obstacles like trust and security issues and the lack of direct contact with both the seller and the product. Therefore other factors are important than in traditional retailing, which means the online purchase process can be influenced in different ways compared to the traditional purchase process (Park & Kim, 2003). The online shopping experience can be identified as a crucial e-commerce marketing activity, because the shopping experience is the total impression a consumer gets about the online company (Constantinides, 2004). This online shopping experience should be optimized in order to improve the profits.

Conversion rate optimization was developed out of a need to improve web site's results. Conversion rate optimization helps e-commerce or online marketing managers to measure their web site's effectiveness. The effectiveness depends on the goals of the web site which results in various definitions of conversion rate optimization. One of the most complete definitions is the one of Andrew B. King:

'Conversion rate optimization (CRO) is the art and science of persuading site visitors to take actions that benefit you, by making a purchase, offering a donation, or committing to some positive future action' (King, 2008).

Conversion rate optimization helps retailers to increase sales, revenues, profits and/or the generation of leads by using different techniques like persuasive copywriting and credibility-based web design.

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[1] http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc_ec_ibuy&lang=en

According to Eisenberg, Eisenberg, and Davis (2005) the following benefits can also be named:

- More sales out of existing traffic and channels (no additional marketing expenses required to attract more traffic);
- Cost of customer acquisition goes down;
- Customer retention goes up;
- Customer lifetime value increases;
- The effect is more permanent than any particular marketing program.

Average conversion rates vary between 2% and 3% (Eisenberg et al., 2005), which means online retailers are still faced with a majority of visitors who do not complete the shopping process. High-quality optimization of online shops might increase the conversion rate by 50% to 200% or even more (King, 2008). This brings the question: what is optimization exactly? The definition of "optimization" is the selection of the best solution from a set of alternatives. Optimization is also the discipline of applying advanced analytical methods to make better decisions. In the context of conversion rates of online shops optimization means systematic measuring and testing to increase conversion rates. Every improvement must be seen as the baseline for the next adjustment (Eisenberg et al., 2005).

This research is carried out for Innovadis[2], an e-commerce company in the Netherlands which lacks an overview of which conversion rate optimization techniques are effective and which ones are more effective than the other in order to reach for high-quality optimization. Innovadis is specialized in e-commerce and part of Innovadis Group (70 FTE). E-commerce companies are specialized in designing, building, implementing and marketing of online shops. They support retailers with their online shop from the beginning. Once an online shop is realized, it is important to keep the shop up to date and to improve the shop continuously. This is where conversion rate optimization comes into play. At the moment a standard method for optimization is missing and decisions about changes are based on gut feelings and previous experiences.

The objective of this study is to structure the research field of conversion rate optimization, create an overview of conversion optimization areas and advise Innovadis on which techniques are most effective, which leads to the following research questions.

> **Which factors are most effective for improving conversion rates of online B2C shops?**

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[2] www.innovadis.com

In order to approach this question the following sub questions are formulated:

- *Which determinants for conversion rate optimization of an online B2C shop can be distinguished?*
  This question will be answered by an extensive literature research concerning possible areas for conversion rate optimization.
- *Which conversion optimization factors are effective?*
  The empirical study will answer this question.

This research is focused on B2C online shops. Most research about e-commerce has been focusing on web sites for selling products or services, but also for information provision and promotional activities (Palmer, 2002). These usages differ substantially. Therefore a focus is required in order to come to one adequate definition of conversion rate optimization. All cases in this study are profit online B2C shops with physical products. The goal of these online shops is to optimize the amount of products sold in order to increase profits which means the definition of a conversion rate is related to sales.

The conversion rate could also be divided into different steps within one online shop. A conversion might be the moment when a consumer places a product in his or her basket, describes to a newsletter or the final moment of payment. The purchase conversion rate can also be divided into different tasks (e.g. selection of product, placement into shopping cart, provision of shipping information, and provision of billing information) a visitor should complete before the purchase takes place (Sismeiro & Bucklin, 2004). All these steps could be a measurement point for the conversion ratio. What measurement point one chooses, depends on the goal formulated by the online retailer. In other words: the conversion goal equals the desired action.

A desired action will be defined as making an online purchase in this research. The cases in this study are all focused on selling physical products, hence the conversion goal is mostly to sell as much products as possible. The definition of a conversion rate follows out of this conversion goal:

Conversion Rate = (purchases/ visitors)*100

In this research the conversion rate will be measured as the percentage of visits that results in purchases. Even very small changes in the conversion ratio can result in considerable increases in sales revenue now and in the future (Sismeiro & Bucklin, 2004).

This study will differentiate determinants of conversion rate optimization which can be used during this systematical process. The goal of the research is to create and test a model for improving

conversion rates. We lack an overview of how to optimize conversion rates at the moment due to the high amount of possible ways to optimize the conversion rate. This research is explorative in nature and will try to relate papers to give an overview and integrate conversion variables in a theoretical model. The updated IS Success Model of DeLone & McLean (2003) will be used to create structure in the determining variables for conversion rate optimization.

1.1 RELEVANCE OF RESEARCH

The academic literature in the field of online commerce has peaked during the rise of the internet at the beginning of this century. Most research is outdated and more than ten years old. Customers are nowadays more used to shopping online then they were ten years ago, which means their needs and expectations also have evolved. Articles on how to optimize web sites were published, but there is no consensus about which ways are effective or any well-known theoretical model about conversion rates of online shops which contributes to improving CRO. Most studies are based on the opinions of participants about web site usability or the intention to purchase, which means they rely on subjective data whereby consumers are not making a real purchase. This research will work with real data of existing B2C shops to examine the conversion rate topic.

The academic relevance of this thesis is to enrich the academic literature about conversion rate optimization. Current research is focused on attracting visitors, but creating more traffic will not necessarily lead to more purchases. Retaining customers is another part of the e-commerce process, but also not the scope of this study. An optimization of the convert part of the process will have positive influence on the retain part of the e-commerce process as well. Therefore this study focuses on converting, because online shops must have an optimized structure to enhance their conversion rate and transform their visitors into customers (Eisenberg et al., 2005). Hence, the convert part of the e-commerce process will be explored.
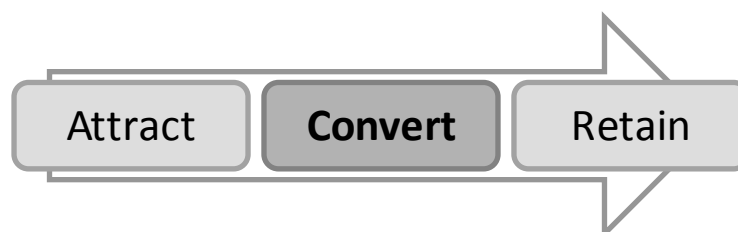

Fig. 1: E-commerce Process; Research Scope

Conversion rate optimization is a popular topic on marketing and e-commerce blogs (www.frankwatching.com, www.getelastic.com), but the conclusions are not based on scientific research. This research will give scientific evidence of which conversion optimization are effective or not and will also create structure by developing a model for measuring CRO metrics.

The practical relevance of this thesis is partly the impact of improved conversion on consumers' online shopping experience. Online shopping will be more convenient for online customers when the online shop aims for an optimal conversion rate.

Second, e-commerce managers and consultants will benefit from this thesis. E-commerce managers struggle with conversion rates rarely exceeding three percent (Eisenberg et al., 2005; King, 2008). The results of this study will enable them to improve this ratio. E-commerce consultants must be forefront with all conversion developments to advise e-commerce managers. This study will give them a model and an overview of effective conversion techniques nowadays.

2. THEORY OF CONVERSION RATE OPTIMIZATION

An online shop replaces the traditional physical shop environment with an electronic shopping environment. It is a combination of both an information system (Van der Heijden, Verhagen, & Creemers, 2003) and an information service (Wijnhoven, 2011). An information system is a group of components that interact to produce information (Kroenke, 2008). Using an online shop is using an information system, because the user and the online shop must employ computer hardware and software focused on information storage, display, processing and transfer (Loiacono, Watson, & Goodhue, 2002). However, an online shop delivers also information about the products or services sold or offered. Unlike traditional information systems, e-commerce information systems contain both information and marketing elements. These elements require specific client-service provider interactions which are a characteristic of an information service (Wijnhoven, 2011).

Prior research investigated different factors of IS Success. System quality (Gable, Sedera, & Chan, 2003), service quality (J. J. Jiang, Klein, & Carr, 2002; Pitt, Watson, & Kavan, 1995; Yang, Cai, Zhou, & Zhou, 2005), usability (Lee & Kozar, 2009; Palmer, 2002; Venkatesh & Agarwal, 2006), user satisfaction (Thirumalai & Sinha, 2011), consumer behavior (Silverman, Bachann, & Al-Akharas, 2001) and design (Hevner, March, Park, & Ram, 2004; Palmer, 2002; Zahedi, 2009) are examples of researched factors. The general definition of Information System Success is 'the extent to which a system achieves the goals for which it was designed' (Drury, 2007). In the case of an online shop the goal is, most of the time, to sell as much products or services as possible in order to increase profits. Conversion rate optimization is a possible way to increase the amount of goods sold.

DeLone and McLean (1992) developed a model to cover all factors related to IS Success. This became one of the most used models in information system research. Ten years after their first concept of this model, they updated the model including e-commerce developments and research contributions. The model is applied under different conditions and the various causal relationships were tested separately in different situations (Molla & Licker, 2001; Petter & McLean, 2009; Seddon & Kiew, 2007; Y. S. Wang & Liao, 2008). However, the model is not applied to online shopping with conversion rate as net benefit until today.

Delone and McLean (2003) published their ten-year update of this model in 2003 including the latest developments and the research contributions since their original paper. The main changes are the addition of service quality as a determinant and the replacement of individual impact and organizational impact with net benefits. The inclusion of service quality was made because of the

changing nature of IS and the replacement of individual and organizational impact addressed the criticism that IS can affect levels other than individual and organizational impact.

The IS Success Model is a causal model which states that A causes B (if A increases, B will increase (or decrease) as well). The creation was driven by a process understanding of information systems and their impacts. DeLone and McLean (1992) distinguish three components; the creation of a system, the use of the system, and the consequences of this system use.

The IS Success Model is based on the quality of the system and has three major dimensions: *information quality*, *system quality*, and *service quality*. Each dimension should be measured separately to see if they will affect the other two dimensions of the model; *use* and *user satisfaction*. As a result of these last two dimensions certain *net benefits* will occur.
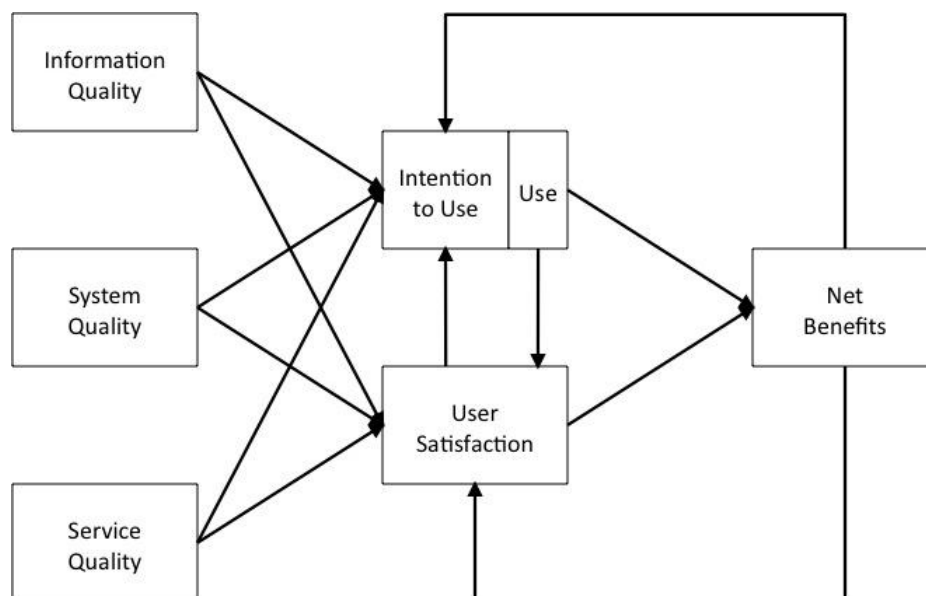
Fig. 2 Updated IS Success Model of DeLone & McLean (2003)

The net benefits of an information system depend on the following variables:

- **Information quality** in the Internet environment is about the web content. Web content should be adequate, complete, accurate, relevant, easy to understand, and secure.
- **System quality** captures the favored characteristics of an e-commerce system, like usability, availability, reliability, convenience, adaptability and response time.
- **Service quality** is the overall support delivered by the service provider which is the online retailer in e-commerce environments.
- **Intention to Use/Use** is broadly defined by DeLone & McLean, from a visit to a web site, to navigation within the site, to information retrieval, to execution of a transaction.

- **User satisfaction** means measuring the customers' opinions of the e-commerce system.
- **Net benefits** are the most important success measures available. These measures depend on the context and objectives for each e-commerce system.

The IS Success Model is used widely in information system research. The popularity of this model convinces that there is a great need for a comprehensive model concerning information system research. A similar complete model for conversion rate optimization would be helpful as well. The emphasis of this study is on assessing the direct impact of content quality, system quality and layout quality directly on conversion rates. The individual-level variables user satisfaction and intention to use/use are excluded in this study because they are outside the control of online shops (and therefore less relevant for Innovadis) and cannot be measured objectively. Hence, the simplified model of conversion rate optimization looks like this:
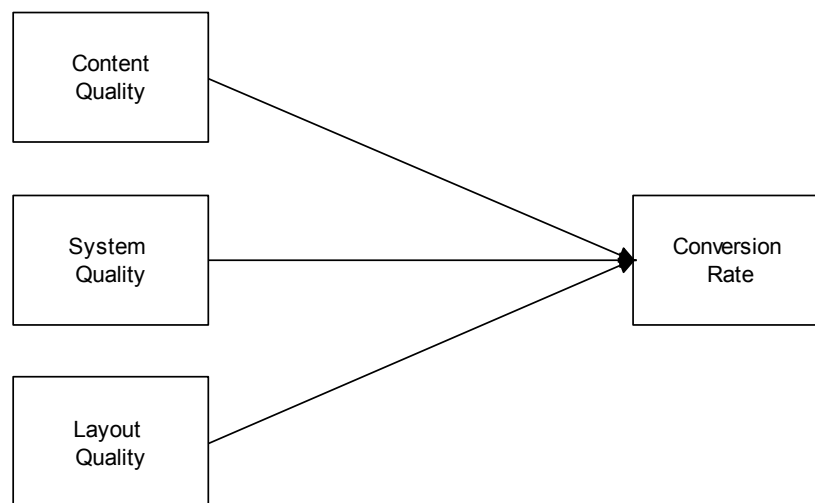
Fig. 3 Conversion Rate Optimization (CRO) Model

Each dimension consists of several factors which define that particular dimension. All factors will be discussed. First of all, the factors related to content quality.

2.1 CONTENT QUALITY

Content refers to the informational components of an online shop, either textual or graphical, as well as the features and services offered in the online shop (Ranganathan & Ganapathy, 2002). It was chosen to replace the label 'information' by 'content' because content is the most widely used term for all information on site which consists of a lot of functionalities described above. The quality of this content will be defined by using the views of known philosophers. The field of e-commerce is vastly changing. Philosophical views are however fundamental and therefore enduring. Therefore these views are used in order to prevent the research from becoming obsolete in short time notice.

Wijnhoven (2011) has explored the field of designing information services. He applies the different philosophical views of Locke, Leibniz, Kant, Hegel and Singer. These views will be used to organize the content part of the research model because the views are about the quality of information.

Each philosopher has been attached to a particular field of online shop content. These fields contribute all to improved information/content quality.

Locke emphasizes the role of experience and perceptions in the creation of ideas of people. The information a person receives must be an accurate and true representation of the reality in order to enhance the quality (Wijnhoven, 2011). This results for online shops in a truthful representation of the products they are offering.

Leibniz states that information is created through using the ratio. He believes the ratio enables people to make optimized choices (Wijnhoven, 2011). The online shop must support people with deciding which option is the most valuable option for them.

Kant mentions the differences between people and the competing ways of looking at reality (Wijnhoven, 2011). These various perspectives ask for customization of (potential) customers. This way the provided information can be targeted more efficiently.

Hegel's view is linked to the persuasion role of the content of online shops. According to Hegel the creation of information is a case of thesis and antithesis which ultimately leads to synthesis. The role of subjectivity is emphasized in his view (Wijnhoven, 2011).

Singer emphasizes that the quality of information is determined by the degree to which the information is able to solve problems of people (Wijnhoven, 2011). Therefore the quality of content of online shops will be higher if the shop displays helpful information and if the shop offers ways to solve problems of visitors. This way they can deliver a high quality of service.

Philosopher	Category
Locke	Representation of Products
Leibniz	Decision Support
Kant	Customization
Hegel	Persuasion
Singer	Problem Solving

2.1.1 REPRESENTATION OF PRODUCTS

There are various ways of presenting products. Different formats and multimedia can be used to present a (customized) display of the product. It can be done by listing product characteristics, providing a product picture, audio/video representation or a combination of these. Product representation is especially of importance for online retailers, because visitors cannot see or touch products in an online environment. During the last decade, technologies have evolved to enhance a truthful representation to overcome this hurdle. Z. J. Jiang and Benbasat (2007) distinguish four product presentation methods currently used online. These methods are: static pictures, videos without narration, videos with narration, and virtual product experience (VPE). A static picture is a method whereby information is presented by a static image combined with explanatory text. The two video formats differ in that the video without narration uses text descriptions to describe product features. The video with narration explains product details out loud. A virtual product experience presents product information with a product simulator and sample product features. This way visitors can interact with the product like in a direct product experience.

The level of interactivity differs by technology used. A single 2D image of the product, which you can click to enlarge, contains a low level of interactivity. A mix-and-match feature or zoom-in function enables users to take more control over the reproduction of the product and be more interactive.

3D virtual technology is relatively new and offers an even higher level of interactivity. It allows the user to view a product from various angles and distances. A 3D virtual model may also consist of the ability to try on apparel products or combinations of products on a virtually created body. 3D product representations outperform 2D images with enhancing perceptions of virtual product online experience (J. Kim, Fiore, & Lee, 2007; Li, Daugherty, & Biocca, 2001). This image interactivity technique (IIT) stimulates consumers' experiences because of the vivid sensory information and the psychological sensation of being present in the online environment (Li et al., 2001). Besides, IIT is one of the most visited web site features, attracts new customers and retains existing customers for online retailers (J. Kim et al., 2007). All product representation methods must however be of high-quality, otherwise the consumers will doubt the professional quality of the online retailer. High-quality product representation generates customer confidence and results in positive associations with the other parts of the web site (Y. D. Wang & Emurian, 2005).

H1a. Good quality of multimedia used for product representation results in higher conversion rates.

2.1.2 DECISION SUPPORT

Decision support is very valuable given that online shops lack the possibility to have physical contact with products, lack face-to-face interaction with a salesperson, and may offer many products which makes it harder for visitors to compare alternatives and make a decision (Häubl & Trifts, 2000).

A decision support system is an interactive information system which supports the mental processes of the visitors of an online shop. Such a system is especially important for big online shops. Big online shops are less effective than small online stores at creating high conversion rates, because visitors experience difficulties in finding the products they seek (Park & Kim, 2003). A decision support system is a good way to overcome these difficulties.

The decision making process of consumers is already researched. It is impossible for consumers to evaluate all available alternatives in great depth while making purchase decisions. Therefore they first screen a large set of available products and select the most promising alternatives. These alternatives are being evaluated in more depth by the consumer (Häubl & Trifts, 2000). In order to design an appropriate decision support system it is necessary to examine this buyer behavior. Miles, Howes, and Davies (2000) have studied the buyer behavior literature and created a three stage model of buyer behavior which contains the abovementioned two stages identified by Häubl & Trifts (2000) as well:

1) Identification and management of search criteria
2) Search for a product
3) Comparison of products leading to a choice, or to a decision to abandon the search

An accurate search system/engine is necessary to help visitors with their quest for the ultimate product (Silverman, Bachann, & Al-Akharas, 2001). Häubl & Trifts (2000) discuss two interactive tools for decision support. The first tool is a recommendation agent. A recommendation agent allows the visitor to screen the set of alternative products available in an online shop more efficiently. The visitor can indicate which attributes are of importance and the recommendation agent generates a personalized list of recommended alternatives (Häubl & Trifts, 2000). So a customer provides inputs, which might be both needs and/or constraints, by choosing from a menu with attributes, components, prices and delivery options for example (Bharati & Chaudhury, 2004). The recommendation agent is a recommendation system which delivers personal recommendations. However, users may be concerned about the integrety of such a system, because they cannot be certain if the recommendation system is purely working for them or for the retailer as well (Xiao & Benbasat, 2007). Luckily, not only a system can act as a recommendation source, other customers can also be used as a recommendation source by creating testimonials (Senecal & Nantel, 2004).

Recommendation systems are still the most influential recommendation source though according to Senecal and Nantel (2004). Even if the system is perceived as less trustworhty than other consumers. Consumers select products twice as often if they are recommended (Senecal & Nantel, 2004).

The second tool is a comparison matrix. This matrix allows visitors to make an in-depth comparison among the selected alternatives. The comparison matrix organizes atttribute information about a couple of products in an alternatives X attributes matrix. This way the visitor can sort the alternatives by any attribute (Häubl & Trifts, 2000).

The interactive decision support tools have strong positive effects on both the quality and the efficiency of purchase decision, because visitors can make much better decisions with less effort Häubl & Trifts (2000). Hanson (2000) states customers are often confused by the wide array of alternative products and choice assistance reduces this confusion and creates customer value. Choice assistance is matching the tastes and needs of customers and products that satisfy them. Srinivasan, Anderson, and Ponnavolu (2002) emphasize the importance of such choice assistance and decision support. This way online retailers can reduce customer frustration and confusion by narrowing the choices for customers and save time for them.

Not all buyer decision support needs to be completely software based. Visitors should also be able to receive human help during their session. This human support will be discussed in more detail in the paragraph about 'problem solving'.

H1b. Decision support functionalities are related positively to the conversion rate.

2.1.3 CUSTOMIZATION

A web site is typically exposed to a large number of consumers with different profiles due to the wide customer reach of the internet channel. Therefore heterogeneity in customer requirements is highly likely (Sousa, Yeung, & Cheng, 2008). The online environment has several options for adjusting the content to a specific user.

Customization, or sometimes called personalization, is one of the key capabilities of e-commerce. It is the tailoring of products to the individual needs and preferences of the customer. Customization increases the probability that consumers will find a product they want to buy (Srinivasan et al., 2002). However, the internet and digital technology developments extend customization beyond the traditional boundaries of manufacturing. Nowadays, available technologies make it possible to customize the online purchase process for individuals based on obtained information about customers either previously or in real-time (Thirumalai & Sinha, 2011). This way the displayed information can be adapted to the needs of a particular visitor which improves the usability and the

user retention of an online shop (Eirinaki & Vazirgiannis, 2003). The objective of customization is to 'provide users with the information they want or need, without expecting them to ask for it explicitly' (Mulvenna, Anand, & Büchner, 2000). It has two major advantages. Customers have access to accurate and timely information which often generates additional sales (Senecal & Nantel, 2004). It also increases the loyalty of customers toward the retailer (Srinivasan et al., 2002). Personalization or customization allows for a targeted solution for every visitor.

Thirumalai and Sinha (2011) study customization as two sub-processes of the online purchase process, namely decision customization and transaction customization. Decision customization is customization of the information showed to a visitor of the online shop in order to help them in the decision making process. This involves the identification of customer needs and the right products which match these needs. The consumer may realize in this stage that he/she has an unmet need through product information (Thirumalai & Sinha, 2011). Transaction customization is customization of the purchase transaction process and improves transaction convenience for the customer. This could be personal account maintenance (e.g. billing information, shipping preferences, frequently ordered products, past purchases, status of order(s) and e-mail preferences), user recognition and order tracking. Transaction inconvenience seems to be one of the most important reasons why customers abandon their shopping carts (Berry, Seiders, & Grewal, 2002).

According to Thirumalai and Sinha (2011) decision customization is positively associated with customer satisfaction with the decision making process and transaction customization is also positively associated with customer satisfaction with the purchase transaction process. The results indicate that both customization forms are related to the overall customer satisfaction with the online shop as well (Thirumalai & Sinha, 2011). These techniques may thus increase conversion rates.

H1c. Presence of customization is related positively to the conversion rate.

2.1.4 PERSUASION

Persuasion becomes more important once the basic conditions of an online shop are equal and comparable to other online shops. Especially the first impression is important for persuading visitors to stay at this particular online shop. Once a visitor visits an online shop and they lack knowledge about the company, it is essential to display brand-promoting information directly (Y. D. Wang & Emurian, 2005). Egger (2001) suggests two ways to do so: (1) display logo and slogan in a prominent way, and (2) present the main selling point of the company to create curiosity.

Persuasion principles were developed by Cialdini (2007). Consumer purchasing decisions are rarely made on rational grounds. The buying process is based on emotion. The interactive online

environment offers more opportunities for influencing consumers' buying processes than traditional marketing channels. The persuasion principles are possible ways to persuade visitors to purchase.

The principles are:

Reciprocity

This principle is based on the return of favor mechanism people tend to have. People feel obligated to respond to positive behavior received (e.g. gifts, extra services, free samples) with positive behavior in return. Reciprocity does not involve logic, but it is something consumers do instinctively (Cialdini, 2007). Online shops can apply this principle by offering valuable or exclusive information or presenting valuable offers. Valuable information might contain whitepapers or instruction videos and exclusive information could be a personal quotation. Visitors will remember your online shop and might recommend you to other consumers. Prompts on the site could encourage this behavior (like buttons for Facebook or Twitter or 'send to a friend').

Commitment and Consistency

People are likely to act in a favorable way if they first commit to some agreement, idea or attitude. Most people have a strong desire to be consistent with their attitudes, beliefs, words and deeds. They want to meet their self-image of a trustworthy person. This principle is especially effective when the decision is taken actively, publicly and voluntarily (Cialdini, 2007). A like on Facebook is a good example of such a mechanism of commitment. Members are reminded of their statement every time they get Facebook updates, and are aware that this statement is also visible to others. Customers who are committed once will be more loyal to the online retailer in the future. They will make decisions consistent with their first statement.

Online retailers can get initial commitment by encouraging visitors to subscribe or to encourage visitors to dig deeper into the online shop. A wishlist is a good way of implementing this principle. Once visitors added a product to the wishlist (commitment), they are likely to act in a consistent way with this action (admitting they want the product). Meaning they will purchase the product eventually.

Social Proof

People are influenced by the behavior and actions of others (Cialdini, 2007). And in the case of an online retailer, the visitors will believe others more than they believe the retailer. Reviews, testimonials and rewards can persuade visitors to purchase from this particular seller. People are looking for confirmation before making a decision. An online shop should proof to visitors the value

their product(s) has to other former customers. The features used to enhance social proof could be displaying the amount of goods sold, the bestselling products, reviews and ratings, amount of Facebook likes and tweets (you will need a decent amount of followers first), or highest rated products. Another way of social proof is to show what other people buy along with the product you are looking at.

Authority

People have a tendency to believe authority figures, even when they are asked to perform certain actions of say certain things. Consumers are more likely to comply with a request if it comes from a authority (Cialdini, 2007). Online retailers have also to prove their own authority, unless they are a well-known brand they have to persuade visitors of their professionalism. The use of experts or professionals, who are seen as authority figures, might persuade visitors to purchase. Once a company has authority they can use it for persuading consumers, for example by showing staff picks of products like Apple did. The displaying of the performance history of a company creates consumer trust and enlarges the confidence of a customer in the company (Shneiderman, 2000).

Liking

People are easily persuaded by other people that they like or who are like them (Cialdini, 2007). This can be accomplished by using people to promote your product(s) or services who are known by your target group (i.e. a celebrity) or people who they can relate to (i.e. peers of the same age). Liking also includes people we actually know in real life. Recommendations of friends are seen as very valuable and are trusted more easily by consumers. This is why it is valuable to offer the possibility to recommend products to friends (e.g. by mail or social media).

Scarcity

Perceived scarcity will create demand (Cialdini, 2007). Scarce products are attractive to consumers. They determine the value and quality of products and services partly based on their availability. The lower the availability, the more they appreciate the product. This principle is based on the psychological effect of possible loss. The fear of loss is more powerful than that of gain. Scarcity could persuade visitors to purchase before it is too late, so it is of importance to show visitors what they could miss out on. Examples of scarcity specifically for online shops are limited stock (i.e*. Only 3 left* or showing that the other sizes are sold out already), a time limit (i.e. *This deal ends in…* or *Deal of the week),* exclusivity (i.e. *web only* or *reserve now*) and VIP's only (i.e. exclusive benefits for newsletter subscribers or member only shops).

H1d.   Persuasion techniques are positively related to the conversion rate.

2.1.5   Problem Solving

Once visitors of an online shop experience some problems or ambiguities, they are likely to back out of the shop if they do not receive an adequate answer to their question(s). An online retailer should anticipate on this by offering enough possibilities for providing assistance. A way to avoid as much questions as possible is a frequent asked questions (FAQ) section. This section provides answers to the most common questions. Online shops with a FAQ section get more consumers visiting than those without it (Ranganathan & Ganapathy, 2002). Consumers want speedy answers to their questions. A FAQ section can fulfill this need for common questions (Park & Kim, 2003). An email button for submitting problems, with the information that the question will be answered within a couple of hours or days, could be an option to help visitors as well. Another way to react on problems and/or questions instantly, is an online chat. Direct human contact with the customer can be crucial for keeping momentum and creates a more socially rich image of the company.

H1e.   Problem solving is related positively to the conversion rate.

2.2   System Quality

System quality refers to the overall organization of information and the techniques which support the displaying of this information. The quality of the system is of great importance for the functioning and evaluation of an online shop. In e-commerce potential competitors are only one mouse-click away. The quality depends on system hardware and software (Bharati & Chaudhury, 2004). Shops must be responsive to the needs of visitors, and a lot of these needs are about the system quality of a shop. They want to receive suitable information fast in an accurate way.

Research on information systems has resulted in various measures of system quality. Usability has been regarded as the most frequently used factor for measuring information system success (Yang, 2005). The system quality has much to do with usability (also called ease of use). An engineering approach has been typically used in usability studies which means that usability is an outcome of system design and quality (Nielsen, 1994; Pearrow, 2000).

Usability is critical for a successful online shop. In an online shop, usability reflects the perceived ease of purchasing (Flavian, Guinaliu & Gurrea, 2006). Other factors of system quality are identified as well. Yang et al. (2005) categorized all these factors into four main categories: usability, accessibility, privacy/security and interaction. These categories will be used in this study as well.

2.2.1 USABILITY

Usability has been shown to be a key factor for influencing online shopping behavior (Flavián, Guinalíu, & Gurrea, 2006) and is mostly treated as an outcome of system design (Palmer, 2002). Usability (also called ease of use) in the context of web sites is related to user friendliness. It is the ability to find one's way around the web, to locate desired information, to know what to do next, and to do so with minimal effort (Nah & Davis, 2002). Even the best retail sites could have fifty percent more business. The cause is poor usability (Venkatesh & Agarwal, 2006). Higher usability leads to an increase in user satisfaction and intention to use which in turn results in more purchases. This positive impact is explained by the main reasons of consumers to shop online. Convenience, price savings and time savings are stated as the main reasons for shopping online (S. J. Chen & Chang, 2003) and good usability fulfills these needs. Usability has also a positive and direct impact on consumer trust, which means one of the most important obstacles for using an online shop (insecurity) can be diminished by improving the usability of an online shop (Flavián et al., 2006; Koufaris & Hampton-Sosa, 2004).

Researchers have identified different factors which influence usability. Ease of navigation is one of the most important and cited factors for improved usability. Navigation is identified as a natural sequencing of web pages, a well organized layout, and consistency of navigation design. Factors related to ease of navigation are a minimal navigation path, suitable taxonomy of navigation menu, link visibility, search facility availability, navigational predictability, navigational errors (Y. Zhang, Zhu, & Greenwood, 2004). Navigation is important because it helps visitors to acquire more information relevant to them and to make it easier to find this information (Palmer, 2002). Difficulties with navigating a web site are a barrier for online purchasing which means poorly designed navigation has a negative impact on online sales (Y. H. Chen, Hsu, & Lin, 2010; Ranganathan & Ganapathy, 2002).

H2a. Usability of the online shop is related positively to the conversion rate.

2.2.2 ACCESSIBILITY

Accessibility contains two aspects: availability and responsiveness. Online shoppers are known for their low tolerance. They expect they are able to visit the web site at all times. They also desire fast access and download time of the web page (Yang et al., 2005). These days the web page must appear immediately. Google engineers discovered that 400 milliseconds (just the blink of an eye) was even too long as load time (Lohr, 2012). The speed of a web site can consist of two different measures according to Palmer (2002). First, the initial access speed of a homepage can be measured. The speed of display between various pages is another factor. Delay in load time depends on different factors, including server-side delay, transmission delay and client-side delay (Palmer, 2002). Internal stability

is necessary for an optimal shopping experience. Unstable information systems frustrate the user and diminish the consumer experience (J. Kim, Lee, Han, & Lee, 2002).

H2b. Availability and responsiveness are related positively to the conversion rate.

2.2.3 PRIVACY & SECURITY

Insecurity of the online shopper has become one of the most important obstacles to the growth of the e-commerce business (Flavián et al., 2006; Koufaris & Hampton-Sosa, 2004). A so-called brick-and-mortar business gives the customer a greater feeling of security. Online shops collect often a variety of personal (and sensible) information of their customers. Therefore security and privacy have become important issues in the e-commerce business in order to build trust and a longtime relationship with the customer. A large number of internet users appear to have serious privacy and security concerns (Belanger, Hiller, & Smith, 2002; Ranganathan & Ganapathy, 2002).

Security is the protection against threads for users. In the business-to-consumer context security is about the techniques which are used (such as encryption and authentication) to protect and secure consumer data (Belanger et al., 2002). One of the main security concerns is the security of monetary transactions. To overcome these concerns, a B2C online shop should offer alternative payment methods, such as credit card or PayPal. Multiple payment methods will also increase customer convenience (Liang & Lai, 2002). A personal account with an ID and password might also diminish customer fears (Ranganathan & Ganapathy, 2002). Another way to reduce the security concerns is to display a confirmation screen after the completion of a transaction (Schaupp & Bélanger, 2005).

Privacy is the ability of a customer to control, manage, and selectively reveal personal information (Eastlick, Lotz, & Warrington, 2006). Web sites can gather information about visitors in an explicit way (e.g. surveys) or an implicit way (e.g. cookies) (Patterson, Johnson, & Spreng, 1997). The completion of a purchase insists the sharing of information over the internet. Consumers must be willing to share this private information. Once they doubt the privacy or security, an online shop has no chance. Privacy issues on the internet are spam, the sharing of information with third parties, usage tracking and data collection. Privacy issues can be diminished by influencing customer perceptions of trustworthiness (Belanger et al., 2002). Privacy policies are displayed by most web sites in order to overcome privacy issues. Independent companies (e.g. TRUSTe and VeriSign) who can verify, audit, and certify privacy policies can also diminish the privacy and security concerns of visitors (Schaupp & Bélanger, 2005).

Security and privacy concerns both relate to trust issues. Trust is defined as the beliefs held by an individual derived from perceptions about certain attributes (Flavián et al., 2006). Trust often

depends on direct physical contact within a store (Koufaris & Hampton-Sosa, 2004). The online transactions contain an element of risk which underlines the importance of trust. Trust is therefore a critical factor in e-commerce. Even experienced online buyers view online purchasing as risky (Schlosser, White, & Lloyd, 2006). Research shows that trust and perceived risk have strong impact on purchase intentions (Gefen, Karahanna, & Straub, 2003; D. J. Kim, Ferrin, & Rao, 2008; Van der Heijden et al., 2003).

Online retailers should overcome this barrier by improving security and privacy issues. Various factors influence the perception of trustworthiness. Trusted labels can be used to build a trustworthy image. Customers also trust a retailer who provides continuous service. This continuous service includes for instance customer service links and a help button on the web site. Explicit information about shipping and handling costs, guarantees, and statements about product quality are also factors which improve the trustworthiness of an online shop (Belanger et al., 2002). The customer should have a sense of control and freedom which will motivate them to trust the retailer and eventually purchase. This may include order tracking, savings information and an optional e-mail notification (P. Zhang & Von Dran, 2002).

H2c. Privacy and security are related positively to the conversion rate.

2.2.4 INTERACTION

A key quality of the internet is the fact that interaction can take place at different levels. There is interaction between visitors and employees of the company, visitors and the web site itself, and among peer users of similar products or services. This study only includes the interactions between visitors and the company (direct) and the interaction between the visitor and the web site (indirect interaction).

The fact that the online environment lacks personal face-to-face contact is a barrier to the growth of e-commerce. Human and social elements have been shown to be major contributions to a positive shopping experience (Hassanein & Head, 2007). Interaction could lower this barrier by diminishing the negative aspects related to the image of online shopping, like impersonality, anonymity and automation (Van der Heijden et al., 2003). A lack of 'human touch' may be a barrier for visitors to trust the online retailer (Y. D. Wang & Emurian, 2005). An online shop has several options and tools for enhancing interaction. Hassanein and Head (2007) identify two types of interaction. Human warmth and social presence can be accomplished by offering a) actual interaction with others humans or b) imaginary interactions. Actual interaction could be incorporated with features like e-mail, chats, message boards, and virtual communities, whereby the response is generated by another person (Hassanein & Head, 2007). These features make it possible to deliver personalized and

customized services from a contact person. Imaginary interactions are generated automatically by the computer and could be incorporated with social cues like personalized greetings, human audio/video, and socially-rich picture or text content (Cyr, Hassanein, Head, & Ivanov, 2007; Gefen & Straub, 2004; Hassanein & Head, 2007). For example, including a photograph of an employee or the company's representative might be an effective technique to increase the trustworthiness of an online retailer (Y. D. Wang & Emurian, 2005). These interactive tools allow online retailers to relate more closely to the customer.

Interactivity of a web site has been credited with positive consumer responses. It improves the attitude of the user, creates more loyal customers, enhances trust, increases the level of shopping enjoyment and may even lead to an increased desire to purchase online (Cyr et al., 2007; J. Kim et al., 2007; Palmer, 2002; Y. D. Wang & Emurian, 2005). Actual interaction is already tested for the problem solving construct. Therefore the hypothesis for interaction reads:

H2d. Imaginary interaction is related positively to the conversion rate.

2.3   LAYOUT QUALITY

Layout, or design, is about the appeal of an online shop and is especially for online shops of great importance. It is the main indication of web site credibility for most of the visitors (Fogg et al., 2003). The layout is the first impression a visitor gets of the shop which means the impression is mainly based on the layout of the shop instead of content or system. Besides, the first impression is already formed after a very brief exposure to the online shop and aesthetics are one of the most notable sources of first impressions resulting in user's evaluations of web sites (Tractinsky, Cokhavi, Kirschenbaum, & Sharfi, 2006). The layout does not only affect visitors during their first impression, but can even change their preferences. Which means the purchase decision could be influenced by design elements (Belanger et al., 2002; Mandel & Johnson, 2002).

In the past decade researchers recognized that the needs of users of web sites go beyond system quality. A more general perspective was adopted. This perspective takes the whole user experience into account including visual aesthetics of web sites (Moshagen & Thielsch, 2010). Recent studies showed that visual aesthetics could improve the performance of an information system (Moshagen, Musch, & Göritz, 2009; Sonderegger & Sauer, 2010). In the case of online shops this means the quality of the aesthetics influences the consumer purchase decision (Hall & Hanna, 2004).

2.3.1 AESTHETICS

Aesthetics is a philosophy and is related to the beauty or appearance of an object (Lavie & Tractinsky, 2004). In the online context, web aesthetics may be defined as the way in which different elements and attributes are combined to yield an impression of beauty (Y. J. Wang, Minor, & Wei, 2011). It also concerns the judgments and sentiments of individuals who perceive the object (in this case an online shop). Aesthetics makes it possible to influence the emotion and mood of a visitor, thus influencing the purchase process of a visitor. This emphasizes the importance of appropriate aesthetics, or sometimes called atmospherics, in an online shop. Kotler (1973) said it already in 1973; atmospherics is 'the conscious designing of space to create certain buyer effects. More specifically, atmospherics is the effort to design buying environments to produce specific emotional effects in the buyer that enhance purchase probability'.

Moshagen and Thielsch (2010) distinguished four facets of visual aesthetics of web sites; simplicity, diversity, colorfulness and craftsmanship.

The first one, simplicity, is concerned with a clear perception and the processing of a layout. This involves clarity, orderliness, homogeneity, grouping and balance (Moshagen & Thielsch, 2010). Simple layouts can be processed more easily and fluently. Moshagen and Thielsch (2010) state that simple layouts should therefore be valued positively. Consumers also appreciate simplicity because it reduces the perceived risks of wasting time, deception, and frustration (Y. D. Wang & Emurian, 2005).

Diversity means visual richness, dynamics, variety, creativity, and novelty. It creates interest and tension which results in a higher arousal of the visitor. Diversity prevents visitors from getting bored and leaving the web site (Moshagen & Thielsch, 2010). This improvement of sensory stimulation creates enjoyment and pleasure. However, this sensory stimulation is most important for hedonic products. These products are then being associated by visitors with this vibrant environment that enhances their positive feelings which might result in higher purchase intentions. Visual design is one of the most important factors that can influence the positive feelings of a visitor in the online environment (Tractinsky & Lowengart, 2007).

Colorfulness is another visual factor determined by Moshagen and Thielsch (2010). The impression of a visitor depends on the selection, placement, and combination of colors. The selection of appropriate colors often depends on the standard style of the company. However, it was found that the interface color should be cool and its main color should be a pastel color. These colors should also be of light brightness to enhance the trustworthiness (Y. D. Wang & Emurian, 2005). The placement of colors means that the colors should be symmetrical. The combination of appropriate

colors is also of importance for creating a professional and trustful image. Hall and Hanna (2004) found appropriate text-background color combinations. They focused on the readability of a page and the effect of color schemes on retention and the intention to purchase. Colors with great contrast improve the readability of web sites and high perceived aesthetic quality is positively related to the intention to purchase (Hall & Hanna, 2004).

The final facet distinguished by Moshagen and Thielsch (2010) is craftsmanship. Craftsmanship is defined as a web site which is designed with skill and care using modern technologies. The use of modern technologies is important to avoid the impression of being outdated. Craftsmanship is related to a professional look which is important for online shops in persuading visitors.

The exact use of aesthetics in layout can differ tremendously. Many combinations of color and typology might work out for improving conversion rates. It depends also on the target group (i.e. young/old, women/men) of an online shop (Tractinsky & Lowengart, 2007). But the abovementioned factors are always of interest for a decent layout.

H3a. Aesthetics of the online shop are related positively to the conversion rate.

2.3.2 COMPLEXITY

Complexity is about the overall organization of the displayed information of an online shop (Y. D. Wang & Emurian, 2005). High complexity results in confused visitors who are more likely to leave the online shop. Clutter has therefore a negative impact on the conversion rate of an online shop. Uncluttered shops are easier to figure out for consumers and require less cognitive effort (Szymanski & Hise, 2000). Y. D. Wang and Emurian (2005) identify factors related to the complexity of a web site. The first one is simplicity. Simplicity makes it easy for visitors to locate relevant information. Various page design techniques (e.g. white space and margin, strict grouping, enumeration, and visual density) are applicable when creating a simple uncluttered page (Y. D. Wang & Emurian, 2005).

The complexity can also be diminished by other factors. The readability of the web site is one of these factors. Better readability leads to less complexity. The readability is related to the use of colors for both background and text. The use of colors with greater contrast generally lead to greater readability. Other page design techniques that can increase readability are an appropriate amount of white space and margins, strict grouping, and visual density (Y. D. Wang & Emurian, 2005). Information overload is also defined as a factor which raises complexity and might result in more users eliminating the content. Jones, Ravid, and Rafaeli (2004) stated that users are more likely to respond to simple messages and are more likely to end active participation as the overload increases.

A way to handle information overload for online shops is to present information in a easy-to-scan way for visitors by using short text blocks and enumeration of important points.

H3b. Complexity of the online shop is related negatively to the conversion rate.

The key factors identified in the literature, that potentially affect conversion rates, were grouped in three main dimensions and each dimension has a couple of sub-categories which are summarized in table 1. Each factor will be operationalized which will be discussed in the next section.

Content Quality	System Quality	Layout Quality
Representation of Products	Usability	Aesthetics
Decision Support	Accessibility	Complexity
Customization	Privacy/Security	
Persuasion	Interaction	
Problem Solving		

Table 1: Independent Variables for Conversion Rate Optimization

The following hypotheses are formulated:

Category	Hypothesis
Content Quality	**H1a.** Good quality of multimedia used for product representation results in higher conversion rates.
	H1b. Decision support functionalities are related positively to the conversion rate.
	H1c. Presence of customization is related positively to the conversion rate.
	H1d. Persuasion is related positively to the conversion rate.
	H1e. Problem solving functionalities are related positively to the conversion rate.
System Quality	**H2a.** Usability of the online shop is related positively to the conversion rate.
	H2b. Availability and responsiveness are related positively to the conversion rate.
	H2c. Privacy and security are related positively to the conversion rate.
	H2d. Imaginary interaction is related positively to the conversion rate.
Layout Quality	**H3a.** Aesthetics of the online shop are related positively to the conversion rate.
	H3b. Complexity of the online shop is related negatively to the conversion rate.

Table 2: Hypotheses

3. RESEARCH METHODOLOGY

3.1 RESEARCH DESIGN

The research design applied can be explained by using the research process onion developed by Saunders, Lewis, and Thornhill (2003) which consists of five layers. Each approach related to this study is shown in bold font.

Layer	Approaches
Research Philosophy	**Positivism**, Realism, Interpretivism
Research Approaches	**Inductive**, Deductive
Research Strategies	Experiment, **Survey**, Case Study, Grounded Theory, Ethnography, Action Research
Time Horizons	**Cross-sectional**, Longitudinal
Data Collection Methods	Sampling, **Secondary Data**, **Observation**, Interviews, Questionnaires

Table 3: Research Process

In a positivist view of the world science was seen as the way to gain knowledge for understanding the world well enough in order to control and predict it. This research can be identified as having a positivist paradigm. It contains quantitative research and emphasizes on facts with the data in the form of numbers that can be used for a mathematical process. The obtained data will be treated in a logical and mathematical way. The research approach used is an inductive reasoning approach. This means specific observations or measurements are made towards developing broader conclusions, generalizations and theories. A general conclusion will be constructed by studying correlations between various variables in this study. The strategy used to draw conclusions is a survey approach. The survey method emphasizes quantitative analysis whereby data is collected through questionnaires, interviews, or from existing statistics for example. The survey approach gives a 'snapshot' of a particular situation at a certain point in time. Hence, the research is conducted at one specific moment in time which means it can be qualified as a cross-sectional study. This type of time horizon is used because of the time limit of this study. Cross-sectional research can be done relatively quick and requires less resources than longitudinal researches (Creswell, 2009).

3.2 DATA COLLECTION

The Netherlands rank among the top countries in the EU with regard to online shopping. Data obtained by Eurostat shows the leading position of Dutch shoppers[3]. Dutch residents are one of the

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[3] http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc_ec_ibuy&lang=en

first who shop online on a regular basis. Therefore especially this environment is suitable for data collection concerning conversion rate optimization research. Dutch online shops are at the forefront of online retail developments.

The data is gathered using various methods. First, the current situation will be mapped with the current conversion rate data of each shop. Subsequently the shops will be rated using the developed rating instrument. The ratings are intended for judging the quality of their content, system and layout quality. The conversion rate is the mean of one month before the rating. The data used are secondary data and data obtained by observation. The data about conversion rates is gained from databases of online shops which means it can be classified as secondary data. The data about characteristics of an online shop is obtained by the rating in order to draw conclusions about the impact of the factors concerning conversion rate optimization.

The unit of analysis is the major entity that is analyzed. In this study Dutch B2C online shops are the unit of analysis. The population of Dutch online shops consists of 16.400 active shops according to CBS in the beginning of 2012 (CBS, 2012). More than 1700 shops carry the 'Thuiswinkel waarborg' label, which is a quality label for sellers of products and/or services online. For this research a total amount of 209 online shops were asked to participate in the study. Forty-three shops agreed to participate resulting in a response rate of 21%. A large amount of online shops will improve the validity of the research instead of analyzing just a couple of shops (Creswell, 2009). However, due to the extensive form of research due to the time consuming rating method (which includes a thoroughly examination of the online shop by using the rating instrument) it was not feasible to include a bigger sample because of the time limit (3 months) linked to this research for empirical research.

The sample of online shops consists partly of clients of the Innovadis Group. The other part of the sample has been collected by contacting e-commerce managers of Dutch online shops. This means that the sample is a nonprobability sample. In total, 17 clients of the Innovadis Group were included in this study. In order to enlarge the research sample, different resources were used for selection of online shops. At first, the Twinkle100 was used to identify possible participants. The Twinkle100 is an overview of the biggest (measured by turnover rate) 100 online retailers within the Netherlands (Twinkle, 2012). Each online shop of this list was contacted if they met the following requirements:

- A B2C online shop;
- Located in The Netherlands;
- Seller of physical products;
- The conversion rate measure has to be defined as definitive purchase per visitor.

These requirements were formulated in order to frame the research and to allow comparisons between different online shops. Ten online shops listed in the Twinkle100 agreed to participate in this study. The online shops were ranked by their sector of industry. The grouping categories are based on the sectors of industries identified for retail by the CBS[4]. These categories are:

- Fashion & Apparel (e.g. clothing, shoes, body fashion)
- Living (e.g. furniture, kitchen, bathroom, lighting)
- Personal care & Beauty (e.g. drugstores, fragrances, jewelry)
- Consumer Electronics (e.g. appliances, computer, telecom)
- Leisure Goods (e.g. entertainment, sport/camping, garden, flowers, toys, pets, department stores)

In order to enlarge the research sample, online shops in the same industries were searched on Google. The product categories were used as keywords. Online shops that appeared in the search results within the first 5 pages and also met the requirements stated above, were contacted to participate in the study. This resulted in 43 online shops which agreed to participate and were used for analyzing their conversion data and the features on site. The shops represent the product categories mentioned above in the following way:
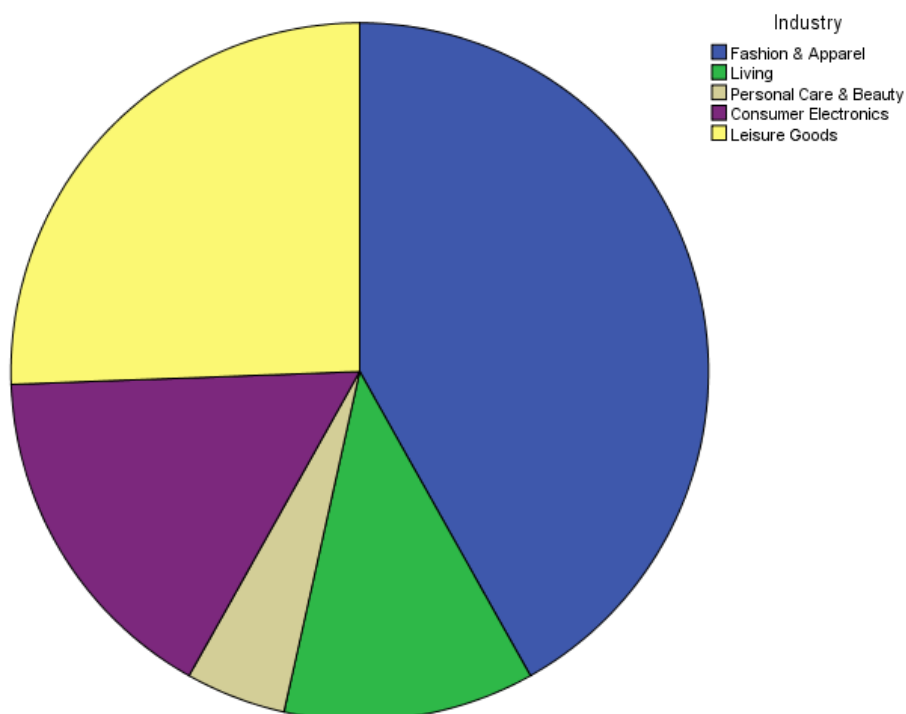

Figure 4: Type of Industry

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[4] www.hbd.nl/pages/14/Brancheafbakening/Detailhandeltotaal

Based on our data, the sector of industry with the lowest level of conversion rates is the living sector of industry (mean=0.49). Consumer electronics has the highest average conversion rate (mean=2.59), followed by leisure goods (mean=2.03), fashion & apparel (mean=2.01), and personal care & beauty (mean=1.71).

3.3 CONCEPTUALIZATION, OPERATIONALIZATION AND MEASURES

Conceptualization and operationalization are steps taken in the measurement process to enhance content validity. It involves defining the construct of interest and generating a list of items which represent the construct. This way the construct is delimited.

The dependent variable conversion rate is measured by the percentage of visitors who make a purchase. The conversion rate of the online shops under study must be of the same period because the rating is carried out at one specific moment. It is necessary to align the moment of measuring with the conversion rate of that particular time in order to look for possible correlations. Therefore the conversion rate is stated as the average percentage of visitors making a purchase during the period of one month.

The determinants for conversion rate optimization are operationalized based on the literature research. They are all summarized with both a conceptualization and operationalization in the table below. A conceptualization is needed before a decent operationalization can be formulated. Conceptualization is the process whereby theoretical constructs are made more specific and precise (Babbie, 2007). Operationalization is the step beyond conceptualization. It contains the operational definitions of variables which means the actions or operations actually involved in measuring a variable (Shadish, Cook, & Campbell, 2002). The operationalizations and measures used in this particular study will be discussed in this paragraph.

Five factors were selected for information quality, four factors for system quality, and two factors for layout quality. Some factors are difficult to operationalize because of the lack of empirical research or widely accepted measures. Table 4 shows the conceptualization of each variable.

Table 4   Conceptualization variables

Construct	Factor	Variable	Conceptualization
Content	Representation of Products	Product Representation	Different formats and multimedia to present a high-quality display of a product
	Decision Support	Comparison matrix	Option to compare between selected alternatives on site
		Recommendation	Option to screen the set of alternatives

Table 4   Conceptualization variables

Construct	Factor	Variable	Conceptualization
		agent	by selecting some attributes (like size, color, etc.)
		Testimonials	Testimonials or recommendations of customers regarding the company
	Customization	Personal account	An individual account for each customer
		Decision customization	The customization of the information showed to a visitor of the online shop in order to help them in the decision making process
		Transaction customization	The customization of the purchase transaction process and improves transaction convenience for the customer
	Persuasion	Reciprocity	People feel obligated to respond to positive behavior received (e.g. gifts, services, concessions or favors) with positive behavior in return
		Commitment	People are likely to act in a favorable way if they first commit to some agreement, idea or attitude
		Social proof	People are influenced by the behavior and actions of others
		Authority	People have a tendency to believe authority figures, even when they are asked to perform certain actions of say certain things
		Liking	People are easily persuaded by other people that they like or who are like them
		Scarcity	Perceived scarcity will create demand
	Problem Solving	Problem Solving	Providing of online assistance for possible problems a visitor may encounter
System	Usability	Usability	The ability to find one's way around the web, to locate desired information, to know what to do next, and to do so with minimal effort
	Accessibility	Accessibility	Fast access and download time of web pages
	Privacy/Security	Payment options	The amount of payment alternatives
		Privacy statement	Privacy statement on site
		Encryption of personal data	A statement on site which gives information about the encryption of personal data
		Labels independent companies for privacy	Labels/logos of independent companies which verify, audit and certify privacy policies
	Interaction	Interaction	Actual interaction with other humans → already included at 'problem solving'.

Table 4   Conceptualization variables

Construct	Factor	Variable	Conceptualization
			Imaginary interaction → interaction automatically generated by computers resulting in social cues
Layout	Aesthetics	Aesthetics	Combining different layout attributes and elements to yield a desirable impression
	Complexity	Complexity	The organization of displayed information (no clutter)

Each factor will be measured by assigning quantifications to observations. This will be done by using a rating instrument which is developed based on the theoretical findings discussed earlier. A clear rating scale is needed for abstract concepts such as usability and aesthetics. The operationalization and the full set of items included in the rating instrument are presented in table 5.

Table 5   Features List of the Items included in the Rating Instrument

Construct	Items
Content	
Representation of Products	**Product Representation**
	Multimedia Use (static pictures, videos without narration, videos with narration, virtual product experience)
	Quality of Representation (5-point Likert scale)
Decision Support	**Comparison Matrix**
	Option to Compare Products (y/n)
	Recommendation Agent
	Selection of Product Attributes (y/n)
	Testimonials
	Testimonials or recommendations of customers regarding the company (y/n)
Customization	**Personal Account**
	Option to create a personal account (y/n)
	Decision Customization
	Personal Recommendations (y/n)
Persuasion	**Reciprocity**
	Free extra's without expecting anything in return: e.g. free samples, free trial, free tutorials, gifts, additional (background) information (y/n)
	Commitment
	Option to subscribe to newsletter (y/n)
	Option to add products to a wish list (y/n)
	Social Proof
	Displaying reviews of products (y/n)
	The amount of fans on social media (y/n)
	Purchases of other customers (y/n)
	Bestselling/highest rated products (y/n)
	Authority

Construct	Items
	Awards/prizes won (y/n)
	Use of professionals/experts (y/n)
	Liking
	Use of celebrities/peers (y/n)
	Option to recommend products to friends (y/n)
	Scarcity
	Use of scarcity principle in offers (e.g. limited stock (for example 'only 3 left'), offer with time limit, exclusive offer for members) (y/n)
Problem Solving	**Problem Solving**
	Options to get answers to questions (FAQ, E-mail, Telephone, Online chat, Other)
System	
Usability	**Usability**
	Display of navigation path (y/n)
	Consistent navigation design (y/n)
	Clear taxonomy of navigation menu (y/n)
	Variety of navigation tools (y/n)
	Visible links (y/n)
	Internal search engine (y/n)
	Navigational errors (y/n)
Accessibility	**Accessibility**
	Initial access speed homepage (0-2 sec/2-5 sec)
	Speed of display between various pages of the shop (0-2 sec/2-5 sec)
Privacy & Security	**Payment Options**
	Payment options (iDeal, Credit Card, PayPal, Afterpay, Monthly Payment Option, Gift Card/Credit, Other)
	Privacy Statement
	Privacy statement on site (y/n)
	Encryption
	Encryption of personal data (y/n)
	Labels
	Labels/logos of independent companies (e.g. TRUSTe, VeriSign) (y/n)
Interaction	**Interaction**
	Personalized greeting (y/n)
	Human audio/video/photos of employees (y/n)
	Socially-rich content (y/n)
Layout	
Aesthetics	**Aesthetics**
	Simple design (5-point Likert scale)
	Professional look (y/n)
	Complexity
Complexity	Readability (y/n)
	Easy to Scan (y/n)

Table 5   **Features List of the Items included in the Rating Instrument**

3.4 DATA ANALYSIS

The reliability of observations obtained by the rating instrument can be assessed by measuring interrater reliability. Interrater reliability is used to examine the agreement between both raters on their assessment decisions. The rating instrument was examined first by an experienced online shop expert. The rating instrument was refined in accordance with his suggestions. Based on the guidelines of Mayring (2010) concerning pretesting, a pretest sample was composed. A number of 10 randomly selected online shops, which represent 23% of the whole sample, were rated by two raters independently. One rater is an expert on conversion optimization and is currently working as a e-commerce consultant for almost 6 years. The second rater is the researcher who has a university degree in Business Administration and has worked at the e-commerce company for more than half a year. This pretest was conducted before the main study to enhance content validity of the proposed items (Straub, 1989).

Study findings are clarified in terms of the rigor or the proposed items and their relevance to managerial aspects of online shops. The rigor of the proposed items was evaluated through conducting a categorical principal component analysis. The items included in this study are categorical measures of online shop features. Therefore it is not possible to conduct a standard factor analysis. The items consist both of nominal as well as ordinal scales which lead to categorical principal component analysis (CATPCA). CATPCA is appropriate for data reduction when items are categorical, while maximizing the amount of variance accounted for in those items, because the optimal scaling option allows us to specify which level of measurement belongs to which variable (SPSS, 1999). CATPCA does also not assume linear relationships among numeric data. The relevance of the items was examined through regression analysis. This analysis was conducted to identify the items which are related to the conversion rate.

4. RESULTS

4.1 INTERRATER RELIABILITY

A statistical measure of interrater reliability is Cohen's Kappa which ranges generally from 0 to 1.0 where large numbers mean better reliability, values near or less than zero suggest that agreement is attributable to chance alone. The Kappa (k) statistic is commonly used for measuring agreement between two raters for both ordinal (e.g. bad, average, good) and nominal (e.g. present or absent) categories. Landis and Koch (1977) provided useful benchmarks for interpreting Kappa:

Kappa	Interpretation
< 0	Poor agreement
0.0 − 0.20	Slight agreement
0.21 − 0.40	Fair agreement
0.41 − 0.60	Moderate agreement
0.61 − 0.80	Substantial agreement
0.81 − 1.00	Almost perfect agreement

Table 6: Kappa Scores (Landis & Koch, 1977)

The agreement can be calculated as the overall percentage of agreement over all paired ratings. However, this measure does not take into account agreements which arise purely by chance. Only agreement beyond that expected by chance can be considered as true agreement. Kappa is such a measure of 'true' agreement. It indicates the *achieved* beyond-chance agreement as a proportion of the *possible* beyond-chance agreement.

$$\kappa = \frac{\text{observed agreement} - \text{chance agreement}}{1 - \text{chance agreement}}$$

The result of the interrater reliability test was an average Cohen's Kappa of 0.95, which is considered a statistically significant almost perfect agreement (Landis & Koch, 1977). This result indicates that the set of items included in the rating instrument have appropriate reliability. The ratio is high enough to proceed to further analysis (Fleiss, Levin, & Paik, 2004). All items for each variable are included in the appendix.

4.2 CATEGORICAL PRINCIPAL COMPONENT ANALYSIS

The goal of the categorical principal component analysis (CATPCA) was to try to uncover major dimensions underlying the set of items and see if this underlying structure corresponds with the

theoretical assumptions. The analysis was done with the IBM SPSS Statistics 20 software. CATPCA was conducted multiple times with different numbers of variables and different numbers of dimensions in order to find the most meaningful solution. At first, the variables with zero variance were eliminated from the dataset. This includes the items '*Personal recommendation*' (all no) and '*Internal search option*' (all yes). Then, an initial CATPCA with three dimensions was conducted. The various steps undertaken during this analysis are displayed in table 7.

Table 7: Categorical Principal Component Analysis

Iteration #	Criteria for Exclusion	Deleted Items	
1	Factor loading < 0.40	-	Product Representation Methods
		-	Comparison Option
		-	Testimonials
		-	Hyperlinks
		-	Personalized Greeting
		-	Socially-rich Content
2	Mean coordinate < 0.10	-	Persuasion
		-	Taxonomy Menu
		-	Navigation Errors
		-	Independent Labels
3	Cross-loading > 0.40	-	Navigation Path
		-	Navigation Tools
		-	Encryption
		-	Employees
		-	Readability

Items that did not load strongly to the dimensions (factor loadings below 0.40), that did not substantially contribute to the dimensions (mean coordinates below 0.10), and items that showed cross-loadings were excluded (Starkweather & Herrington, 2012). A total of 15 items were therefore deleted after three iterations. The remaining 12 items were again analyzed by CATPCA. The third dimension contained a low Cronbach's Alpha of 0.31, which led to a model with two dimensions. These two dimensions were generated and each item was found to have a factor loading higher than 0.40, a mean coordinate higher than 0.10 and strong loading on only one factor. They account for 53,80% of the variance and each dimension has a high Eigenvalue (above 1 is desired). Table 8 shows the model summary. Table 8 also shows the internal consistency coefficient (Cronbach's Alpha) calculated from the categorical principal component analysis. Cronbach's Alpha is calculated for each

dimension and for all dimensions in total. A total coefficient of 0.922 indicates that the metrics have appropriate reliability (Gefen, Straub, & Boudreau, 2000). Table 9 presents construct loadings from the categorical principal component analysis. The discriminant validity of the dimensions is assessed by the cross-loadings on the other dimension. All measures of both dimensions have lower cross-loadings than 0.40 which is considerably lower than the corresponding factor loadings. These results support the discriminant validity of all dimension measures.

Table 8
Model Summary of the CATPCA

Model Summary			
Dimension	Cronbach's Alpha	Variance Accounted For	
		Total (Eigenvalue)	% of Variance
1	,826	4,118	34,316
2	,624	2,338	19,486
Total	,922[a]	6,456	53,802

a. *Total Cronbach's Alpha is based on the total Eigenvalue.*

Table 9
Component Loadings

Component Loadings		
	Dimension	
	1	2
Professional Look	**0.847**	0.215
Navigation Design	**0.801**	0.053
Simple Design	**0.768**	-0.192
Product Representation Grade	**0.753**	0.219
Easy to Scan	**0.692**	-0.121
Selection of Attributes	**0.657**	-0.139
Privacy Policy	**0.588**	0.236
Payment Methods	**0.504**	0.053
Speed Homepage	-0.163	**0.878**
Browsing Speed	-0.216	**0.849**
Personal Account	0.045	**0.588**
Customer Support	0.127	**0.523**

Variable Principal Normalization.

As said, two dimensions were extracted. They were labeled: professionalism (1) and convenience (2). Among these dimensions, the professionalism of an online shop appears to be the most important factor because it explains the largest portion (34,32%) of the total variance. This dimension consists of eight items; multiple payments methods (1), consistent navigation design (2), a professional look (3), quality of product representation (4), simple design (5), easy to scan (6), functionality to select product attributes (7), and the presence of a privacy policy statement (8). These items are measures of the following constructs: privacy & security (1+8), usability (2), aesthetics (3+5), representation of products (4), decision support (7), and complexity (6). The dimension was labeled 'professionalism' because all items are concerned with the level of expertness and the professional image a visitor assigns to an online shop. Professionalism is the combination of all the qualities that are connected with a successful online shop.

As stated in the literature review, the offering of multiple payment methods is considered to lower customer concerns about security and to enhance the ease of ordering (Liang & Lai, 2002). The reason this item loads on the professionalism dimension could be the fact that offering multiple payment methods is seen as a confirmation of good security of the online shop which results in a higher association with professionalism.

The consistency of the navigation design is closely related to usability. Usability has a positive and direct impact on consumer trust (Flavián et al., 2006) and poorly designed navigation has a negative impact on online sales (Y. H. Chen et al., 2010) which means a consistent navigation design is also an important factor for creating a professional image. Differences and disruptions in navigation design will make visitors doubt the professionalism of the online retailer.

A professional look is defined as an online shop which is designed with skill and care using modern technologies (Moshagen & Thielsch, 2010). This helps the shop to avoid the impression of being outdated. A professional looking shop is important for persuading visitors to purchase online.

A high-quality and truthful representation generates customer confidence and results in positive associations with the online shop. Otherwise the customers will doubt the professional quality of the online retailer (Y. D. Wang & Emurian, 2005).

A simple design is also a sign of professionalism. The possibility for a visitor to get a clear perception of the layout (Moshagen & Thielsch, 2010) and the reduction of perceived risks of wasting time, deception, and frustration (Y. D. Wang & Emurian, 2005) by implementing a simple design are both relevant factors for a professional online shop. If the design is too complicated it will scare visitors off.

Easy to scan is the next item which loads on the professionalism dimension. It is concerned with the presentation of information on site. Visitors are more likely to respond to simple messages and are more likely to end active participation as the overload increases (Jones et al., 2004). Information can be presented as easy to scan by using short text blocks and enumeration of important points. An overload of information or a cluttered way of presenting information can be associated with a less professional retailer.

Selection of attributes (which is called recommendation agent in the literature review) enables the visitor to select desired attributes and a personalized list of recommended alternatives is generated. This lowers customer frustration because visitors can find desired products more easily (Srinivasan et al., 2002). A recommendation agent of good quality might also be a sign of high professional online shops.

The inclusion of a privacy policy is the last item of the professionalism dimension. Such a policy or statement can be used to diminish privacy issues of visitors by influencing visitors perceptions of trustworthiness as a dependable and professional retailer (Belanger et al., 2002).

The second dimension, convenience, is based on the following items: speed of homepage (1), browsing speed (2), a personal account (3), and customer support options (4) and explains 21.4% of the variance. These items are measures of the following constructs: accessibility (1+2), customization (3), and problem solving (4). The extraction of this particular dimension is in line with earlier findings of S. J. Chen and Chang (2003) who concluded that convenience, price savings and time savings are the main reasons for shopping online. Application of this principle might result in higher conversion rates. The influence of both dimensions on conversion rates are being tested in the next paragraph.

4.3   REGRESSION ANALYSIS

The managerial relevance of the metrics is evaluated through regression analysis. The causal relation between the predictors (both dimensions) and the dependent variable (conversion rate) are measured by conducting a linear regression analysis in SPSS. Each generated dimension was transformed into a new variable consisting of the items which loaded strongly on that particular dimension. Following the CATPCA, factor scores (saved as factor variables per item) were computed and used for regression analysis. The factor scores for each shop related to the professionalism or convenience dimension were calculated by summing the raw scores corresponding to all items loading on a factor. The sum score method is most desirable when the scales used to collect the original data are exploratory and untested (Anderson, Hair, Tatham, & Black, 2006). This approach is generally acceptable for most exploratory research (Tabachnick, Fidell, & Osterlind, 2001). The

regression analysis related convenience to conversion rate and professionalism to conversion rate. No statistically significant linear dependence of the mean of both professionalism and convenience on conversion rates was detected ($P < .05$).

As said in the beginning, the conversion rate can be determined at various steps in the ordering process or formulated based on different goals. Three main metrics in website analytics are bounce rate, page views/user, and time on site. All these factors have in common that they increase the possibility of turning visitors into actual customers when they are optimized. The bounce rate is the percentage of visitors who enter the online shop and leave the shop rather than continue viewing other pages within the shop. A low(er) bounce rate is desirable to increase the likelihood of conversion. A higher amount of page views means the visitor is exploring the shop and clicking deeper into it which may also result in higher conversion rates. The last metric is time on site and measures the visit duration. This metric might be an indication of the level of interest or involvement that a visitor has with the online shop. Therefore longer visits could result in higher conversion rates. After we did not find a statistical significant relationship between professionalism and conversion rates as well as between convenience and conversion rates, we decided to test whether these dimensions has statistical influence on above mentioned metrics. Data about these metrics was selected from the database of the web site Alexa.com[5] (table 10).

Metric	Operationalization
Bounce Rate	Percentage of visits that consist of a single page view
Page Views/User	Unique page views per user
Time on Site	Time on site per user

Table 10: Operationalization of web analytics metrics

Dependent Variable	Independent Variable	Standardized Coefficients Beta	*t*-value	*P*-value
Conversion Rate	Professionalism	0.224	1.474	0.148
	Convenience	0.224	1.469	0.150
Bounce Rate	Professionalism	0.102	0.578	0.567
	Convenience	-0.138	-0.786	0.438
Page views/user	Professionalism	0.181	1.122	0.269
	Convenience	0.221	1.378	0.176
Time on Site	Professionalism	0.176	1.045	0.304
	Convenience	0.172	1.021	0.315

Table 11: Results Regression Analysis – Impact of Dimensions

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[5] http://www.alexa.com/

The results of the regression analyses can be deduced from table 11. It appeared that for these relationships the t-value was also insignificant. The tests were run again, this time with the industry they operate in as controlling variable. There was no significant difference between the industries found. Subsequently it was tested whether the individual factors of both dimensions had impact following the prediction that all factors should have positive impact on the dependent variables, whereby the opposite is true for the dependent variable bounce rate. Categorical regression analysis was conducted for each individual factor of the dimensions. Categorical regression analysis was chosen because of the nature of the original independent variables (nominal and ordinal variables) which are effectively transformed into interval variables by using this regression analysis. The regression results are shown in tables 12 and 13. First the impact of the factors on conversion rates was examined. Four out of twelve factors contributed to conversion rates. Two factors of professionalism (easy to scan and representation of product) and two factors of the convenience dimension (homepage speed and personal account). Easy to scan was found to be significant with a standardized beta of 0.275 (F=10.044, p=0.003), representation of products with 0.255 (F=5.049, p=0.011), homepage speed with 0.242 (F=4.561, p=0.039), and personal account with 0.218 (F=7.423, p=0.009). These regressions show that these factors have predictive value for conversion rates. All are of positive influence on conversion rates while easy to scan has the strongest effect.

Second, the effect of the factors on bounce rates was tested. Of the professionalism factors selection of attributes was found to have significant impact (β=0.295, F=5.399, p=0.027) and of the convenience factors the variable personal account (β=0.251, F=6.496, p=0.016). The regression analysis shows positive relationships surprisingly, which means that the presence of both functionalities results in higher bounce rates. Apparently these factors are of unimportance for visitors when they decide to leave or stay at the online shop. Three factors (navigation design, simple design, and homepage speed) show a negative coefficient which means they could lower bounce rates. However, these coefficients are not proven significant following the predetermined significant levels of 0.01 and 0.05.

The amount of payment methods (β=0.456, F=6.496, p=0.015) and homepage speed (β=0.212, F=4.165, p=0.048) relate positively to page views per user. Knowing that the online shop offers multiple options for payment might help convincing visitors to click deeper into the shop and to avoid losing visitors because they cannot order at the online shop because of lack of particular payment methods. A fast loading time of the homepage contributes also to a higher amount of page views according to the regression analysis.

At last, the impact of the factors on time on site was examined. Three factors appeared to have significant influence which are navigation design (β=0.113, F=6.080, p=0.019), easy to scan (β=0.262, F=7.346, p=0.010), and payment methods (β=0.339, F=5.281, p=0.028). None of the convenience factors showed significant relationships with time on site. Two factors related to usability of an online shop, navigation design and easy to scan, showed up at this particular analysis. The results show also a high coefficient (β=0.295) for the variable simple design (F=2.755, p=0.078) which is close to the significance level of 0.05. It can be said that time on site is largely affected by an easy to use online shop while multiple payment methods are also of importance.

Table 12: Regression Analysis Results - Impact of Professionalism Constructs: Path Coefficients

	Independent							
	Professionalism							
Dependent	NavDes	SelAtt	EasyScan	ProfLook	SimpDes	ProdReprGr	PriPol	PayMeth
Con. Rate	0.010	0.092	**0.275****	0.212	0.236	**0.255***	0.025	0.129
Bounce Rate	-0.003	**0.295***	0.077	0.198	-0.157	0.264	0.142	0.187
Page views	0.003	0.051	0.153	0.168	0.271	0.051	0.006	**0.456***
Time on Site	**0.113***	0.197	**0.262****	0.145	0.295	0.058	0.090	**0.339***

** Results are significant at <.01
*   Results are significant at <.05

Table 13: Regression Analysis Results - Impact of Convenience Constructs: Path Coefficients

	Independent			
	Convenience			
Dependent	SpHome	SpBrowse	PersAcc	CustSupp
Con. Rate	**0.242****	0.186	**0.218****	0.212
Bounce Rate	-0.105	0.012	**0.251***	0.117
Page views	**0.212***	0.160	0.190	0.130
Time on Site	0.182	0.211	0.029	0.145

** Results are significant at <.01
*   Results are significant at <.05

5. DISCUSSION

5.1 CONCLUSION

This research was motivated by an interest in examining how different features on site affect conversion rates of online shops. Past IS Success studies gave theoretical grounding for the selection of model constructs in this study. The analysis aimed at testing this model which resulted in two distinct dimensions: *professionalism* and *convenience*. As outlined in the introduction of this paper, the main research question is about which factors are most effective for conversion rate optimization. It appeared that conversion rates are influenced by initial access speed of the homepage of the online shop, the possibility to create a personal account, a product representation of good quality, and an easy to scan shop where information can be easily located. All factors have positive influence on conversion rates while the relationship between easy to scan and conversion rates appears to be the strongest. The supported hypotheses will be shortly discussed.

H1a. *Good quality of multimedia used for product representation results in higher conversion rates.*

This hypothesis is supported. Y. D. Wang and Emurian (2005) already proved that high-quality product representation generates customer confidence and results in positive associations with the other parts of the web site. This research shows good product representation also appears to result in higher conversion rates. There was no relationship found between amount of multimedia used and conversion rates.

H1c. *Presence of customization is related positively to the conversion rate.*

This hypothesis is partly supported. Not all customization factors were found to have significant impact, only the presence of a personal account has significant influence on conversion rates. A personal account is the own online environment of a customer within the online shop and improves the transaction convenience for the customer because all personal information is already entered which reduces the time to order. According to Thirumalai and Sinha (2011) the use of a personal account results in an increase of the overall customer satisfaction. This study shows it has also an impact on conversion rates.

H2a. *Usability of the online shop is related positively to the conversion rate.*

There was no significant relationship with conversion rates found though one of the usability factors showed a significant impact on time on site. A clear navigation design seems to be of importance for avoiding visitors to leave the online shop.

H2b. *Availability and responsiveness are related positively to the conversion rate.*

Responsiveness, the speed of browsing within the online shop, did not relate significantly to any of the dependent variables. Availability, the initial access speed of the homepage, did result in two significant paths with conversion rates and page views per user. Therefore we can state that availability relates positively to conversion rates.

H3b. *Complexity of the online shop is related negatively to the conversion rate.*

This hypothesis is partly supported. Easy to scan has the biggest influence on conversion rates and has also a significant impact on time on site. Easy to scan has to do with the organization of displayed information on a web site in an uncluttered way in order to overcome information overload by using short text blocks and enumeration of important points. This way the visitor can locate important information while it requires less cognitive effort. This study shows it results in higher conversion rates and longer visits.

5.2　IMPLICATIONS FOR RESEARCH AND PRACTICE

The study contains several important findings and has implications for both research and practice:

- It is one of the first empirical researches about conversion rate optimization for the online shop environment.
- The study offers a comprehensive overview and conceptualization of conversion rate optimization constructs.
- First operationalization and test of the proposed conversion rate optimization model based on the DeLone and McLean IS Success model.
- The study contributes to explanatory models of conversion rate optimization by discussing conversion rate constructs in the theoretical section which resulted in three dimensions and by the results of the empirical study which encourages the use of two dimensions for conversion rate optimization in future research. Hence, the findings provide a basis for further study of this topic along both theoretical and empirical dimensions.
- The rating instrument can be used by e-retailers to benchmark their online shops with competitors to identify their comparative strengths and weaknesses concerning conversion rate optimization.
- The study also highlights the importance of professionalism and convenience for conversion rate optimization. Due to this research online shops now know where their focus should be.

- Both the model and rating instrument offer practical means for online shops to evaluate their progress in conversion rate optimization and offer possible options and guidelines for optimizing conversion rates.

5.3 LIMITATIONS AND FUTURE RESEARCH

Limitations that might restrict the interpretation of the findings must be acknowledged. First, because of the extensive way of research a large sample was not feasible within the time limit. The relatively small sample size could harm the external validity. Future research with larger samples should be undertaken in order to test the findings.

Second, online shops included in this research might not be able to represent the whole online shop population. The size of the company, the purpose of the web site, and the industry they operate in are factors for example which might influence conversion rates as well. Online B2C shops with products were the focus of this research without including online service providers. Researchers can develop richer models that capture these differences between various online shops. Also, this study collected data mostly on the Dutch market which might delimit the use of the proposed framework in other global contexts. More research about the topic in various countries is needed to make conclusions about possible differences between geographical areas.

The emphasis of this study was on assessing the impact of content quality, system quality and layout quality on conversion rates. These dimensions contain multiple variables. However, the model does only take into account variables which can be influenced by e-commerce consultants. Certain individual-level variables (such as satisfaction, use and trust) may also have an impact which are outside the control of the online shop. Based on the findings of this study more comprehensive models of conversion rate optimization should be developed and validated.

Despite these limitations, this study provides a starting point for research on conversion rate optimization for online shops with an extensive literature overview as well as two important dimensions for conversion rate optimization. Therefore, the results of this study can be used as guidance for further development of conversion rate optimization factors and models. With the still growing e-commerce business, it becomes more important for e-retailers to compete successfully. They will need to convert as much visitors as possible into actual customers resulting in high conversion rates. Therefore it is necessary to focus on conversion rate optimization factors in a continuously way. Toward this task, e-retailers must first thoroughly understand these factors and their effectiveness. The findings of this study may hopefully contribute to the accomplishment of this crucial task.

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Appendix

Rating Online Shop

Date:	
Name Shop:	
URL:	

1. Check the product representation of **3** random products. Which product representation methods are being used?

   Product 1

   ☐ Text

   ☐ Pictures

   ☐ Video

   ☐ 3D Virtual Technology (the ability to view a product from various angles and distances)

Show these methods a truthful and appropriate presentation of the product? Rate only the methods which are present.

Is the text a good representation of the product? Give a grade. (1=no representation … 5=perfect representation)

☐

Is the picture a good representation of the product? Give a grade. (1=no representation … 5=perfect representation)

☐

Is the video a good representation of the product? Give a grade. (1=no representation … 5=perfect representation)

☐

Is the 3D virtual technology a good representation of the product? Give a grade. (1=no representation … 5=perfect representation)

☐

Product 2

☐ Text

☐ Pictures

☐ Video

☐ 3D Virtual Technology (the ability to view a product from various angles and distances)

Show these methods a truthful and appropriate presentation of the product? Rate only the methods which are present.

Is the text a good representation of the product? Give a grade. (1=no representation … 5=perfect representation)

☐

Is the picture a good representation of the product? Give a grade. (1=no representation … 5=perfect representation)

☐

Is the video a good representation of the product? Give a grade. (1=no representation … 5=perfect representation)

☐

Is the 3D virtual technology a good representation of the product? Give a grade. (1=no representation … 5=perfect representation)

☐

Product 3

☐ Text

☐ Pictures

☐ Video

☐ 3D Virtual Technology (the ability to view a product from various angles and distances)

Show these methods a truthful and appropriate presentation of the product? Rate only the methods which are present.

Is the text a good representation of the product? Give a grade. (1=no representation ... 5=perfect representation)

☐

Is the picture a good representation of the product? Give a grade. (1=no representation ... 5=perfect representation)

☐

Is the video a good representation of the product? Give a grade. (1=no representation ... 5=perfect representation)

☐

Is the 3D virtual technology a good representation of the product? Give a grade. (1=no representation ... 5=perfect representation)

☐

2. Is there an option to compare self-selected products on site?

☐ Yes

☐ No

3. Is there an option to self-select desired attributes/features (like color, size, etc.)?

☐ Yes

☐ No

4. Are there any testimonials or recommendations of the company shown?

☐ Yes

☐ No

5. Is there a possibility to create a personal account?

☐ Yes

☐ No

6. The shop displays personal recommendations for you on the homepage without your own input (for example based on recently viewed items).

☐ Yes

☐ No

7. The shop offers free samples, free trial, free tutorials, gifts, or other free stuff without expecting something in return.

☐ Yes

☐ No

8. The shop offers the possibility to subscribe to a newsletter.

☐ Yes

☐ No

9. The shop offers the feature to add products to a wish list or another personal list.

☐ Yes

☐ No

10. The shop shows product reviews of customers at the product page.

☐ Yes

☐ No

11. The shop displays social media coverage of the company (amount of Facebook likes, followers on Twitter, etc.).

☐ Yes

☐ No

12. When looking at a product, you can see products bought by other customers that also purchased the product you are looking at.

☐ Yes

☐ No

13. The shop displays bestselling or highest rated products.

☐ Yes

☐ No

14. The shop displays awards/prizes won.

☐ Yes

☐ No

15. The shop uses experts and/or professionals to promote the product(s).

☐ Yes

☐ No

16. The shop uses celebrities and/or peers to promote the product(s).

☐ Yes

☐ No

17. The shop offers the possibility to recommend products to friends (by e-mail and/or social media).

☐ Yes

☐ No

18. The shop uses scarcity selling techniques by offering their products, such as: limited stock (for example 'only 3 left'), offer(s) with time limit (for example weekly or daily deals), exclusive offers for members.

☐ Yes

☐ No

19. How does the online shop provide customer support? *Mark all available options.*

☐ FAQ

☐ E-mail

☐ Telephone

☐ Online chat

☐ Physical Store

☐ Other

20. The navigation path is displayed all the time (e.g. breadcrumb trial).

☐ Yes

☐ No

21. The taxonomy of the navigation menu is clear.

☐ Yes

☐ No

22. The navigation design is consistent throughout the shop.

☐ Yes

☐ No

23. Hyperlinks have high visibility.

☐ Yes

☐ No

24. The shop provides a variety of navigation tools (like a home button on each level page, navigation links of each level, back button on product page, and site map).

☐ Yes

☐ No

25. Is there an internal search option?

☐ Yes

☐ No

26. Are there any navigational errors?

☐ Yes

☐ No

27. The homepage of the shop loads in:

☐ 0-2 seconds

☐ 2-5 seconds

☐ More than 5 seconds

28. The navigation between pages of the shop takes:

☐ 0-2 seconds

☐ 2-5 seconds

☐ More than 5 seconds

29. The shop offers the following payment methods: *(Mark all available options)*

☐ iDEAL

☐ Credit card

☐ PayPal

☐ AfterPay (Acceptgiro)

☐ Monthly payment option

☐ Gift card/credit

☐ Other

30. A privacy policy is included in the online shop.

☐ Yes

☐ No

31. The shop uses encryption (the transforming of data using an algorithm to make it unreadable) to secure personal, financial and transaction-related data (like SSL→ recognizable as 'https' and the little lock in the URL).

☐ Yes

☐ No

32. The shop shows labels or logos of independent companies which verify, audit and certify privacy policies and security (e.g. TRUSTe, VeriSign, Thuiswinkel Waarborg).

☐ Yes

☐ No

33. The shop uses personalized greetings (after login).

☐ Yes

☐ No

34. The shop shows human audio/video/photos of employees.

☐ Yes

☐ No

35. The shop uses socially-rich content to present their products (e.g. using photos of human beings using the product, personal tone in text content, etc.).

☐ Yes

☐ No

36. The design of the shop can be defined as a simple (clarity, orderliness, homogeneity in design, grouping of information and balance) design.

Rate the design, whereby 1= not simple at all and 5=extremely simple.

☐

37. The colors used create a professional and trustful image.

☐ Yes

☐ No

38. The shop uses different colors with great contrast for their background and text, which results in good readability.

☐ Yes

☐ No

39. The information on site is easy to scan (short text blocks, enumerations of important points, etc.).

☐ Yes

☐ No

TABLE 1: INTERRATER RELIABILITY

Variables	Cohen's Kappa
Comparison Matrix	1,00
Recommendation Agent	1,00
Testimonials	1,00
Personal Account	1,00
Decision Customization	1,00
Reciprocity	1,00
Commitment – Newsletter	1,00
Commitment – Wish List	1,00
Social Proof – Reviews	1,00
Social Proof – Social Media Coverage	0,78
Social Proof – Purchases Other Customers	1,00
Social Proof - Bestselling/Highest Rated Products	0,78
Authority – Awards/Prizes	1,00
Authority – Professionals/Experts	1,00
Liking – Celebrities/Peers	1,00
Liking – Recommend products to friends	1,00
Scarcity	0,60
Problem Solving – FAQ	1,00
Problem Solving – E-mail	1,00
Problem Solving – Telephone	1,00
Problem Solving – Online chat	1,00
Problem Solving – Physical Store	1,00
Problem Solving – Other	1,00
Usability – Display Navigation Path	1,00
Usability – Navigation Design	1,00
Usability – Taxonomy Navigation Menu	1,00
Usability – Variety Navigation Tools	1,00
Usability – Visible Hyperlinks	1,00
Usability – Internal Search Engine	1,00
Usability – Navigational Errors	1,00
Accessibility – Access Speed	0,74
Accessibility – Navigation Speed on Site	0,78
Payment Options - iDeal	1,00
Payment Options – Credit card	1,00
Payment Options - PayPal	1,00
Payment Options – AfterPay/Acceptgiro	1,00
Payment Options – Monthly Payment Option	1,00
Payment Options – Gift Card/Credit	1,00
Payment Options – Other	0,78
Privacy Statement	1,00
Encryption of Personal Data	1,00
Labels Independent Companies	1,00
Interaction – Personalized Greetings	1,00
Interaction – Human audio/video/photos of employees	1,00
Interaction – Socially-Rich Content	0,74
Aesthetics – Simple Design	0,46
Aesthetics – Professional Look	1,00
Complexity – Readability	1,00

Complexity – Easy to Scan	1,00