TAMPEREEN TEKNILLINEN YLIOPISTO
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ATTITUDES OF FINNISH B2B-DISTRIBUTORS TOWARD DIGITAL GUIDED SELLING TOOLS

Thesis work

Examiners: Professor Petri Suomala and University Teacher Tommi Mahlamäki
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ABSTRACT

SAMULI PYLKKÖNEN: Attitudes of Finnish B2B-distributors toward digital guided selling tools
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Keywords: B2B-distributor, guided selling, sales configurator, technology adoption, technology acceptance model

The study focused on the Finnish B2B-distributors' familiarity with and attitudes toward sales configurators – a type of digital tool that can be utilized in industrial selling contexts. The research was conducted as a cross-sectional questionnaire study concentrating specifically on distributor representatives in order to examine how the representatives perceive the use of sales configurators in a work setting.

From the results it can be concluded that while most of the representatives have heard of and even used a sales configurator before, utilization of sales configurators within supplier distributor relationships is still somewhat uncommon. The distributor representatives' attitudes toward sales configurator were very positive, however, suggesting that sales configurators are seen as useful tools for managing configuration related tasks.

Some of the contributions of this thesis work are conceptual, as the conceptual model constructed in this study proposes several interesting directions for future research. First of all, this thesis work offers a categorization of beliefs into groups that follow simple rules of causation: that is, behavioral intention is determined by outcome expectations, outcome expectations by efficacy expectations, and efficacy expectations by internal and external control factors. Second, this thesis work can potentially help to explain the relationship of perceived ease of use, perceived usefulness, and behavioral intention, by introducing new outcome and efficacy expectation constructs. Third, the dominant technology adoption model is questioned, as the role of belief salience has perhaps been overlooked by the current technology acceptance literature. Fourth, a new model is presented for categorizing the types of control beliefs according to the external and internal locus of control, as well as to the task-technology-human fit conceptualization.

TIIVISTELMÄ

SAMULI PYLKKÖNEN: Suomalaisten B2B-jakelijoiden asenteet digitaalisia ohjatun myynnin työkaluja kohtaan
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Avainsanat: B2B-jakelija, ohjattu myynti, myyntikonfiguraattori, teknologian hyväksyntä, teknologian hyväksyntämalli

Tutkimuksessa selvitettiin suomalaisten B2B-jakelijoiden asenteita myyntikonfiguraattoreita kohtaan. Lisäksi tutkimuksessa selvitettiin kuinka hyvin jakelijat ylipäänsä tuntevat myyntikonfiguraattorin käsitteen. Tutkimus oli poikkileikkauksellinen kyselytutkimus, joka toteutettiin keräämällä jakelijoiden näkemyksiä myyntikonfiguraattorin käytöstä työelämässä web-portaalin kautta jaetulla kyselylomakkeella.

Tutkimuksen tulokset osoittavat että suurin osa jakelijoista on kuullut aiemmin myyntikonfiguraattoreista, ja suurin osa jopa käyttänyt myyntikonfiguraattoria. Sen sijaan myyntikonfiguraattoreiden käyttö jakelijoiden ja toimittajien välisissä suhteissa vaikuttaa olevan harvinaisempaa. Jakelijoiden asenteet myyntikonfiguraattoreita kohtaan olivat kuitenkin hyvin positiivisia, mikä viittaa siihen että jakelijat näkevät myyntikonfiguraattorit potentiaalisina apuvälineinä omien konfigurointiin liittyvien työtehtäviensä suorittamisessa.

Osa tutkimuksen kontribuutioista on konseptuaalisia. Ensinnäkin, tämä opinnäytetyö esittelee asenteiden ja näkemysten kategorisointiperiaatteen, joka noudattaa yksinkertaisia kausaalisuuden sääntöjä. Toiseksi, esittämällä uusia konsepteja tämä opinnäytetyö voi lisätä ymmärrystä koetun helppokäyttöisyyden, koetun hyödyllisyyden, ja aikomuksen välisistä suhteista. Kolmanneksi, vallitseva teknologian hyväksyntämalli kyseenalaistetaan, sillä se ei riittävällä tavalla ota huomioon onko tutkimuksen kohdejärjestelmä lainkaan vastaajalle olennainen. Neljänneksi, tämä opinnäytetyö esittää konseptuaalisen mallin jonka avulla on mahdollista jaotella kontrollitekijöitä sen mukaan, onko tekijä sisäinen vai ulkoinen, ja liittyykö tekijä teknologian vai henkilön koettuihin ominaisuuksiin.

PREFACE

After ups and downs, after feelings of joy and occasional tears of despair, I have finally accomplished something that I already started to doubt at some point during my life: I have finished off my studies. Better yet, I have managed to do so with a thesis work that I can honestly say I’m proud of. Now, a new chapter in my professional career may begin, and I’m looking forward to the opportunities that will follow.

I’m very grateful for the guidance, help, patience, and encouragement I received from University Teacher Tommi Mahlamäki and Postdoctoral Researcher Mika Ojala along the long road of writing this thesis work. I couldn’t have asked for better instructors.

I would also like to thank my life partner Emma, who has had the strength to support me when I have struggled, and rejoiced with me when I have succeeded, as well as my beautiful daughter Siiri, who has brought a lot of happiness into my life since her birth two and a half years ago. I don’t think that I would have had the strength to accomplish this without you. Thank you.

In Tampere, Finland, on 6 November 2016

Samuli Pylkkönen

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LIST OF ABBREVIATIONS

B2B	Business-to-Business
CRM	Customer Relationship Management
ERP	Enterprise Resource Planning
PDM	Product Data Management
TAM	Technology Acceptance Model
TAM2	Technology Acceptance Model 2
TAM3	Technology Acceptance Model 3
TRA	Theory of Reasoned Action
TPB	Theory of Planned Behavior
SCT	Social Cognitive Theory

1. INTRODUCTION

Some 30 years ago, a company created value to its customers by continuously developing new and improved products, finding new and improved ways of manufacturing these products, and creating new and improved ways of delivering these products via its sales channels. The value being embedded to its products and services, the role of the company's sales force and its distributors was to communicate the superiority of the company's offering to the end-customer. The salesman justified his pay-check by generating new leads, communicating the value of the company's products and services to his customers, and closing the deals with clever presentations and tactics that left the customer no other choice but to accept the offer.

The world is not the same as it was 30 years ago, however. In fact, the world has changed quite a bit. For one, some innovative firms learned how to customize products by the masses while keeping their costs and margins at an acceptable level at the same time. This was made possible by automating the manufacturing processes in a new, more flexible way, and by designing the product architecture to support modularity between components and sub-assemblies. As a consequence, the old ways of doing things – developing products beforehand and offering the same to everyone who is willing to listen – didn't seem to work that well anymore. (Vargo & Lusch 2004)

In addition to the increased customizability of the offerings, the development of information technologies and the World Wide Web has brought customers closer and closer to product information (Adamson et al. 2012). All of the sudden, holding information about the new advancements in product technology wasn't as valuable as it used to be, as anyone could readily access it without spending much time and effort at all. With the customers already armed to the teeth before the first sales call, the traditional salesman was getting closer and closer to extinction (Adamson et al 2012; Rackham & DeVincentis 1999). No longer could the sales force justify its existence by its lead generation or value communicating function, as there were much more cost-effective ways of making things happen (Moncrief & Marshall 2005; Rackham & DeVincentis 1999).

Indeed, some of the traditional roles of the sales representatives are now being handled by other functional departments of the firm (Moncrief & Marshall 2005). The distributors, who serve as a conduit between manufacturers and the business users of a product, are in trouble as well. Should the distributors not find a way to serve their customers more effectively, their place as the middleman between the manufacturer and the end-customer is being endangered by the possibilities that might come along with the Internet and E-commerce. (Mudambi & Aggrawal 2003)

Due to the fundamental changes in the marketplace, the supplier's and the distributor's sales forces need to re-define their purpose. Mere communication of value is not enough any longer, but the sales force needs to find new ways of *creating* value to the customer (Rackham & DeVincentis 1999). Indeed, one of the hot topics in the marketing literature during the past decade has been the co-creation of value, and the change in perspective of how value is actually created. A central theorem of this literature stream is that it is not the supplier who creates customer value, but the customer itself: value is created only when the supplier's product is being used in the customer's processes in a way that improves customer's productivity (Vargo & Lusch 2004; Grönroos 2008).

One of the most important ways a seller can participate this value creation process is to help the customer to define and to configure a solution that fits the customer's business processes in the most optimal way (Rackham & DeVincentis 1999). Thus, for the sales representative, a whole new set of challenges have emerged. For starters, the increased possibilities related to the customization of the offering has resulted in increasing difficulties in determining the sales specification: the sheer number of rules that dictate how the components and modules can be combined together can be enormous. Second, the customer of the today is more demanding than ever before: the sales representative has to be able to do more than merely presenting new advancements in their products to the customer. Consequently, the process of selling needs to be defined in a way that it targets value co-creation, rather than value communication. Moreover, there's a need for tools that help the sales representative during this value co-creation process. (Rackham & DeVincentis 1999, pp. 151-153)

Thus, two central concepts related to value co-creation from the sales representative's perspective are introduced. First, **guided selling** is defined as a process in which the sales representative is guided by a certain procedure or system that ensures that the end result, for example, the product or service to the customer, is optimal both for the end customer and for the selling company. Second, **digital guided selling tools** are defined as digital systems or tools that provide guidance to the sales representative during the guided selling process.

1.1 Sales configurators

The prime objectives of this study is to measure Finnish B2B-distributors' familiarity of and attitudes toward a **sales configurator**. A sales configurator can be described as a digital guided selling tool that is responsible for guiding the user through a service or product configuration process (Rogoll & Piller 2004, p. 3). Sales configurators may be stand-alone applications or modules of other applications, which support translation of needs into sales specifications, as well as translation of sales specifications into the product data necessary to build the product variant requested by the customer (Rogoll & Piller 2004; Trentin et al. 2013, pp. 436-437). The *configuration process* aims to produce a consistent product variant, i.e. a configuration, that specifies the composition of an instance of the product or the service, adapted to the requirements of the customer within the limitations set by the product architecture (Tiihonen et al. 1996).

The fundamental idea behind the configurator is that it makes customization of complex products and services as easy to the user as possible. The user should not be able to make invalid configurations, but the system should guide the configuration process so that the end-result is a valid product or service that can be delivered by the supplier and the distributor. The configuration rules can be implemented in many ways, but some of the most common methods include the following logic-systems (Felfernig et al. 2014; Sabin & Weigel 1998):

1. **Rule-based systems.** In these systems, the system rules have the form ***if*** *condition* ***then*** *consequence*. These systems derive solutions in a forward-chaining manner: at each step, the system examines the entire set of rules and considers only the rules it can execute next. The system then selects and executes one of the rules under consideration by performing its action part. As the system rules do not separate directed relationships from actions, knowledge maintenance may become difficult, however (due to the knowledge of a single entity being spread across multiple rules).
2. **Constraint-based systems.** In these systems, each component is defined by a set of properties and a set of ports for connecting to other components. Constraints among components restrict the ways various components can be combined to form a valid configuration. As opposed to rules, constraints work in two ways: the order of choosing the parameter values does not matter, as one option restricts another, regardless of which one is chosen first.
3. **Resource-based systems.** The goal of a resource-based system is to find a set of components that bring the overall set of resources to a balanced state, in which all demands are fulfilled. A configuration is acceptable only if the resources that the environment and different components demand are each balanced by the resources the environment and components can maximally supply.

1.2 The research questions, objectives, and confinements of the study

Some of the common motives for using sales configurators is to assist in the transfer of product configuration, pricing, and delivery time information from the company repositories to the sales representative, resulting in a more effective and efficient sales dialogue with the customer (Jelinek 2013, p. 637; Salvador & Forza 2007; Tiihonen et al. 2013, p. 105). Being able to build and visualize high-quality product configurations on the fly, the sales representative can create solutions that better fulfill the needs of the customer (Jelinek 2013, p. 637; Mahlamäki et al. 2016; Rogoll & Piller 2004, pp. 10-11). In addition, the use of a sales configurator can potentially lessen the amount of configuration errors logged in by the sales representatives, resulting in a more efficient order-delivery process (Keil et al. 1995; Tiihonen 1996).

One of the most prominent advantages of digital guided selling systems is, however, that they can be utilized by the distributor representatives, in addition to the company's own sales force (Mahlamäki et al. 2015). Distributors hold valuable information of the needs and requirements of the local customer (Mudambi & Aggarwal 2003, p. 324), and provide a more cost-effective means for the supplier to grow business in different geographical areas than the company's own sales force (Friedman 2002). Thus, selling through distributors may provide new growth opportunities for the focal firm, given that the distributor representative are able to do more than mere value communication.

As a sales configurator can provide the distributor representative with in-depth information on the optional structures and capabilities of the different configuration variants, the customization of the product should become easier and the distributor representative could be able to serve her customers more effectively as a result. Furthermore, through an integration with the supplier's ERP, the distributor representative may submit orders that are already in the right form, and which contain all the information that is required by the supplier for manufacturing and delivering the product to the distributor (Mahlamäki et al. 2015).

Whether the distributor representatives see things the same way is by no means self-evident, however. First of all, none of the studies concerning sales configurators seem to have focused on the supplier-distributor relationship and to the perception of distributors. Second, there seems to be only a handful of studies that measure user perceptions on sales configurator in the first place (e.g. Agrawal & Prasad 1998; Keil et al. 1995; Trentin et al. 2014), some of which do not measure actual adoption intention at all.

Consequently, there are two main topics that are being examined in this study. The first topic is concerned over the degree of familiarity of sales configurators to the distributor representatives. The familiarity and experience with a particular information system has been linked to positive adoption decisions in numerous studies (e.g. Karahanna et al. 2006; Taylor & Todd 1995b; Venkatesh & Bala 2008). Furthermore, the degree of familiarity of a sales configurator to the distributor representatives gives insights on how common it currently is for the suppliers to provide a sales configurator for their distributors in the Finnish B2B-markets. By examining the degree of familiarity, one may estimate the overall stage of the innovation diffusion within the supplier-distributor relationships. Thus, the first research question is formulated as follows:

1. What is the degree of familiarity of distributor representatives with sales configurators in the Finnish B2B-market?

The second, and also the main topic is concerned over the distributor representatives' perceptions on a sales configurator. The more positive perceptions the distributor representatives have toward a sales configurator, the more likely such a tool would be adopted by them (Davis 1989). Although the distributor representatives might receive many of the aforementioned benefits by utilizing sales configurators in their work, the representatives themselves might have a totally different view of things; for example, the potential users might not trust the system, they might perceive it as too complex or difficult to use, or they might think that they would not have the necessary support in place in order to utilize a sales configurator successfully in their jobs, and so on. Thus, the second research question is formulated as follows:

2. How do the distributor representatives perceive sales configurators?

However, before measuring the distributor representatives' perceptions, one should determine which perceptions should, in fact, be measured. After all, an arbitrarily or intuitively selected set of perception measures tend to include many irrelevant associations to the research object, resulting in poor construct validity (Ajzen 1991, p. 192). Already over a decade ago, Franke & Piller (2003, p. 12) raised a particular research problem that addressed the question of which factors influence user satisfaction in a sales configurator context. In order to answer Franke & Piller's (2003) call, a conceptual model that justifies the connection between the individual's technology adoption decision and the individual's perceptions on the technology itself is built.

1.3 Research confinements

The research questions are addressed within certain limiting assumptions. The term adoption, for instance, refers to the secondary adoption made by individual distributor representatives with the assumption that the representatives do not have to think about their organization's adoption decision.

Furthermore, sales configurators are referred to in a general sense; that is, the term *sales configurator* does not refer to any specific system in this study, but to the concept of one. Thus, any system-specific perceptions cannot be measured. This does not endanger the comparability of the study results to other studies, however, as it is quite a common practice within the information systems acceptance literature to measure an individual's perceptions on information systems before any actual hands-on experience with it, or after a short introduction session (e.g. Davis et al. 1989; Davis et al. 1992; Chin & Gopal 1995; Taylor & Todd 1995a). After all, only quite general perceptions toward an information system could have been formed in such research settings.

1.4 Research methodology and the structure of the text

The current research is descriptive and cross-sectional in nature. Descriptive research is desirable when one wishes to project a study's findings to a larger population (Burns & Bush 2006, pp. 121-122), which is also one of the objectives of this study. Cross-sectional studies measure units from a sample of the population at one point in time and thus provides a “snapshot” of the current situation (Burns & Bush 2006, p. 122).

As the second research question can’t be fully answered before providing a solid theoretical ground, a large part of the text concentrates on building the conceptual model based on existing work in the fields of social psychology, information systems acceptance literature, and information systems satisfaction literature. Beginning with the central concepts of the study, the second chapter takes a look at the concept of guided selling and provides a basis for the understanding of a configuration task and its context. Specifically, the concept of guided selling is defined in more detail, and the structure of the guided selling process is introduced

The third chapter concentrates on the behavioral theories that guide an individual’s decision formation process in the information systems adoption context. The chapter takes a look at the behavioral theories that the typical technology adoption models have been built upon, and provides a theoretical basis for the conceptual model built and utilized in this study.

While the third chapter concentrates on building the foundations, the fourth chapter aims at building a conceptual model on top of them. In addition to the construction of the conceptual model, the chapter provides insights on the potential shortcomings of the currently most well-known technology adoption models. Several conceptual problems with the current models are raised and discussed in detail, and alternative theoretical explanations are provided to the empirical findings presented by the original authors.

The fifth chapter discusses about the research methodology in more detail; the research setting and participants are presented, as well as the measurement methodology and the handling of the results. Research population is defined, and the key characteristics of the actual sample are presented. The chapter also presents the actual variable measures along with their sources (if they exist) in the literature in detail.

The sixth chapter presents the actual results of the study, along with their method of analysis. Constructs’ reliability is also demonstrated. Finally, the seventh chapter provides a detailed discussion of the results; the theoretical meaning of the results and its underlying theory is discussed, as well as the practical implications and limitations of the study. Furthermore, several potential directions for future research are given.

2. DIGITAL GUIDED SELLING

The knowledge on how to sell effectively is often implicit personal knowledge; it is in the minds of the best salespersons. Many organizations trust this invaluable asset in the hands of a couple individuals (Rackham & DeVincentis 1999, pp. 139-148), generating difficulties to the organization in the long run; after all, it is knowledge, and – more specifically – techniques and skills that are the fundamental sources of an organization's competitive advantage (Teece 2000, p. 35; Vargo & Lusch 2004). One of the ways of transforming this knowledge from tacit to explicit is by storing, retrieving, transferring and applying it to and by other members of the organization with IT systems (Alavi & Leidner 2001, p. 111), including the knowledge of how to sell (Rackham & DeVincentis 1999, p. 148). By using digital tools, the sales representative can get support along the sales process: the tool can provide her information just when it's required, and help the salesperson to process this information more efficiently (Bush et al. 2005).

2.1 An optimal end-result

As selling *an optimal solution* is the fundamental goal of the guided selling process, the definition of the word *optimal* is required. The word *optimal*, on the other hand, can be best explained through the concept of value. In selling, where transaction is often seen as the focal point of examination, the concept of value is dyadic: by selling a product the seller receives money, while the customer receives some type of a productivity increase (Terho et al. 2012, p. 175).

Customer value, on the other hand, can be defined more specifically as the difference between the economic benefits and costs associated with the acquisition and use of a product or a service (Anderson et al. 2009), whereas the seller's value can be defined as the difference between the price of the offering and the costs associated with manufacturing and delivering the product or the service to the customer (Grönroos & Helle 2010). Then, the optimal product for the buyer would be such, that the difference between the buyer's benefits and costs would be of maximum value, and the optimal for the seller would be such that the price gained in exchange, less the costs associated with manufacturing and delivering the product, would be of maximum value. However, from the dyadic viewpoint, the optimal product would be such that the sum value would be of maximum value:

$$(Value_d)_{max} = (Value_c + Value_s)_{max}, \quad (1)$$

where $Value_c$ is the customer value, and $Value_s$ is the supplier value. $Value_d$ is defined as the dyadic, or the total value of the exchange that integrates the value for the customer and for the seller together (Terho et al. 2012).

The buyer's value and the seller's value can't be maximum at the same time, as the costs of the buyer are affected by the price of the product. As the buyer's value increases, the seller's value decreases, and vice versa. In order to make things a bit easier, however, the exchange price can be treated as separate. Then, the customer net benefits is defined as the difference between all the benefits associated with the offering, and all the costs associated with the offering, excluding the price (Anderson et al. 2009, pp. 6-7; Anderson & Wynstra 2011; Töytäri et al. 2015).

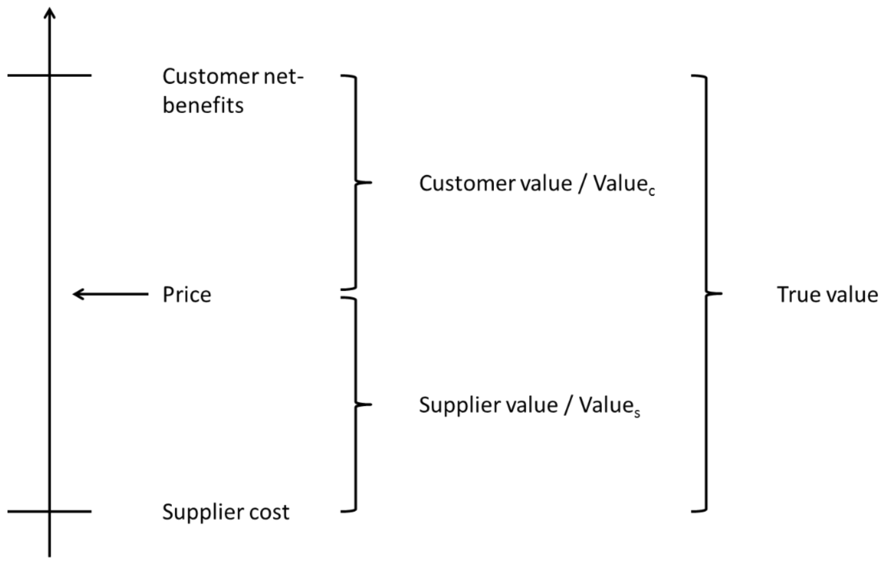


Figure 1. *The true dyadic value of the offering (Adapted from source: Töytäri et al. 2015, p. 55)*

Consequently, "true" dyadic value can be created only when the customer net benefits is larger than what the supplier costs are; otherwise value is actually being effectively destroyed in the transaction (Grönroos & Helle 2010) (see figure 1). Thus, for the sum value to be of maximum value, the difference between customer's net benefits and seller's cost should be of maximum value (Grönroos & Helle 2010; Töytäri et al. 2015).

The sum value can be visualized as a pie (see figure 2), the size of which is dependent on the amount of the "true" value that has been created, and the slices of which represent the amount of value the different parties are able to capture by setting the price for the exchange (Jap 1999). If value is being destroyed, the pie has been burned in the oven, and all that's left are the costs associated with getting rid of it. There has to be a possibility of an edible slice for both of the parties for the true value to exist.

Consequently, the main priority of guided selling is to ensure that there's a pie to be shared among the participating firms in the begin with. In some situations, the seller might decide that it's worth to burn the other side of the pie by selling a product with a price that is not profitable for the seller, but this is a matter of marketing strategy and relationship value in the long-term, and not a matter of selling as an operational process.

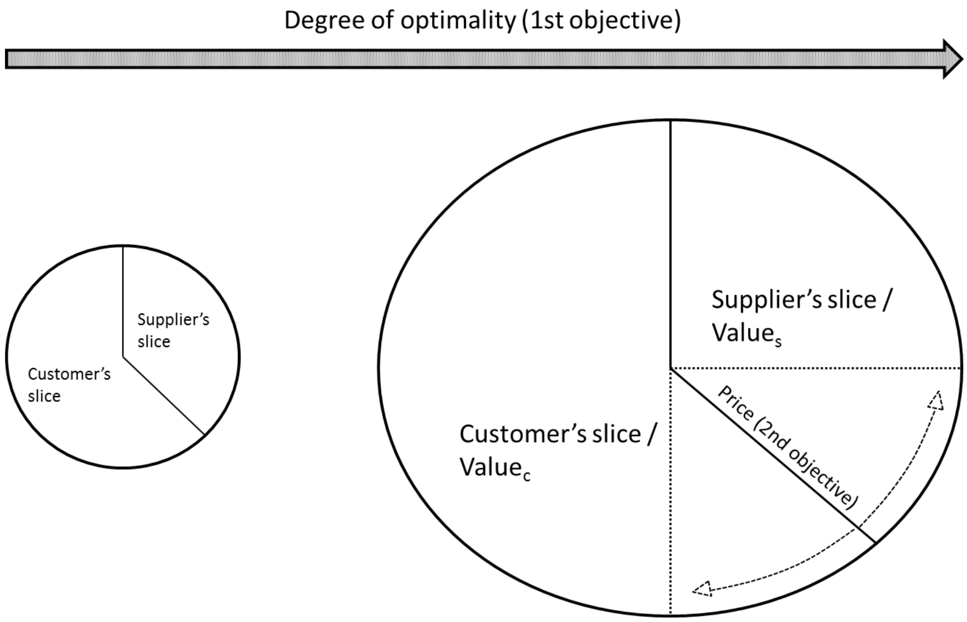


Figure 2. *The objectives of guided selling.*

Thus, the objective of guided selling is two-fold:

1. to ensure that the value pie is as large as possible, and
2. to ensure that the seller gets a fair return for the offering,

where the first objective is a necessary condition for the second.

Customer value can be created by improving products and components through their fitness for purpose, performance and reliability, product features, or ease of handling, or by improving customer processes through process development, process integration, and outsourcing (Töytäri et al. 2015, p. 54). Customer costs, on the other hand, stem from the acquisition, use, maintenance and disposal of the offering (Ferrin & Plank 2002). The operational benefits and sacrifices will ultimately translate into (either positive or negative) economic value through changes in inputs, outputs, and in the ways they are processed (Grönroos & Helle 2010, p. 575).

The value of an offering is not the same as the sum value of the offering's components alone. In fact, the potential value of an offering includes three separate components: (1) the sum value of the individual components, (2) the value of customization, and (3) the value of integration. Operational integration is the difference between bundling, and true integration; the integrated whole is more than the sum of its components. Operational integration either means that the individual products are engineered to work better together, or that the individual services are delivered using an integrated services platform. (Sawhney 2006)

2.2 Customer's purchase process

As the customer's net benefits sets the upper-bound for the dyadic value, it is necessary for the guided selling process to accommodate with the customer's value-creation activities. Consequently, customer's purchase process is used as a basis for defining the guided selling process. At a high level of abstraction, several structural characteristics of the customer's purchase process can be identified: (1) the process is non-linear, (2) some of the stages of the purchasing process overlap, (3) the process may be iterative, (4) the stages of the process might be recursive, and finally, (5) all of the stages of the process are causal and lead to outcomes that are used as resources in the next stage (Verville & Halingten 2003, p. 590). Several stages can also be identified (Adamson et al. 2012; Moncrief & Marshall 2005; Rackham & DeVincentis 1999; Sawhney 2006; Tuli et al. 2007; Verville & Halingten 2003; Webster & Wind 1996):

1. Identification of problems or needs.
2. Requirements and evaluation criteria definition.
3. Identification and evaluation of alternatives.
4. Making of the purchase decision.

In the first stage of the buying process, the customer recognizes that something is imperfect, incomplete, or missing. Needs arise when the customer no longer feels satisfied with the existing situation and becomes receptive to the idea of change. (Rackham & DeVincentis 1996, p. 68) Customers frequently are not fully aware of their business needs and cannot easily articulate them to a supplier, however. Therefore, the customer may have both recognized and unrecognized needs. (Tuli et al. 2007, p. 6) The issues for the customer in this stage are thus to determine the problems and needs that they have, and to determine whether the problems are big enough to be worth any further actions (Rackham & DeVincentis 1999, p. 68).

In the second stage of the process the requirements for the desired solution are specified, and the evaluation criteria are decided upon (Verville & Halingten 2003). Thus, the issues for the customer in this stage are to determine what will be required from the potential solutions, as well as to determine what are the criteria that are being used to measure the value of the different offerings (Verville & Halingten 2003; Rackham & DeVincentis 1999, p. 68). The requirements definition may include the analysis of the organization's existing technological environment, solution's functional and technical requirements, as well as the analysis of the organizational (business, procedural, and policy) requirements. The evaluation criteria, on the other hand, may contain criteria for the suppliers themselves in addition to the potential solutions. (Verville & Halingten 2003, p. 592)

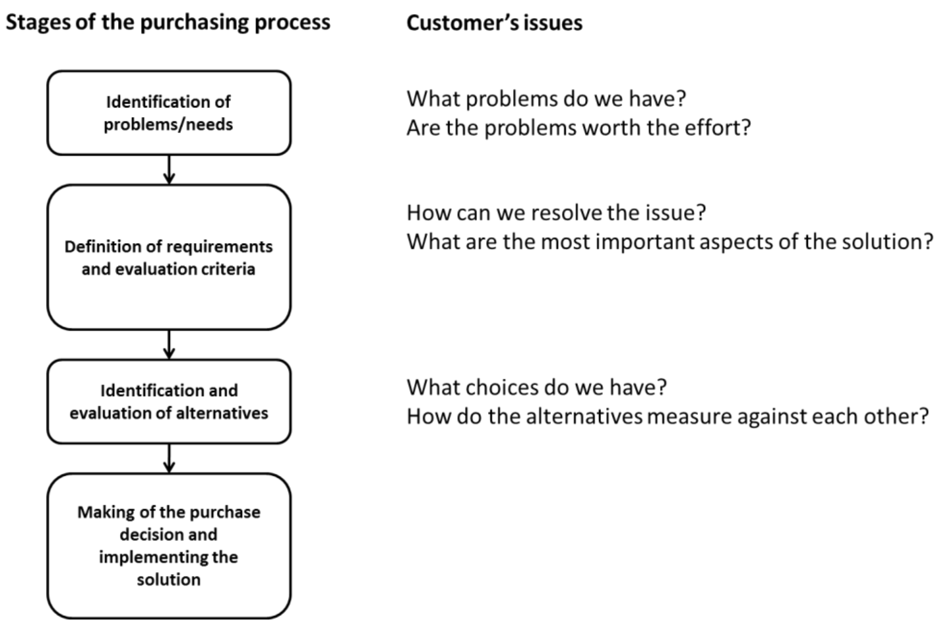


Figure 3. *Stages of the purchase process (Adapted from source: Rackham & DeVincentis 1999).*

In the third stage of the process, the customer must identify the suppliers that might be able to deliver a solution matching with the specified requirements. Furthermore, the customer needs to evaluate how the potential suppliers and their solutions measure against the evaluation criteria that were formed earlier in the purchase process. After careful evaluation of the suppliers' proposals, the most potential suppliers may be shortlisted for a final evaluation. (Verville & Halingten 2003, p. 592) Before advancing to the final stage, the seller is likely to be confronted with concerns related to the value of the proposed offering. Thus, providing the customer with credible evidence of the offering's value is crucial for the seller's success during this stage. (Anderson & Wynstra 2011; Rackham & DeVicenntis 1999, pp. 68-69)

In the last stage of the purchase process, the customer makes their decision and final negotiations begin. During the final stage, the business and legal clauses related to the solution's delivery are finalized, and detailed deployment planning begins (when separate deployment is required). (Verville & Halingten 2003, p. 593) Figure 3 summarizes the stages of the customer's purchase process, along with the key issues the customer is facing at each stage of the process.

2.3 The guided selling process

According to Friedman (2002), *a sales channel* is any pipe that one can use to connect products and services with the target customers. Further, a channel, unlike an advertising medium such as a radio advertisement or a highway billboard, enables information to flow both ways between buyer and seller, thus making sales transactions possible. In a guided selling process, information flows between the different organizational functions, the distributor, and the customer. The distributor may – as an example – access the guided selling tool through a web-based user-interface, with the supplier being able to control the information that the distributor may access (Mirani et al. 2001). Thus, with an access to the tool, the distributor representative can be provided with a selected set of supplier's product information, product configuration knowledge, pricing information, customer information, and delivery information, as a few examples.

The seller-buyer contact patterns can be modeled on a high level to include the supplier, the customer, the middleman, and different functional roles inside those organizations (Cunningham & Homse 1986, pp. 272-275). According to Storbacka et al. (2009, p. 892), in order for the salesperson to succeed (s)he needs information "*held not just by marketing (unique selling features, value in use, competitive advantage, segmentation, branding) but also by operations (product issues, production scheduling, quality control, R&D, delivery timeliness and reliability), and finance (profit and loss information)*".

To reflect the customer's purchase process, the actual process of guided selling includes five stages:

1. Understanding the customer's needs, and helping the customer to understand them too (Adamson et al. 2012; Rackham & DeVincentis 1999; Terho et al. 2012).
2. Defining the functional requirements (Felfernig et al. 2014; Salvador & Forza 2007; Tiihonen 1996).
3. Crafting the solution that best matches with the functional requirements (Felfernig et al. 2014; Terho et al. 2012).
4. Communicating the value of the solution to the customer (Terho et al. 2012).
5. Supporting the purchase by making it as simple and hassle-free as possible (Rackham & DeVincentis 1999).

Information from the supplier's functional departments and systems can be utilized at different stages of the guided selling process: for example, CRM (Customer Relationships Management) system can give input in the beginning of the process by providing specific customer-related information to the sales representative, such as information of the members of the buying team, cost to serve -information, details on customer financials and expected rate of growth, billing information, and so on (Anderson et al. 2009, p. 338). The Product Data Management (PDM) system, on the other hand, can be utilized in the creation and maintenance of the product models in the guided selling system database. Furthermore, the quotation might receive its templates and most of the documentation automatically from the repositories the tool is connected with, decreasing the amount of work the sales representative has to put into work that is not selling. (Hvam et al. 2006) Thus, a guided selling tool enables the retrieval of relevant information from the supplier's functional processes and systems, and – once processed with the help of the software – this information may be applied in the specific customer context to provide value for the customer.

Figure 4 depicts the stages of the guided selling process, and the corresponding stages of the customer's purchase process. Just as the customer's purchase process, the guided selling process might be iterative, the stages might be recursive, the process may be non-sequential, and the stages of the process might overlap, mirroring the stages of the purchase process.

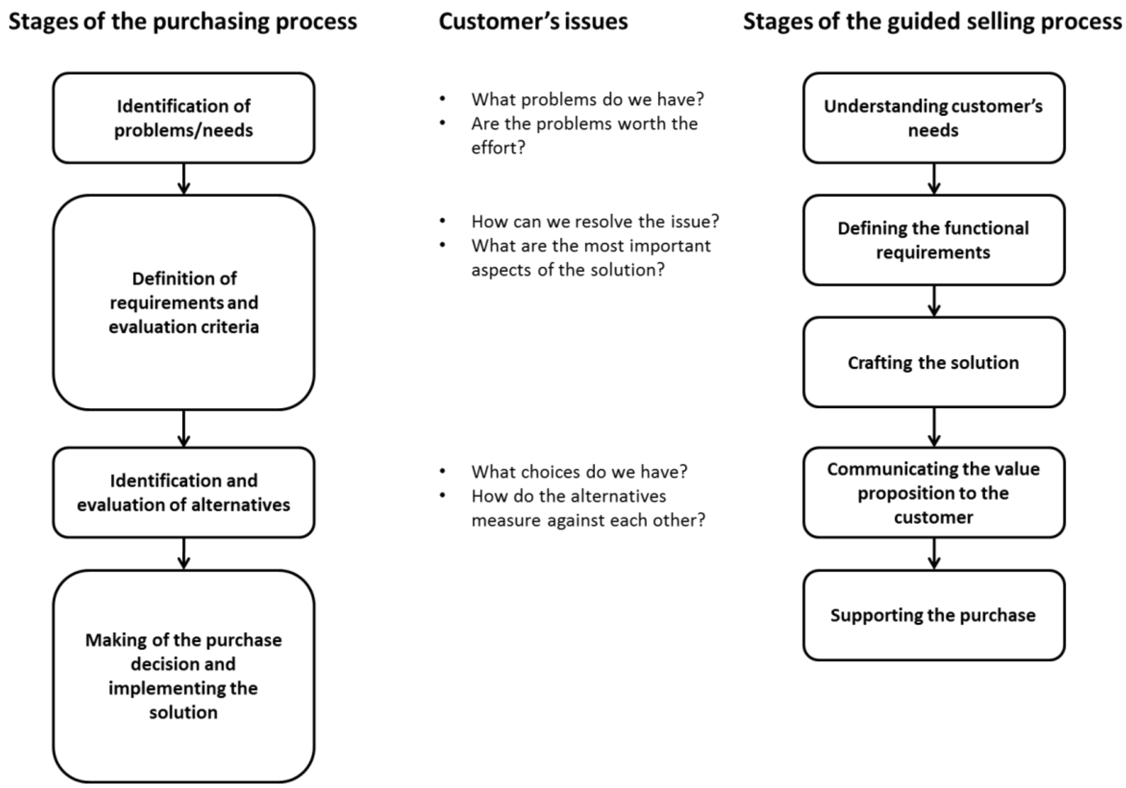


Figure 4. *Stages of the guided selling process.*

The foundation for the success of the selling attempt is built during **the first stage** of the guided selling process. In fact, some authors argue that this is the stage where the seller can create most value for the customer. By helping the customer to identify their needs and by emphasizing the importance of the needs to the customer, the seller can direct the customer toward an improvement in their business processes. (Adamson et al. 2012; Rackham & DeVincentis 1999)

As a result of the first stage, a performance specification should be formed. The performance specification states what kind of performance-related attributes (or KPIs) – such as cycle times, cost per unit, rejection rate, etc. – the supplier's offering should achieve (Salvador & Forza 2007, p. 11; Terho et al. 2012). Importantly, the sales representative should try to determine (together with the customer purchasing manager) what is the cost of not solving the problems that the customer is facing (Rackham 1988). By demonstrating the customer how much they could save or gain in monetary terms, the sales representative is able to justify the effort that would be required from the customer (Rackham & DeVincentis 1999). For example, sales representatives may turn to total cost of ownership analyses and try to identify and quantify the major cost drivers together with the customer's purchasing managers (Anderson et al. 2009, p. 356). Identifying the customer's key value drivers forms the basis for crafting compelling value propositions and communicating them effectively at later stages, as well (Terho et al. 2012, p. 180).

The second stage of the guided selling process deals with defining the *functional* specifications based on the customer's needs and use context. The functional specifications describe what kind of functionalities or features is required from the solution to produce the defined performance in the customer's environment. Thus, the functional specifications are conceptually separated from the technical properties of a configurable product. (Felfernig et al. 2014)

The difficulty of translating the performance specification into a functional specification increases with increasing distance with the level of abstraction between the two: the products and services vary with their level of complexity, while the customers vary in their level of technical sophistication (Tiihonen 1996). For example, some customers are only able to describe their needs at a very high level, while others can readily describe their needs in terms of functions, or even in terms of specific technical components. (Salvador & Forza 2007, pp. 117-119; Tiihonen 1996) Therefore, the guided selling tool would ideally take into account the degree of abstraction of the description that the user is able to give, allowing specifications to be based on performance, rather than functional or component level attributes whenever required (Felfernig et al. 2014; Salvador & Forza 2007, p. 118; Tiihonen 1996).

During the second stage, the sales representative may educate the customer by demonstrating the different options and possibilities related to the solution, as well as limitations and constraints, in more detail. Ideally, the sales representatives may also introduce new criteria into the customer's decision-making process, helping the customer to make a more informed choice in the later stages of the purchase process (Rackham & DeVincentis 1999, p. 68).

In the third stage of the process, the goal for the sales representative is to connect the functional description to certain product or service components or sub-assemblies. The actual configuration of the product or the service may include steps such as

- selecting the components,
- determining parameter values for the components,
- designing the layout,
- determining component connections, and

- checking for completeness and consistency of the configuration (Tiihonen 1996).

Many of these steps are usually left for the sales configurator to be done automatically, while the selection of components is usually left for the user. Usually the sales configurator is designed to dynamically check the consistency of the configuration during its creation. A rule-based system does this by guiding the user to trough the selections in a certain procedure (as rules go one-way only), and a constraint-based system by informing the user of invalid selections, irrespective of the order of choices. (Sabin & Weigel 1998) Thus, the user should not be able to create an invalid configuration even if (s)he tried.

There are at least two ways for the configuration system to help the sales representative to craft a technical specification based on the functional, or even on the performance-based, requirements. The first way is the sales configurator's capability to hide the technical specifications behind higher levels of abstraction: the sales representative doesn't necessarily need to have much specified knowledge on the technical aspects of the product, as the product model has been built inside the system and can be shown as a higher-level optionality to the user (Felfernig et al. 2014; Salvador & Forza 2007).

Specifically, Felfernig et al. (2014) propose that the configuration knowledge should be modeled in two levels of abstraction: in feature level, presenting the features or functionalities and their relations, and in system level, presenting the technical system along with its components and their relations. By modeling both features and components, it becomes possible to determine which components are required for realizing which sets of features, and to build rules or constraints between them. As a consequence, the dialogue between the user and the system can be about features and functionalities instead of technical product components.

The second way is the sales configurator's capability to offer an optimization logic that's either built-in to the sales configurator, or provided by a separate engine that communicates with the sales configurator through an integration. Ideally, the user could only give functional or even performance-based values to a sales configurator as inputs, and the sales configurator would automatically provide a technical specification that fulfills the requirements with an optimal way (e.g. with the best value for the given set of restrictions). (Felfernig et al. 2014; Sabin & Weigel 1998)

The fourth stage of the guided selling process is concerned with communicating the value of the final configuration. Assessing the characteristics of the proposed offering might be challenging for the customer (Ford 2002, p. 24), and even if the customer should understand them, there still may be considerable uncertainties related to the value provided by it (Anderson & Wynstra 2010; Rackham & DeVincentis 1999;). According to Terho et al. (2012, p. 181), it is important for the seller to try to quantify the value with a "*credible demonstration of the offering's contribution to the customer's business profits*". Ideally, the representative is able to configure a solution that is valid for the supplier and optimal to the customer, and is able to provide convincing evidence that the proposed solution is actually the best alternative the customer has.

Even if it's not always possible to give a specific number due to a number of reasons (such as unwillingness from the customer's side to give up necessary information, the salient value dimensions are difficult to define, etc.), it would still be worthwhile to concentrate on the favorable points-of-difference of the offering compared to the next-best alternative (Anderson et al. 2009, pp. 160-161; Terho et al. 2012; Töytäri et al. 2015). It is important that the purchasing managers have arguments they can use to sell the supplier's offering to other members of the buying team whenever the sales representative is not present (Anderson et al. 2009, pp. 356-357). Notably, the first stage of the guided selling process is closely tied to the value communication stage, as the effectiveness of the communication effort is largely dependent on the seller's understanding of the customer's business problem (Terho et al. 2012).

Value calculators can be used for communicating the value – i.e. the economic outcomes – to the customer. Value calculators are software tools based on, for example, simple spreadsheet applications, that enable the sales representative to quantify the offering's value with the help of some input data from the customer. (Anderson et al. 2009; Töytäri & Rajala 2015) It is possible to build a simple integration between the sales configurator and the spreadsheet software (Hvam et al. 2016, p. 10), or build a value calculation capability inside the tool. If the value drivers have been defined in the first stage of the guided selling process, the sales representative should be able to give at least directional calculations for demonstrating the actual savings or other key sources of value to the buyer (Terho et al. 2012).

The fifth and final stage of the guided selling process concentrates on making the purchase of the offering as convenient as possible (Rackham & DeVincentis 1999, p. 69). One of the ways of achieving this goal is to build an integration between the company ERP system and the guided selling tool, automating some of the tasks in the order-delivery process. As the system can check for the completeness and consistency of the configuration, errors in orders logged by the sales representatives can be reduced, resulting in faster deliveries. (Tiihonen 1996) Furthermore, a guided selling system may allow more efficient management of change requests: orders that have been already submitted to the ERP system could be altered via the tool, thus reducing the steps that would have to be taken if the customer should change their mind. As the order would already exist in the guided selling system's database, the reconfiguring of it would be easy.

In summary, the guided selling tool should be able to support value co-creation activities in any (or all) of the stages of the guided selling process. As the primary goal of the process is to maximize the total, dyadic value of the transaction, the process should first help the sales representative to boil down the performance requirements into optimal technical specifications. Thus, the sales representative and the customer first move from a high lever abstraction to a low level of abstraction. As the secondary objective of the guided selling process is to ensure that the seller gets a fair return, guided selling should enable the sales representative to bring the discussion from the low level of abstraction back to the high level of abstraction. Should the sales representative be able to support her argumentation with improvements that can be measured with the customer’s key performance indicators, (s)he would be well on her way to finalize the deal.

Next, discussion moves onwards toward the factors that form an individual’s adoption decision. Before the factors themselves can be examined, however, it’s necessary to take a closer look at the theories and models that explain how an individual’s adoption decision is formed. Thus, the third chapter concentrates on some of the most well-known decision theories in the social psychology domain, as well as on the models that have been used to explain information system acceptance and user satisfaction in the technology adoption domain.

3. TECHNOLOGY ADOPTION

It is clear, that for a sales configurator to affect individual's – and ultimately organization's – performance, it has to be utilized (Trice & Treacy 1986, pp. 236-237). Markus & Soh (1995) divide the process of transforming IT expenditure into organizational performance into three sub-processes. The first sub-process – the *IT conversion process* – transforms IT expenditure into IT assets, such as (1) applications, (2) IT infrastructure, and (3) user IT knowledge and skills. The second sub-process transforms these IT assets into IT impacts. IT impacts can take different types of forms, such as new products and services, or improved business processes. These impacts, however, do not materialize unless IT assets are used for reaching those impacts. This *IT use process* is therefore necessary for the company to receive any return for their IT investment. (Markus & Soh 1995, pp. 37-39)

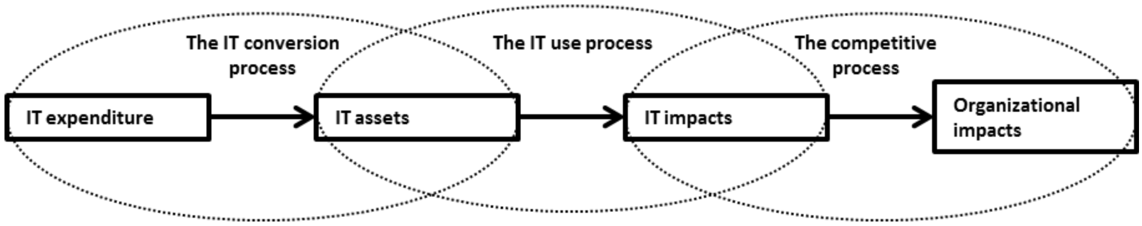


Figure 5. *How IT creates business value (Source: Markus & Soh 1995, p. 37)*

To understand how an individual forms her adoption decision, a measurement construct that predicts one's actual behavior would be a good place to start. Fortunately, an individual's *behavioral intention* have been found to be just that (Sheppard et al. 1988), and it is therefore not surprising that the majority studies related to information acceptance measure the respondents' intention to use the tool in question (e.g. Chang & Cheung 2001; Cheung & Vodel 2013; Davis 1989; Davis et al. 1989; Mathieson 1991; Taylor & Todd 1995a; Venkatesh & Bala 2008; Wixom & Todd 2005 etc.). Behavioral intention can be defined as the measure of the strength of one's intention to perform a specified behavior (Ajzen & Fishbein 1975, p. 288), and it's a central concept in the core technology acceptance models, such as the technology acceptance model (TAM), presented by Davis (1989). TAM, on the other hand, has been used to explain behaviors related to various information systems, including the use of sales or product configurators (Agrawal & Prasad 1998; Keil et al. 1995).

Another research stream on information system usage has focused on factors affecting user satisfaction on information systems, instead of focusing on general predictors of human behavior (e.g. Bailey et al. 1983; DeLone & McLean 1992; Molla & Licker

2001). While only very few TAM studies have focused on actual system characteristics as antecedents to behavior, system characteristics have been the core elements in the user satisfaction literature. The problem with the information system satisfaction literature has been, however, that user satisfaction with an information system hasn't been found to predict a person's actual usage behavior very well. (Wixom & Todd 2005) On the other hand, while the theories of social psychology tend to do better at predicting human behavior (Sheppard et al. 1988), their shortcoming – from the information system design perspective – has been that they do not help to explain which aspects of the information system are related to the actual use of the technology, other than at a very high level of abstraction.

As the characteristics of a sales configurator and their connection to the user's intention to use such a tool are of one of the primary interests in this study, this conceptual gap between the two research stream requires some further consideration. Therefore, the relevant models and their relations to one another are inspected more closely in the next few chapters.

3.1 Social Cognitive Theory

One of the theories used for predicting people's information system usage has been the social cognitive theory (SCT), presented by Bandura (1977). Social cognitive theory postulates that a person's sense of her self-efficacy can be used to explain why some people refrain from conducting certain behaviors, while others perform them readily. The theory is closely related to the learned helplessness theory presented by Abramson et al. (1978), which tries to explain how people attribute their sense of inefficaciousness to other factors. One of the key combining factors for the two theories is that they both postulate that people choose to or choose not to conduct certain behaviors because they expect certain outcomes out of it.

As an example, the distributor sales representative wouldn't use a sales configurator as likely if she thought that using the tool wouldn't result in any desirable outcomes. The salesperson might, for example, believe that the outcome – such as improved work performance – is non-contingent of the behavior in question (i.e. using the tool). The reason for this non-contingency can be either *internal*, meaning that the representative doesn't believe in her own capabilities and skills in using the tool properly (Bandura 1977), or *external*, in which case the perceived non-contingency is due to the lack of relationship between the behavior and the outcome in a more general sense (Abramson et al. 1978). It could just simply be the case, for example, that the tool itself wouldn't be useful (Davis et al. 1989).

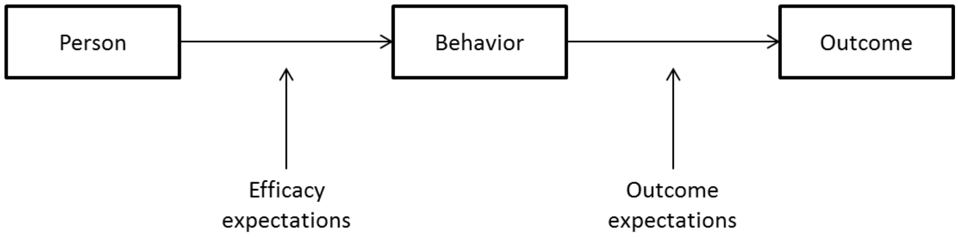


Figure 6. *Diagrammatic representation of the difference between efficacy expectations and outcome expectations (Source: Bandura 1977, p. 193)*

The internal and external factors form one's efficacy expectations. *An efficacy expectation* can be defined as the conviction that one can successfully execute the behavior required to produce the outcomes (Bandura 19877, p. 193), or judgements on how well one can execute courses of action required to deal with prospective situations (Bandura 1982, p. 122). *An outcome expectation* is defined as a person's estimate that a given behavior will lead to certain outcomes. Representing future consequences in thought provides a cognitively based source of motivation to an individual. (Bandura 1977, pp. 193-194) Importantly, people will approach, explore, and try to deal with situations within their self-perceived capabilities, but tend to avoid stressful situations they fear to exceed their capabilities (Bandura 1977, p. 203).

The individual's self-efficacy expectation is separated from the outcome expectation, because "*individuals can believe that a particular course of action will produce certain outcomes, but if they entertain serious doubts about whether they can perform the necessary activities such information does not influence their behavior*" (Bandura 1977, p. 193). Although Bandura (1977; 1982) calls for the separation of these two types of beliefs, he argues (1982, p. 140) that they are related: "*the types of outcomes people expect depend largely on their judgments of how well they will be able to perform in given situations… …those who judge themselves highly efficacious will anticipate successful outcomes and self-doubters will expect mediocre performances of themselves, and, thus, less favorable outcomes*".

Abramson et al. (1978) introduce a concept of *helplessness* to contrast one's sense of self-efficacy. While Bandura (1977; 1982) concentrates on factors which inhibit behavioral performance within a person, Abramson et al. (1978, p. 52) separate two distinct sources of inefficaciousness, and use the self-other dichotomy as the criterion of internality of their helplessness concept. When people believe that outcomes are more or less likely to happen to themselves than to *relevant others* (e.g. peers, friends, or colleagues), they attribute these outcomes to internal factors. Alternatively, people make an external attribution for outcomes they believe are as likely to happen to themselves as to relevant others. (Abramson et al. 1978, p. 52) In other words, people ask themselves whether their relevant others would be able to reach the outcome, and based on this judgement, they attribute the cause of (the expected) success or failure to either internal or external reasons.

Table 1. *The self-other dichotomy and the nature of helplessness (Source: Abramson et al. 1978, p. 53)*

	Self	
Other	The person expects the outcome is contingent on a response in her repertoire.	The person expects the outcome is not contingent on any response in her repertoire.
The person expects the outcome is contingent on a response in the repertoire of a relevant other.		**Personal helplessness**
The person expects the outcome is not contingent on a response in the repertoire of any relevant other.		**Universal helplessness**

In the above table, the helplessness concept applies for the right side of the table: the individual is unable to reach an outcome either because of lack of personal capabilities (personal helplessness), or because the outcome would be unreachable not only for the person herself, but for others too (universal helplessness). This distinction is especially relevant in the information systems literature, because it illustrates the difference between one's sense of her own capabilities and skills, and her view of the capabilities of the information system. An individual might, for example, feel that she would be perfectly capable of using the system, but that using the system wouldn't be beneficial to anyone, and thus choose not to use the system.

Social cognitive theory has received some support in the information systems literature for its ability to predict usage behavior (e.g. by Compeau & Higgins 1995 and Compeau et al. 1999; Lin & Huang 2008), and the theory has some important similarities to the Davis' (1989) technology acceptance model. To understand more about intentions and outcomes, however, the theory of reasoned action is discussed next.

3.2 Theory of Reasoned Action

TAM was originally derived from Ajzen & Fishbein's (1975) Theory of Reasoned Action (Davis et al. 1989, p. 983), which postulates that the individual's intention to perform or not to perform a given behavior is determined by (1) her attitude towards the behavior and (2) her perception that significant others think she should or should not perform the behavior. The term *significant others* has very much the same meaning that the term *relevant others* used by Abramson et al. (1978) to indicate that the person mirrors herself to other persons in the social group where she belongs to. According to Ajzen (1991, p. 181), intentions are assumed to capture the motivational factors that influence a behavior; they are indications of how hard people are willing to try and of how much of an effort they are planning to exert in order to perform the behavior. The theory is illustrated in the below figure.

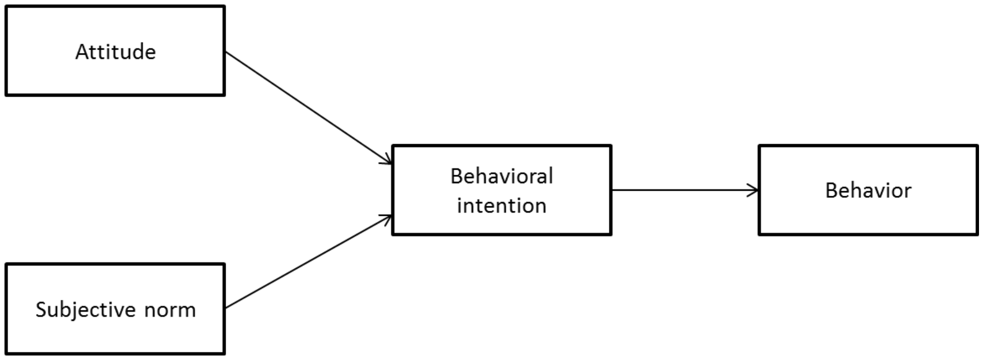


Figure 7. *Theory of Reasoned Action (Source: Ajzen & Fishbein 1975)*

The individual's attitude towards performing a given behavior is a function of the perceived consequences out a specific action or behavior and the individual's evaluation of these outcomes (Ajzen 1991, p. 191). Thus, attitude can be represented symbolically as follows:

$$A = \sum_{i=1}^{n} b_i \times e_i, \qquad (2)$$

where A is the attitude towards the behavior in question, b is the belief that performing a specific behavior will result in the *i*th outcome, and e is the individual's evaluation of that outcome. (Ajzen 1991)

The subjective norm component can be represented as follows:

$$SN = \sum_{i=1}^{n} n_i \times m_i, \qquad (3)$$

where SN is the subjective norm, n represents the normative belief that the *i*th person or group thinks she should or should not perform the behavior in question, and m is the individual's motivation to comply with that referent in question. In summary, TRA argues that people intend to perform certain behaviors because they have a positive attitude towards the behavior in question and because they feel social pressure to conduct the behavior from their significant others (Ajzen 1991). The term *pressure* is important here, as the subjective norm should only be used to measure the degree of felt pressure for behaving or not behaving in a manner that is acceptable or preferable in the eyes of others. The term subjective norm has since been used rather loosely in the information systems literature to indicate, for example, effects of someone recommending the use of an information system to the potential user (Venkatesh & Davis 2000, pp. 188-189). This is not a case of social pressure however, as the social pressure measures only compliance to the social norm (Ajzen 1991).

It is important to emphasize that here the attitude construct measures the person's perception of the *behavior*, and not the *instrumental object* (Ajzen 2002b): e.g. a sales representative may have a positive or negative attitude toward *using* the sales configurator, and a positive or negative attitude toward the *sales configurator*, but it is the attitude toward the behavior that is measured in TRA. That is, the object of attitude measured is the behavior of using the sales configurator, and not the sales configurator itself.

According to Ajzen (1991; 2002), attitude can be measured either indirectly with behavioral beliefs, or directly with measuring attitude itself. Above in formula 1, a direct measurement of attitude is represented by A, whereas b refers to a behavioral belief. In TRA, a person's attitude (A) is directly proportional to the summative belief index (Ajzen 1991, p. 191). However, the two types of beliefs measure the same underlying latent variable (Ajzen 2002b, p. 8). An example of a behavioral belief would be the statement "*my using of the sales configurator in my work would improve my work performance*", whereas a direct measure of attitude could state that "*for me, using the sales configurator in my work would be beneficial*". The latter statement is on a higher level of abstraction than the former when it comes to the expected outcome.

Sheppard et al. (1988, pp. 326-327) point out that the presence of choice might have a role to play in the intention formation process. Specifically, in information system adoption context, the adoption decision may be seen as a choice between two alternatives: (1) using one's time and resources to learn how to use the system, and (2) using one's time and resources to do something else. There's always an opportunity cost present, as the time and resources used in learning could have been spent to something else. This suggests that people do not conduct certain behaviors because they feel there's too much lose in comparison to how much there is to gain.

Similar ideas have been presented – among others – by Bandura (1977, p. 209), who argues that people conduct defensive behaviors because of the predictive value of the perceived threats they associate with conducting the behavior, and also by Ajzen (1991, p. 193), who argues that people form attitudes toward a behavior based not only on the benefits, but also on the costs associated with it. Therefore, should the representative expect negative consequences out of using the sales configurator overall, she would avoid using it. Interestingly, the idea of opportunity costs seem to have been largely neglected in information system acceptance studies utilizing TRA (see Davis et al. 1989 and Mathieson 1991, who compare the predictive power of TRA and the technology acceptance model).

Although TRA has been shown to predict both intentions and behavior quite well in several contexts (in a thorough meta-analysis conducted by Sheppard et al. 1988), the theory has had its share of criticism, as well. One of the sources of criticism has been the boundary conditions of the theory: Sheppard et al. (1988, p. 326) note, that actions which are at least in part determined by factors beyond individual's voluntary control fall outside the boundary conditions established for the model: "*whenever the performance of some action requires knowledge, skills, resources, or other's cooperation, or necessitates overcoming environmental obstacles, the conditions of the model cannot be met*". For example, a sales representative may be prevented to use a sales configurator because she does not have a laptop at her disposal, does not possess the necessary skills, or cannot access the configurator wherever she would choose. Thus, TRA does not explicitly include any efficacy considerations.

TRA has received some support in the information systems acceptance literature, but has provided poorer prediction of intentions than the technology acceptance model (see Davis et al. 1989; Mathieson 1991). In addition to Sheppard et al. (1988), Triandis (1980) has proposed some important additions to TRA, which are considered next.

3.3 Triandis' model

Triandis' (1980) model is originally based on Ajzen & Fishbein's (1975) TRA. The model has some similarities, as well as differences with the theory or reasoned action. First of all, the *perceived consequences* construct is measured in the same manner as the indirect measures of the attitude construct in TRA. However, the *affect* construct represents the affective outcomes missing from TRA.

Affect is defined as the feeling felt towards the performance of the behavior, and represents the individual's emotional response to the thoughts of performing a given behavior, or the feelings that performing this behavior will be pleasant or unpleasant, exciting or boring etc. (Godin et al. 1988, pp. 462-463; Triandis 1980) The Triandis' (1980) model is depicted in the below figure.

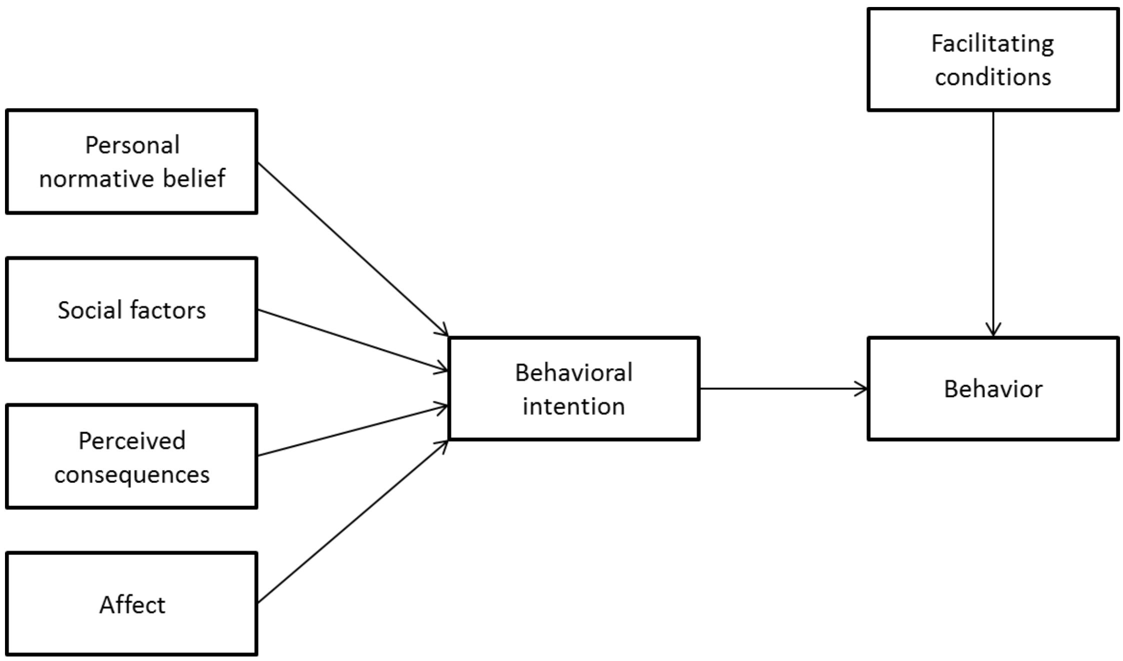


Figure 8. *A subset of the Triandis' model (Adapted from source: Thompson et al. 1991, p. 127)*

The affective component can be represented as follows:

$$A_{ff} = \sum_{i=1}^{n} Ab_i \times Ae_i, \quad (4)$$

where A_{ff} represents affect, Ab is the believe that performing the behavior will result in *i*th affective outcome, and Ae is the evaluation of that outcome (i.e. whether the outcome is either good or bad). (Godin et al. 1988; Triandis 1980) The facilitating conditions construct refers to the objective factors, “out there” in the environment, that several judges or observers can agree to make an act easy or difficult to do and are thought to influence one’s behavior independent of intention (Thompson et al. 1991, p. 129; Triandis 1980).

The social factors construct differs from the subjective norm construct in TRA, as it includes role beliefs. While the normative component is similar to that of subjective norm in TRA (it depicts the appropriateness of performing the behavior for a member of a reference group), the role beliefs depict the appropriateness of the behavior for a person occupying a specific position in the social structure (Godin et al. 1988, p. 463; Triandis 1980). The social factors construct can be represented as follows:

$$S = [(\sum_{i=1}^{m} NB_i) \times (\sum_{i=1}^{p} RB_i)], \quad (5)$$

where NB is the *i*th normative belief and RB is the *i*th role belief (Godin et al. 1988, p. 463; Triandis 1980).

In addition to these two normative beliefs, the personal normative belief component measures the extent of felt moral obligation to conduct the behavior in question (Godin et al. 1988, p. 463; Triandis 1980). Although the normative beliefs might be important when predicting behavior in certain contexts, the concepts do not add into understanding why sales configurators are seen as valuable or valueless tools by distributor representatives. Furthermore, the social factors or TRA’s subjective norm have been shown to be insignificant factors in predicting information systems usage in voluntary settings (see Venkatesh et al. 2003, p. 440 for summary). Therefore, the social factors are not considered further and left out of the model of this study.

The inclusion of affective outcomes is relevant here, however. After all, it might be that the act of using or learning to use an information system is considered as valuable, but unpleasant to perform (Chang & Cheung 2001, p. 3). Ryan & Deci (2000) make a distinction between intrinsic and extrinsic sources of motivation: intrinsic motivation is defined as the doing of an activity for its inherent satisfactions, while extrinsic motivation is defined as a construct that pertains whenever an activity is done in order to attain some separable outcome (Ryan & Deci 2000, pp. 56-60). In information systems acceptance literature, the inclusion of intrinsic motivation – as a type of an outcome expectation and a predictor of intention – has received support from Davis et al. (1992). To be more specific, Davis et al. (1992) learned that *perceived enjoyment*, a construct similar to that of affect, affected intentions directly and significantly.

It is also worth noting the similarity between the concepts of facilitating conditions and universal helplessness: both refer to factors that make conducting the behavior easy or difficult due to obstacles (or lack of them) outside the individual. However, while Abramson et al. (1978) argue that environmental factors should affect one's intentions through interactions with outcome perceptions, Triandis (1980) postulates a direct relationship between actual behavior and the perception of facilitating conditions. Similar factors have also been taken into account in the successor of TRA – the theory of planned behavior (TPB), presented by Ajzen (1991). This model is considered next.

3.4 Theory of Planned Behavior

The theory of planned behavior adds a new component to the Ajzen & Fishbein (1975) original TRA model: perceived behavioral control. Perceived behavioral control refers to the perceived ease or difficulty of performing the behavior in question, and it can be represented as follows:

$$PBC = \sum_{i=1}^{n} c_i \times p_i, \quad (6)$$

where c is the belief that *i*th factor inhibits the respondent's performance of the behavior in question, and p is the perceived power of that factor (Ajzen 1991, pp. 196-197). According to Ajzen (1991), perceived behavioral control has a direct influence on the respondent's intention to conduct the behavior. TPB is depicted in the figure below.

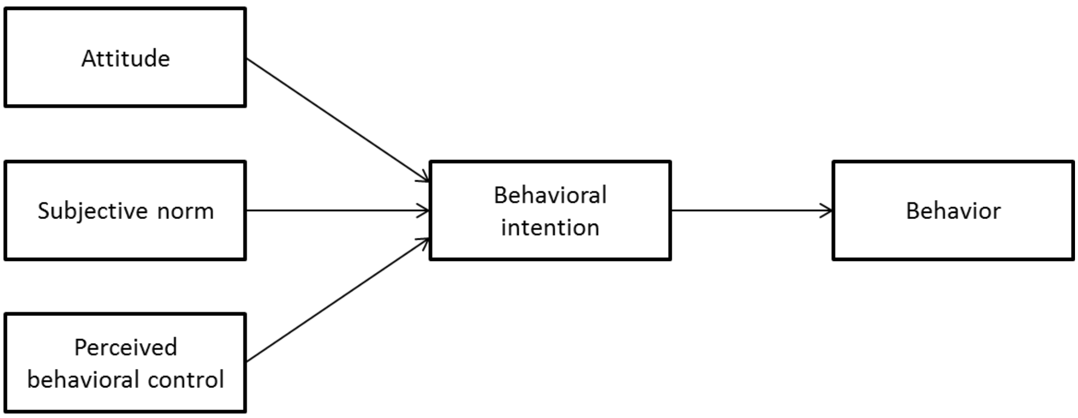


Figure 9. *The theory of planned behavior (Source: Ajzen 1991)*

The other two factors constituting to behavioral intention are defined in the same manner as in TRA, so the main difference between TRA and TPB is the added control construct. Unlike the Triandis' (1980) model, TPB's attitude construct does not make an explicit distinction between the evaluative outcomes (i.e. the perceived costs and benefits out of performing the behavior) and affective set of outcomes. However, Ajzen (1991, pp. 200-201) acknowledges that the separation of outcome judgments might be justified, and in his later work he implies that the two components are, in fact, under the same latent attitude variable and co-determinants of intention (Ajzen 2002b).

Ajzen (1991, p. 184) compares perceived behavioral control to be a similar construct with Bandura's (1977) self-efficacy. However, while Bandura (1977; 1982) mainly concentrates on factors that mirror one's beliefs of herself (i.e. *internal control factors*) in his studies, Ajzen (1991) takes *external control factors* more explicitly into account (Mathieson 1991, p. 179; Sparks et a. 1997). External control factors include factors outside the person that inhibit the performance of a behavior, whereas an example of an internal control factor would be the perceived lack of personal capability, skill, or willpower (Ajzen 2002a, p. 669; Sparks et al. 1991, p. 419).

It is, however, important to emphasize the distinction between control factors and efficacy expectations: whereas control factors represent the factors that make conducting a behavior easier or more difficult, efficacy expectation represent the perception of how easy or difficult conducting the behavior actually is. That is, the control factors and efficacy expectation are measures of the same latent construct, but the former is an indirect measure, whereas the latter is a direct measure of it. Therefore, the control factors are determinants of efficacy expectations. (Ajzen 2002a, pp. 667-669) An example of a control factor statement would be "the sales configurator's user-interface is poorly designed", whereas an example of an efficacy statement would be "using the sales configurator would be difficult for me". Here, the former is a statement of a characteristic of some object (i.e. the sales configurator) related to the behavior, and the latter is a statement of the perceived ease of conducting the behavior (i.e. using the sales configurator). Taking a look at formula 6 above, the former represents c, whereas the latter represents the direct measure of PBC.

Returning to Abramson et al. (1978) conceptualization of self-other dichotomy and the concept helplessness presented earlier, the distinction between efficacy expectations and control factors – and their relationships – can be depicted in a more meaningful way. The "self"-dimension is determined by internal control factors affecting the perception of how well the respondent's own abilities would support performing the behavior, whereas the "other"-dimension is determined by external control factors affecting the respondent's perception of how well relevant others would be able to perform the behavior. (Abramson et al. 1978) For example, should the sales configurator be poorly designed, nobody would be able to produce the desired outcomes by using it. Similarly, should the sales configurator be inaccessible at certain critical times, this would naturally lower the degree to which it could be used, thus lowering the ability to attain goals. From internal perspective, should the respondent feel (s)he does not possess the required capabilities, (s)he might think that the performance of the behavior would depend largely on herself. Importantly, the respondent might at the same time feel that others would be able to use the sales configurator, but that (s)he would not, due to her personal inefficaciousness.

TPB postulates that perceived behavioral control and attitude affect intentions concurrently and directly. This is one of the aspects where SCT and TPB differ, however.

While TPB postulates a direct effect, Bandura (1977) links the concept of self-efficacy strongly with outcome expectations (by defining efficacy expectation as the conviction that one can successfully execute the behavior required to produce the outcomes). Indeed, lower efficacy expectation should imply lower outcome expectations. Should the sales rep feel she is not able to use the sales configurator effectively, she would not expect desirable outcomes either. In fact, also Ajzen (2002a, p. 667) acknowledges that logically, perceived behavioral control shouldn't have a direct effect on intentions, but should affect intentions through interactions with attitude, although the measurement of the interaction could be too challenging.

TPB has received some support in the information systems acceptance literature by its ability to predict behavior: for example, in Taylor & Todd's (1995a) study, (composed) TPB explained 57 % of the variation in intention, while the technology acceptance model explained 52 %. Yet some researchers have aimed at combining TPB with TAM (e.g. Mathieson et al. 2001; Pavlou & Fygenson 2006). Next, the technology acceptance model presented by Davis (1989), is discussed in more detail.

3.5 Technology Acceptance Model

According to Davis et al. (1989, p. 985) the technology acceptance model (TAM) is an adaptation of TRA specifically tailored for modelling user acceptance of information systems. The goal of TAM is "*to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified*" (Davis et al. 1989, p. 985). Specifically, "*one would like a model that is helpful not only on prediction but also for explanation, so that researchers and practitioners can identify why a particular system may be unacceptable, and pursue appropriate corrective steps*" (p. 985).

Thus, one of the key purposes of TAM is to provide a basis for tracing the impact of external variables on internal beliefs, attitudes and intentions. The model posits that these external variables influence two key beliefs, namely *perceived usefulness* and *perceived ease of use*. Perceived usefulness is defined as the prospective user's subjective probability that using a specific application or system will increase his or her job performance within an organizational context. It follows from the definition of the word useful: "*capable of being used advantageously*". Perceived ease of use refers to the degree to which the prospective user expects the target system to be free of effort; this follows from the definition of ease, that is "*freedom from difficulty or great effort*". (Davis et al. 1989, p. 985) Perceived ease of use is postulated to have a significant direct effect on perceived usefulness in TAM, as "*between the two systems that perform the identical set of functions, a user should find the one easier to use more useful*" (Davis 1993, p. 477). TAM is illustrated in the below figure.

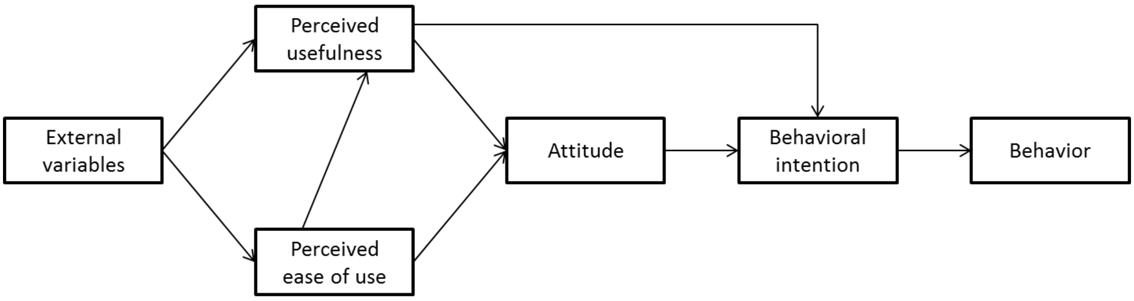


Figure 10. *Technology Acceptance Model (TAM) (Source: Davis et al. 1989, p. 985)*

TAM has been utilized successfully in numerous studies predicting intention or behavior (e.g. Bhattacherjee 2001; Calisir et al. 2014; Cheung & Vogel 2013; Dishaw & Stron 1999; Grandon & Pearson 2004; Karahanna et al. 2006; etc.), and it has fared very well in comparison with TRA and TPB (Davis et al. 1989; Mathieson et al. 1991; Taylor & Todd 1995a). As noted earlier, TAM is designed to be parsimonious so that in can be readily adapted to various information system contexts: perceived usefulness and perceived ease of use are postulated a priori, and are meant to be fairly general determinants of user acceptance (Davis et al. 1989, p. 988). This is one aspect where TRA or TPB and TAM differ: while TRA and TPB are meant for predicting specific behaviors at specific time and context (Ajzen 2002b), TAM should adapt to a variety of conditions and situations. The items originally included in TAM to measure perceived usefulness and perceived ease of use have been presented below.

Perceived usefulness:

1. Using [information system] in my job would enable me to accomplish tasks more quickly.
2. Using [information system] would improve my job performance.
3. Using [information system] in my job would increase my productivity.
4. Using [information system] would enhance my effectiveness on the job.
5. Using [information system] would make it easier to do my job.
6. I would find [information system] useful in my job.

Perceived ease of use:

1. Learning to operate [information system] would be easy for me.
2. I would find it easy to get [information system] to do what I want it to do.
3. My interaction with [information system] would be clear and understandable.
4. I would find [information system] to be flexible to interact with.
5. It would be easy for me to become skillful at using [information system].
6. I would find [information system] easy to use.

Although rooted in TRA, TAM closely resembles the social cognitive theory. This is also noted by Davis (1989, p. 321), according to whom the perceived ease of use construct is similar to Bandura's (1977) concept of self-efficacy, while perceived usefulness is a similar concept to that of Bandura's outcome expectation. By looking at the perceived usefulness items, it becomes clear that the perceived usefulness items measure the evaluative dimension of outcomes – a perceived improvement in one's work performance. Perceived ease of use items, on the other hand, measure one's conception of the amount of effort required to learn to use the system (the 1st and 5th items), or the amount of effort required to use the system (the other four items).

The perceived usefulness items are measurements of *behavioral beliefs,* which are indirect measures of attitude, according to TRA or TPB. Although originally included in the model, the attitude construct did little to help explain the linkages between beliefs and intentions in Davis (1989) and Davis et al. (1989, p. 999) studies, however, and was dropped out from the model. Similar kind of results have been reported by Taylor & Todd (1995a, pp. 165-166), who suggested that the non-significant indirect link from attitude to behavior may have been due to the fact that TAM allows a direct link from perceived usefulness to intention, which seemed to capture the effect (see figure 10). Indeed, as the specific outcome (or behavioral) beliefs should measure the same underlying latent variable as attitude, with the former being a determinant of the latter in accordance with an expectancy value model (i.e. the sum of the specific outcome beliefs should equal attitude), the inclusion of attitude would be unnecessary given the good predictive ability of other outcome belief measures.

The ease of use items refer mostly to the human-technology interaction itself (Mathieson 1991, p. 179), and not to the performance of the actual task at hand. However, the fact that interacting with the system is easy does not yet imply whether conducting the intended behavior is also easy to do with the system. Specifically, Goodhue & Thompson (1995) argue that for the technology to be utilized, there has to be a working interaction not only between the user and the technology, but also with the technology and the tasks the user is trying to conduct with the system. This aspect seems to be largely missing from the ease of use construct (although it could be argued that the second item implies more than just interaction between the user and the system).

TAM has also been further developed since its introduction: Davis & Venkatesh (2000) introduced TAM2, which adds several antecedents to perceived usefulness, while Venkatesh & Bala (2008) introduced TAM3, which adds antecedents to perceived ease of use. Partial model of TAM3 has been presented below.

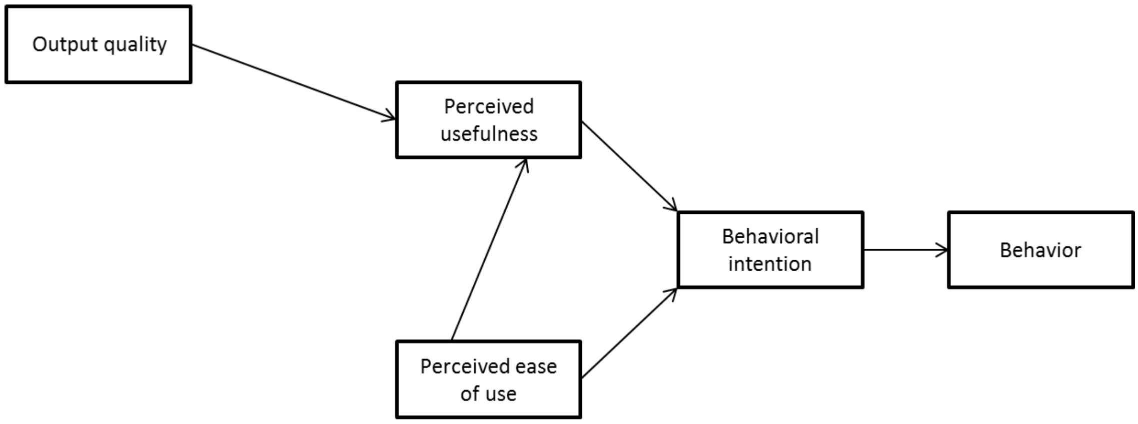


Figure 11. *A subset of TAM3 (Source: Venkatesh & Bala 2008, p. 280).*

Davis et al. (1992), Seddon & Kiew (1996), Venkatesh & Davis (2000), and Venkatesh & Bala (2008) all learned that the perceived quality of the system's output had a significant effect on perceived usefulness. *Output quality* is judged by observing the quality of the intermediate or end products of using the system, as defined by Davis et al. (1992, p. 1115). Therefore, in order for a system to provide work performance benefits for the user, the output of the system should be of high quality.

3.6 DeLone & McLean model and the information systems satisfaction literature

While the models presented so far help to explain the cognitive and affective dimensions, efficacy expectations, control factors, and their link to behavioral intentions, they do not identify the control factors. Although the system design features should affect perceived usefulness and perceived ease of use (Davis 1993, p. 476), there is a lack of theoretical and empirical work to fill what Wixom & Todd (2005, p. 89) call the "conceptual gap" between the system characteristics and behavioral beliefs. This is a crucial problem for the purposes of this study, however, as one of the goals of the study is to examine which aspects of the sales configurator constitute to the intention to use it.

At the heart of the user satisfaction literature is the DeLone & McLean (1992) model, depicted in figure 12.

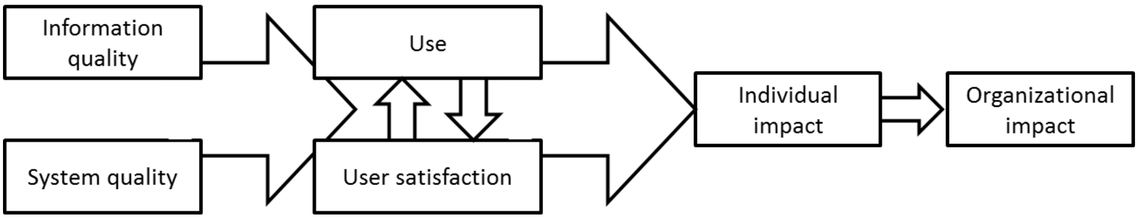


Figure 12. *The original DeLone & McLean model of information system success (Source: DeLone & McLean 1992, p. 87)*

The original DeLone & McLean model is more of a categorization of information system success measures than an actual variance model (Seddon 1997). However, according to DeLone & McLean (1992, p. 88), the different success measure categories are interrelated. They recognize six independent measurement categories from the literature, namely system quality, information quality, system use, user satisfaction, individual impact, and organizational impact. The model reflects the process nature of information system success (DeLone & McLean 1992, p. 88); in other words, it is not a variance model, where variance in each independent variable would be necessary and sufficient to cause variance in the dependent variable (Seddon 1997, p. 241).

In their process model, DeLone & McLean (1992, pp. 83-87) postulate that system quality and information quality singularly and jointly affect both use and user satisfaction. Furthermore, the amount of use can affect the degree of user satisfaction, whereas use and user satisfaction are direct antecedents of individual impact. Lastly, this impact on individual performance should eventually have some organizational impact.

Following DeLone & McLean's (2003, p. 26) definitions, system quality is concerned with the adaptability, availability, reliability, response time, and usability of the system. Information quality, on the other hand, reflects the completeness, ease of understanding, degree of personalization, relevance, and security of the output from the system. DeLone & McLean's (1992) classification of the determinants of user satisfaction resemble closely to that of Iivari & Koskela's (1987), who argue that user satisfaction stems out of three components: (1) informativeness, reflecting the relevance, recentness and reliability of information, (2) accessibility, reflecting the convenience of getting the desired output, response time, and information interpretability, and (3) adaptability, reflecting the degree to which the system adapts to changes in I/O requirements.

Saarinen (1995, p. 110) divides information system quality into (1) user interface quality, (2) flexibility of the system (to adapt to changes in needs and new requirements), (3) information quality, (4) information contents, and (5) information format. Notably, while DeLone & McLean (1992; 2003; 2004) combine user interface quality, system adaptability, and dependability of the system operation under their system quality category, Saarinen (1995) divides user interface and system adaptability as their own categories. Furthermore, Iivari & Koskela (1987, p. 415) separate accessibility as its own distinct category, and make a distinction between information interpretability and informativeness. Table 2 summarizes some of the better-known information and system quality metrics in the information systems satisfaction literature.

***Table 2.** Information and system quality metrics in the information systems success literature.*

Construct	Determinants	Authors
Information quality	Accuracy Completeness Currency/Recentness Precision Information reliability Relevance Security Timeliness	Aladwani & Palvia (2001); Bailey & Pearson (1983); DeLone & McLean (1992; 2002; 2003); Iivari & Koskela (1987); Ives et al. (1983); Molla & Licker (2001); Palmer (2002); Saarinen (1995); Wixom & Todd (2005)
System adaptability	Ability to adapt to requirements	Iivari & Koskela (1987); Saarinen (1995); Wixom & Todd (2005)
User interface quality	Response time Ease of navigation Information interpretability	Aladwani & Palvia (2001); Bailey & Pearson (1983); Iivari & Koskela (1987); Molla & Licker (2001); Palmer (2002); Saarinen (1995); Wixom & Todd (2005)
System availability	System accessibility System reliability	Bailey & Pearson (1983); Iivari & Koskela (1987)

Of the determinants of information quality, accuracy represents the user's perception that the information is correct, while completeness refers to the degree to which the system provides all the necessary information. Currency represents the user's perception that the information is up-to-date. Precision, on the other hand, refers to the variability of the output information from that which it purports to measure. Reliability refers to the consistency and dependability of the output information, while relevance refers to the congruence to what is required by the user and the information provided by the system. Security refers to the protection of information from unsanctioned intrusions or outflows, and timeliness to the degree to which the information is available at a time suitable for its use. (Bailey & Pearson 1983; Molla & Licker 2002; Wixom & Todd 2005, p. 91)

Response time refers to the degree to which the system offers timely responses to requests of information or action, while ease of navigation refers to the sequencing of pages or tabs, well organized layout, and consistency of navigation protocols. Information interpretability refers to the user's perception on how well the information is presented by the system. (Bailey & Pearson 1983; Iivari & Koskela 1987; Palmer 2002, p. 155; Wixom & Todd 2005, p. 91) System accessibility refers to the ease of accessing the system, while system reliability refers to the dependability of the system operation (Bailey & Pearson 1983; Wixom & Todd 2005, p. 90).

Some authors (Seddon & Kiew 1996) contrast their measure of system quality to that of Davis' (1989) perceived ease of use construct, while others (Wixom & Todd 2005) theorize that system quality is an antecedent to perceived ease of use. Furthermore, both Seddon & Kiew (1996) and Wixom & Todd (2005) (among others) empirically found a relationship between Davis' (1989) perceived usefulness and DeLone & McLean's (1992) information quality constructs. Here the concept of information quality takes the role of an external variable in TAM (see figure 11). Notably, the conceptualization of information quality closely resembles to that of output quality in TAM.

4. CONCEPTUAL MODEL OF THE STUDY

Now that the basic theories and models from the information system acceptance literature and social psychology have been presented, a theoretical model can be constructed. Beginning from the end, there is considerable empirical evidence that one's intention to conduct a behavior is a good predictor of the actual behavior (Sheppard et al. 1988), and is therefore the starting point for the model.

First, it's important to understand what the actual behavior under measurement is. Although the measurement items do not always have to separately specify every aspect of the behavior and its context – should it be clear otherwise (Ajzen 2002b) –the behavior which the respondent intends to conduct is not to use the system, but *to use it for something* (Goodhue & Thompson 1995). Here, the distributor representative does not intend to use the sales configurator for its own sake, but to use the sales configurator for configuring products. The difference might sound trivial, but it's an important one: the former aspect concentrates only on the interaction between the technology and the user, whereas the latter concentrates on the interactions between the user, the technology, and the tasks the user is trying to accomplish. Therefore, the behavior under question is using the sales configurator for configuring products or services with it.

Almost all of the relevant theories presented in chapter 3 postulate that the antecedents to behavioral intention are outcome expectations. Consequently, these expectations form the second stage of the theorized model. Two types of outcome expectations are separated: (1) evaluative outcomes, and (2) affective outcomes.

4.1 Outcome expectations

Evaluative outcomes. As noted by Venkatesh et al. (2003), several similar concepts to that of perceived usefulness have been proposed in the information systems acceptance literature. Moore & Benbasat (1991) – who utilize the concepts provided by the innovation diffusion theory (presented by Rogers 1983) – use the term *relative advantage* to determine the degree to which an innovation is perceived as better than its precursor, and compare it to be a similar construct to that of perceived usefulness (pp. 195-197). On the other hand, Thompson et al. (1991, p. 129) utilize the Triandis' model and conceptualize *job fit* for measuring the extent to which an individual believes that using a PC can enhance the performance of his or her job. They, too, note it to be a similar construct to that of perceived usefulness. Compeau et al. (1999, p. 147) utilize the social cognitive theory in their study to explain the use of computers at work in general, and conceptualize *performance outcomes* to measure one's perception of performance increases in one's job.

Venkatesh et al. (2003) form a new conceptualization of outcomes, that is *performance expectancy*, by merging the perceived usefulness, relative advantage, job-fit, and performance outcomes constructs together. Performance expectancy is defined as the degree to which an individual believes that using the system will help him or her to attain gains in job performance (p. 447). In addition to these, Bailey & Pearson (1983, p. 542) conceptualize *perceived utility* as the user's judgment about the relative balance between the cost and usefulness of the computer-based information products or services.

Table 3. *Evaluative job performance outcomes defined in the information systems acceptance literature.*

Evaluative outcomes		
Construct	**Author**	**Definition**
Perceived usefulness	Davis (1989)	The prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context.
Relative advantage	Moore & Benbasat (1991)	The degree to which an innovation is perceived as better than its precursor.
Job-fit	Thompson et al. (1991)	The extent to which an individual believes that using a PC can enhance the performance of his or her job.
Performance outcomes	Compeau et al. (1999)	One's perception of performance increases in one's job.
Performance expectancy	Venkatesh et al. (2003)	The degree to which an individual believes that using the system will help him or her to attain gains in job performance.
Perceived utility	Bailey & Pearson (1983)	The user's judgment about the relative balance between the cost and the considered usefulness of the computer-based information products or services that are provided.

In contrast to the TAM's hypothesized relationships between ease of use and intention, both Davis (1989) and Davis et al. (1989) learned that perceived ease of use does not seem to influence peoples' intentions directly, but indirectly via perceived usefulness. To be more precise, Davis et al. (1989, p. 997) found that after a one-hour introduction to the system, peoples' intentions were jointly determined by perceived usefulness and perceived ease of use. However, after 14 weeks of practice, intention was directly affected by usefulness alone (see figure 13). Furthermore, similar patterns of relationships between perceived usefulness, perceived ease of use, and intention have also been reported in other longitudinal studies utilizing TAM (e.g. by Venkatesh & Bala 2008).

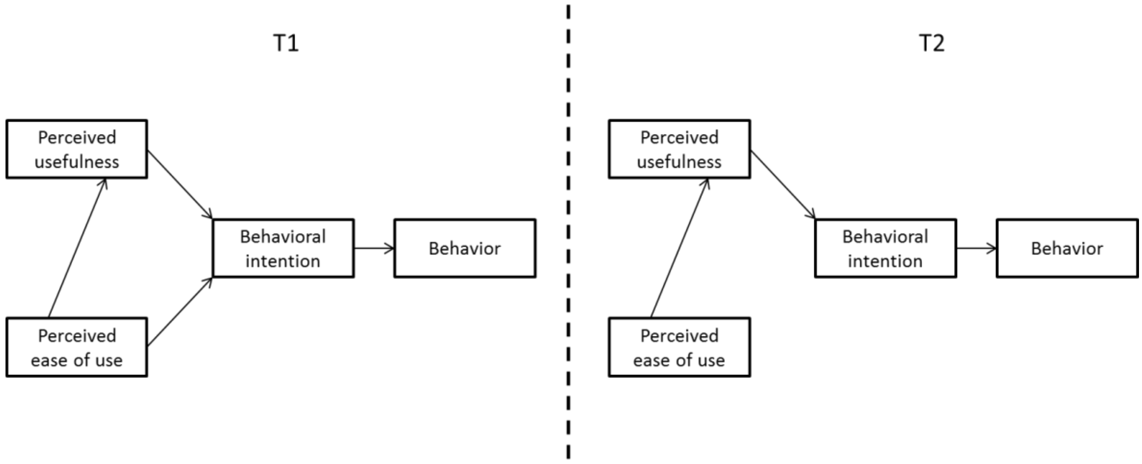


Figure 13. *The direct effect from ease of use to intention vanishes with passing time (T1 = after one-hour introduction, T2 = after 14 weeks of system use).*

Davis (1989, pp. 320-321) contrasts the perceived ease of use construct to that of effort, as well as to that of ability, but does not make a clear distinction between the two. Effort and ability have some important conceptual differences, however. First of all, effort is a manifestation of an opportunity cost: as Davis (1989, p. 320) explains, "*effort is a finite resource that a person may allocate to various activities*". In other words, effort can be contrasted to money or time. All of these – money, time and effort – represent valuable, finite resources which people trade for something that's expected to be equally (or more) valuable. The value of these resources is determined by their alternative targets: people generally have a choice into what they would like to invest their resources. Ability, however, is not a tradeable resource. In fact, ability to use the system is something that is gained by putting these resources into action.

Coming back to the first and fifth items of the perceived ease of use construct ("*learning to operate [information system] would be easy for me*" and "*it would be easy for me to become skillful at using [information system]*"), one should ask the following question:

- What makes a respondent say that a system is easy or difficult to learn for her?

Following the reasoning above, it should be possible that the respondent forms her judgement of "ease" based on the perceived tradeoff between the effort (s)he would have to invest in the learning, and the level of ability gained in return. The easier it would be to get skillful at using the system, the less effort it should take to reach a certain level of ability. Figure 14 illustrates this line of reasoning.

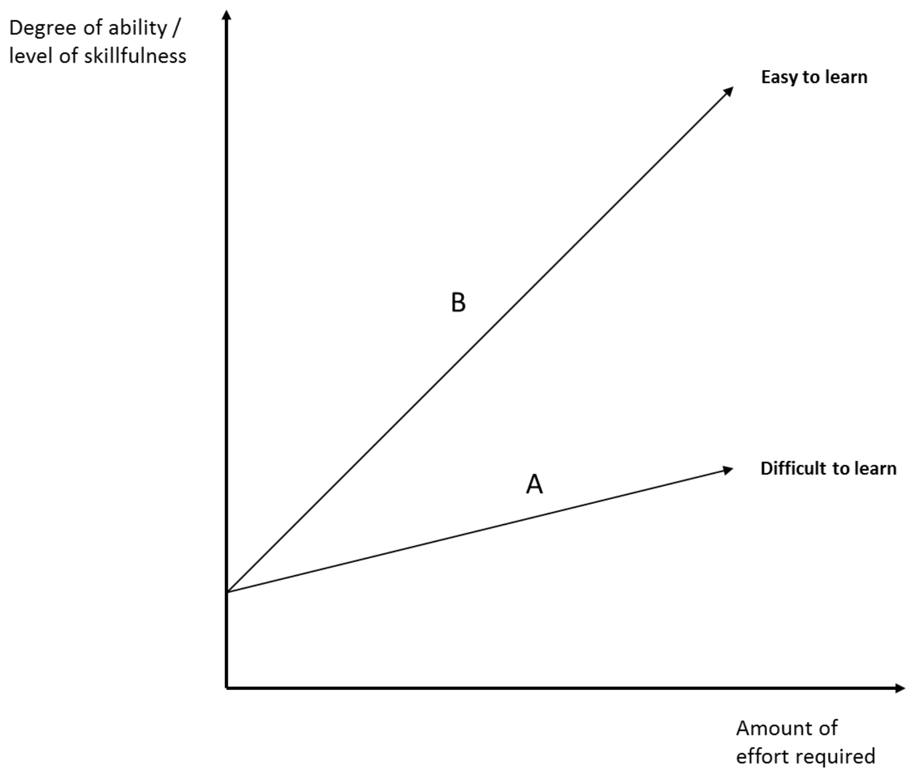


Figure 14. *The level of ease of learning to use technology A and technology B.*

If the respondent would perceive that becoming skillful at using the system would require a lot of her effort (i.e. the system is difficult to learn), this would, in turn, result in an opportunity cost. After all, she would have less of her effort to spend for accomplishing her other duties. As argued by Bandura (1982, p. 142), self-development of efficaciousness requires mastery of knowledge and skills that can be attained only through long hours of arduous work, which often necessitates sacrificing many immediate rewards. Indeed, Buehrer et al. (2005) found that the investment in time required to learn to use the technology was among the key barriers of sales representatives' technology adoption.

Looking at the perceived usefulness items presented earlier, this type of an opportunity cost is not explicitly included in the measurement items. Although it could be argued that, for example, the third item ("*using [information system] in my job would increase my productivity*") would also cover the opportunity cost of learning, this may not be the case, as the person might – at the same time – be convinced that using the system would eventually improve her productivity in her work, but that to reach the required level of skillfulness, the person has to spend a lot of effort first. Therefore, there could be two evaluative influence mechanisms of how ease of use affects intention:

1. **Indirectly via perceived usefulness.** It is suggested that the person first evaluates how easy or difficult the system is to use for her. Based on this evaluation, she makes a judgment on how skillful she would be able to get if she tried using

the system. The more skillful she would be able to get, the more of the system's potential (s)he would be able to unleash. Taken that the functionalities of the system are relevant to her job, this would also lead into enhanced work performance.

2. **Indirectly via expected opportunity cost of learning.** As in the first option, the respondent first evaluates how easy or difficult the system is to use for her. However, based on this judgment, the respondent evaluates how much an effort (s)he would have to spend in order to reach a certain level of skillfulness. Therefore, based on the amount of effort required, (s)he is able to estimate the opportunity costs associated to the learning process. Importantly, this estimation is no longer valid in T2, as the level of skillfulness has been reached already, and no further effort has to be spent.

This line of reasoning is further supported by the empirical results reported by Venkatesh & Bala's (2008): they found that the effect of ease of use on intention became weaker with increasing experience with the system, while the effect of ease of use on usefulness became stronger. Following the reasoning above, the results are not surprising. In fact, the weaker effect of ease of use on intention would be expected with increasing experience, as ease of use - intention linkage reflects considerations on the perceived learning effort. Similarly, the ease of use - usefulness relationship reflects the considerations of the perceived ability to utilize the system effectively.

Following social cognitive theory, the perceived ease of use construct should not – in any case – have a direct effect on one's intention to use the system, although such an effect has been hypothesized in TAM. Davis (1989, p. 320) justifies the direct relationship from ease of use to usage (and presumably on intention) by arguing that "*even if potential users believe that a given application is useful, they may, at the same time believe that the systems is too hard to use and that the performance benefits of usage are outweighed by the effort of using the application. That is, in addition to usefulness, usage* [and therefore intention, too] *is theorized to be influenced by perceived ease of use"*. This argument poses problems, however: for instance, if the respondent believed that the system would be too hard to use, then how could (s)he – at the same time – perceive that her job performance would increase if (s)he used the system (after all, Davis measures the degree of perceived usefulness with perceptions of the expected improvements in one's work performance)? Well, (s)he can't – the perceived usefulness construct (and possibly other types of outcome expectations) should capture such effects on intention.

Furthermore, coming back to the results presented by Davis et al. (1989, p. 998), they explain that the direct effect of ease of use on intention diminished after T1 because "*early on, people appeared to process EOU* [ease of use] *from a self-efficacy perspective, appraising how likely they would be to succeed at learning to use the system given they tried… …as learning progressed over time, this concern became less salient, and*

EOU evolved into a more instrumental issue, reflecting considerations of how the relative effort of using the system affect the overall performance impact the system offered [perceived usefulness]".

Keeping in mind that Davis et al. (1989) postulate a direct relationship between perceived ease of use and intention, they are consequently stating that – at the same time – the respondent might perceive that "*yes, I would not be able to learn to use the system given I tried*" and "*yes, by using the system my work performance would increase*". Again, these two statements would be contradicting: the less probable is the ability to learn – as perceived by the respondent – the less probable are the work performance increases. The two statements are therefore logically interrelated, with the former perception affecting the latter. The respondent's considerations of her ability to use the system should affect her considerations on expected outcomes, not (directly) on intention.

The question is therefore not only how likely the respondent would be able to succeed at learning, but also how much it would cost her. It is the effect of the expected effort spent on learning that Davis et al. (1989) might had discovered, and interpreted as the "direct" effect between ease of use and intention. In truth, the direct relationship from ease of use to intention has been explained vaguely at best in the literature, although kept in the technology acceptance model over the years (e.g. Davis 1989; Davis et al. 1989; Davis 1993; Venkatesh & Davis 2000; Venkatesh & Bala 2008).

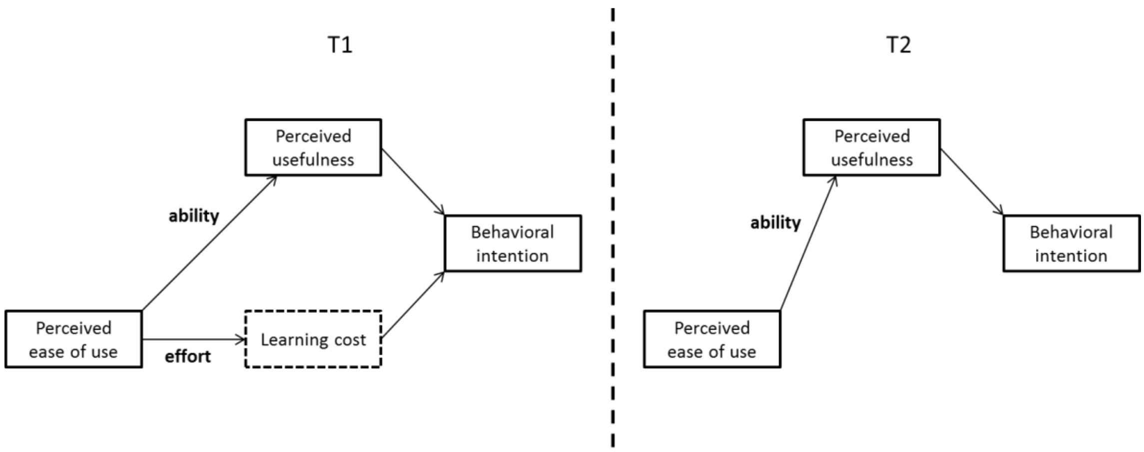


Figure 15. *Two evaluative mechanisms of how perceived ease of use might affect behavioral intention.*

In summary, the person trades her time and effort – by learning to use the system – to an increase in her work performance. Therefore, the effect of perceived ease of use on intention should be mediated by evaluative outcome expectations at T1, namely (1) perceived usefulness and (2) *perceived learning cost* outcomes. Figure 15 illustrates this line of reasoning. The work performance outcomes represent the potential benefits the respondent might receive in the future, while the opportunity cost of learning represents the cost of unleashing that future potential. The distinction is similar to that of the value equation presented in chapter 2 (customer net benefits less the price paid), with the distinction that money has been replaced by another finite personal resource – effort.

Affective outcomes. Affective outcomes have been measured – among others – by Davis et al. (1992) with the *perceived enjoyment* construct. They define it as the extent to which the use of the technology is enjoyable in its own right, apart from any performance consequences (p. 1113). Compeau et al. (1999, p. 148), on the other hand, utilized Triandis' conceptualization and define *affect* as the enjoyment a person derives from using computers.

Other authors utilizing measures of affective outcomes include Chin & Gopal (1995), and Chang & Cheung (2001), but they do not provide new conceptualizations. The combining factor for all of the four studies is, however, that they measure constructs reflecting the respondents' expected emotions stemming out of the use of a system, in addition to the expected evaluative outcomes that might follow from the use. Table 4 summarizes the conceptualizations of affective outcomes utilized in the information systems acceptance literature.

Table 4. *The affective outcomes defined in the information systems acceptance literature.*

Affective outcomes		
Construct	**Author**	**Definition**
Perceived enjoyment	Davis et al. (1992)	The extent to which the use of the technology is enjoyable in its own right, apart from any performance consequences.
Affect	Compeau et al. (1999)	The enjoyment a person derives from using computers.

As with the evaluative outcomes, it might be reasonable to separate individual's attitudes toward the using of the system (i.e. use process), and toward the process of learning how to use the system (i.e. learning process). Venkatesh (1999) found, that by manipulating the nature of the training sessions for which the respondents participate, their perceptions of ease of use and intentions seemed to change. Specifically, two changes in perceptions were observed:

1. The more enjoyable the training session was designed to be, the easier the respondents perceived the information system to use.
2. The more enjoyable the training session was designed to be, the more the respondents intended to use the system.

Before jumping into any conclusions based on these results, a further consideration is required. Starting with the first result, there are at least two theoretical mechanisms how a more enjoyable training experience could affect the perceived ease of using the system.

First of all, a positive training experience may be associated with emotional arousal (Bandura 1977, pp. 198-199). As Bandura (1977, p. 199) explains: "*by conjuring up fear-provoking thoughts about their ineptitude, individuals can rouse themselves to elevated levels of anxiety that far exceed the fear experienced during the actual threatening situation*". In other words, people fear performing a behavior even more if they find themselves to be anxious about performing it. Thus, an enjoyable training session might have had a relaxing effect for the participants, resulting in an increased sense of self-efficacy.

Yet another source of self-efficacy is experience: successes raise mastery expectations, whereas repeated failures lower them. This is particularly true if the mishaps occur early in the course of events. (Bandura 1977, p. 195) As Compeau et al. (1999, p. 146) explain, "*self-efficacy is viewed in SCT as an antecedent to use, but successful interactions with technology (e.g., enactive mastery) are also viewed as influences on self-efficacy*". It is therefore possible that the more enjoyable training experience was also more adept for giving positive mastery experiences than the "traditional training" experience. Thus, these two theoretical mechanisms (emotional arousal and mastery experiences) give a theoretical explanation to the first result presented above.

The second result is a bit trickier to explain, however. The first potential explanation is that the increased levels of perceived ease of use affected respondent's intentions via increased levels of perceived usefulness. However, this may not be the case as the perceived usefulness scores did not differ much at all between the training experiences, while the "direct" effect from ease of use on intention was substantially larger with the more enjoyable training experience, also increasing the variance explained in intention (Venkatesh 1999, pp. 252-254). Therefore, it seems quite possible that there's another type of an outcome expectation mediating the effect from ease of use to intention than perceived usefulness.

Two of such outcome types have been presented earlier, namely (1) perceived learning cost, and (2) perceived enjoyment. First of all, it might be possible that the increased levels of perceived ease of use led the respondent believe that the amount of effort required to learn how to use the system would be very little, thus increasing the degree of intention. Second, it is possible that the increased level of perceived ease of use led the respondent to expect higher levels of enjoyment out of using the system, thus increasing the amount of intention.

Yet a third explanation might be, that the respondents formed an expectation of a more enjoyable learning experience as a result of a more effective training method and a subsequent increase in their sense of self-efficacy. According to Bandura (1991, p. 256) people anticipate affective reactions depending on how they expect themselves to fare compared to their internal standards. Here, internal standards might not relate to the use of the system, but to the learning of it. If people expect that they are not able to learn how to use the system, they expect feelings of unpleasantness and frustration related to the learning process. However, when people expect that they are fully capable of learning how to use the system, they will expect feelings of enjoyment and interest.

Furthermore, Bagozzi & Warshaw (1990) separate attitude toward the process and attitude toward the outcome as two separate constructs. For example, when measuring whether an overweight person would intend to lose weight, or a chain-smoker to quit smoking, it would be appropriate to separate *goals* from *behavior*. Losing one's weight is a goal, and attitude toward a goal can be measured by inquiring the degree of enjoyment one would expect out of achieving that goal. However, the means of losing weight (e.g. exercising) is a behavior that can be measured by asking how likeable the act of losing the weight actually is. Consequently, even people who think they would be able to lose weight (and thus expect positive outcomes should they try to act upon it) might not choose to do so if they think that the act of doing so is unenjoyable, or even disgusting.

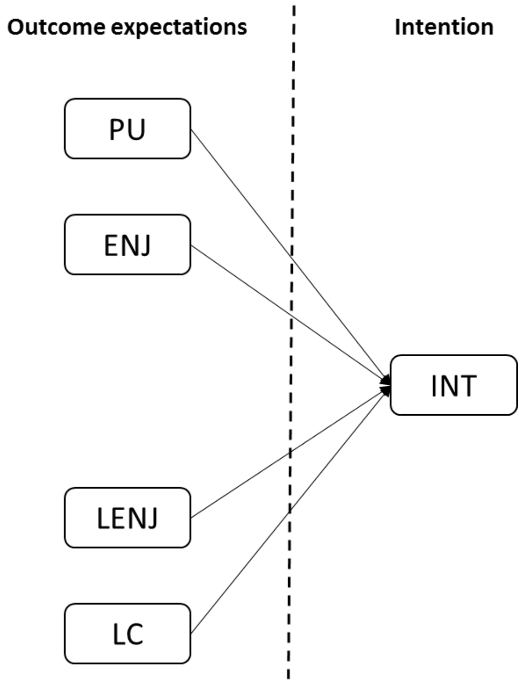


Figure 16. *Intention (INT), perceived usefulness (PU), perceived enjoyment (ENJ), perceived learning enjoyment (LENJ), perceived learning cost (LS), and their hypothesized relationships.*

In contrast to the weight-loser example, here the goal is to learn how to use the system, whereas the process can be contrasted with trying to learn how to use the system. Thus, the respondents who participated the more enjoyable a training session might have formed a more positive an expectation toward the learning process than those who participated in the not-so-enjoyable a training session. The degree of the expected *learning enjoyment* would then affect the respondents' intentions (see figure 16).

Thus, an individual's technology adoption decision should include affective judgements based on two different processes – the learning process, and the use process – much in the same way as there should be separate outcome beliefs based on the expected learning effort and the expected benefits out of use. Perceived enjoyment represents the expectation of satisfaction out of the configuring task, while perceived learning enjoyment represents the expectation of satisfaction out of the learning task. Thus, both perceived enjoyment and perceived learning enjoyment might have a role to play at T1, but only perceived enjoyment should influence intention at T2 (of the two types of affective outcomes). Table 5 summarizes the types of outcomes included in the theoretical model of this study, along with their sources in the literature.

Table 5. *The outcome types and their definitions in the theoretical model.*

	Construct	**Definition**	**Sources**
Evaluative outcomes	Perceived usefulness	The degree to which an individual believes that using the system for her work tasks will help her to attain gains in work performance.	Bailey & Pearson (1983), Davis (1989), Compeau et al. (1999), Goodhue & Thompson (1995), Moore & Benbasat (1991), Thompson et al. (1991), Venkatesh et al. (2003)
	Learning cost outcomes	The degree to which an individual believes that learning to use the system will (not) cause opportunity costs because of lost time and effort.	Not analoguous with current conceptualizations in the information systems acceptance literature.
	Construct	**Definition**	**Sources**
Affective outcomes	Perceived enjoyment	The degree to which the use of the system is enjoyable for the individual, apart from any considerations on the attainment of separable evaluative outcomes.	Davis et al. (1992), Compeau et al. (1999)
	Perceived learning enjoyment	The degree to which the learning of how to use the system is enjoyable for the individual, apart from any considerations on the attainment of separable evaluative outcomes.	Not analoguous with current conceptualizations in the information systems acceptance literature.

According to SCT, outcome expectations are dependent from efficacy expectations, as the outcomes one expects derive largely from judgments as to how well one can execute the requisite behavior (Bandura 1982, p. 140). The respondent shouldn't expect to receive any performance benefits or positive affective reactions out of the behavior in question should (s)he expect inadequate performance in conducting it. Efficacy expectations, therefore, represent the next line of variables in the study model.

4.2 Efficacy expectations

Ajzen (1991; 2002) argues that perceived behavioral control resembles closely to that of Bandura's (1977) concept of self-efficacy. This is also evident when comparing the definitions of the two concepts: while perceived behavioral control refers to the perceived control over the performance of the behavior, self-efficacy refers to the conviction that one can successfully execute the behavior required to produce the outcomes. In other words, they are both perceptions concerning how easy or difficult the respondent perceives the performance of the behavior to be (Ajzen 1991, p. 183; Bandura 1977), and thus the concepts of perceived self-efficacy, perceived behavioral control, and efficacy expectations are used synonymously in this text.

Two central arguments have been presented thus far in this text concerning the nature of the efficacy expectations:

1. Efficacy expectations and control factors should be differentiated from one another.
2. The control factors influence one's (self-)efficacy expectations.

The relationship between efficacy expectations and evaluative outcome expectations. Information systems acceptance literature often – either explicitly or implicitly – contrasts perceived ease of use construct with what Ajzen calls (1991; 2002) behavioral beliefs (e.g. see Wixom & Todd 205). Behavioral beliefs represent the indirect measures of attitude, and are typically measured by items stating specific outcome expectations, as discussed earlier in chapter 3.2. An example of a construct that measures behavioral beliefs is Davis' (1989) perceived usefulness scale, which measures the expected work performance improvements out of using an information system.

By inspecting the nature of the perceived ease of use items (presented in chapter 3.5) it becomes clear, however, that the ease of use items do not express beliefs concerning outcomes, but rather the expected level of performance of a behavior. Thus, following Bandura's (1977) definitions, perceived ease of use is an efficacy expectation, not a behavioral belief.

As the efficacy expectations are supposed to have a strong relation to the outcome expectations (Bandura 1982), one would expect to find demonstrated effects between perceived ease of use and perceived usefulness from the information systems acceptance literature. Indeed, the relationship between perceived ease of use and perceived usefulness has been found in numerous studies (e.g. Davis 1989; Davis et al. 1989; Davis et al. 1992; Mathieson et al. 2001; Wixom & Todd 2005; Venkatesh & Davis 2000; Venkatesh & Bala 2008). However, opposite results exist, as well: for example, Davis et al. (1989) did not find a significant relationship between usefulness and ease of use at T1, but only at T2. Other researchers have reported insignificant relationships between the constructs, as well (Adams et al. 1992; Jackson et al. 1997; Hu et al. 1999).

As discussed in the beginning of chapter 4, a careful definition of the behavior under question is important. It is often assumed that the behavior under question is information system usage itself, and not the task accomplishment. This is apparent when information systems acceptance literature is explored in depth: for example, Mathieson

(1991, p. 179) argues that perceived ease of use "*refers to the match between the respondent's capabilities and the skills required by the system*", i.e. interaction between the user and the information system per se, apart from any task accomplishment considerations. Then again, Mathieson & Kiel (1998) seem to (implicitly) assume that the target of the behavior is the accomplishment of certain work tasks: they create new measures for the perceived ease of use scale to measure the ease or difficulty of completing particular work tasks (instead of measuring the ease or difficulty of interacting with the system's user-interface).

Indeed, the definition of perceived ease of use is ambiguous on the question of the target behavior: the definition does not clarify what exactly should be easy or difficult to do. As the perceived ease of use items presented by Davis (1989) refer to the interaction with the tool rather than the accomplishment of certain work tasks, the definition of perceived ease of use is further specified: in this text the concept refers to *the respondent's perception of how well (s)he is able to interact with the information system, apart from any task considerations*.

Being able to interact with the tool is not enough for reaching any performance improvements, however. Consequently, there has to be a match between the respondent's capabilities, system functionalities, and the task requirements for the system to be considered useful by an individual (Goodhue & Thompson 1995). The behavior under question – that will result in the desired outcomes – is not the interaction with the tool, but the accomplishment of certain tasks with the help of the information system. The user does not intend to use the information system per se, but intends to use the information system for accomplishing her work tasks (Goodhue & Thompson 1995).

In the context of this study, the task the user is trying to accomplish with the sales configurator is configuring products or services. Whether the configuring context is selling products to a customer, or buying products from a supplier, is irrelevant, as the underlying task is still the same. It is the performance of this behavior that will result in work performance outcomes: should the respondent feel that the tool supports her configuring task better than the current methods, there should be an increase in her work performance. Therefore, the perceived usefulness construct is dependent on the perceived degree of efficacy in the performance of the configuration task. This argumentation follows straight from the SCT's postulated relationship between the outcome and efficacy expectations (Bandura 1980, p. 140).

Consequently, another construct is required in addition to the perceived ease of use posited by TAM: an efficacy construct that directly measures the expected performance of the behavior in question. Such a construct is defined here as *perceived effectiveness*, and it refers to the respondent's perception of how well (s)he is able to perform the tasks in question with the information system in her work. The concept differs from perceived ease of use in its definition of the behavioral target: while ease of use reflects considerations of the efficacy related to the interaction with the tool, effectiveness reflects considerations of the efficacy related to the configuring of products or services with the tool. As such, ease of use is a determinant of effectiveness. After all, the easier the interaction between the user and the information system, the more effectively and efficiently should the user be able to conduct the requisite tasks.

The relationship from ease of use on effectiveness and ease of use on learning cost carry different meanings. The ease of use - effectiveness relationship represents the respondent's ability in the sense that the more effort the respondent expects to put on the interaction with the sales configurator, the less effective is its use for the configuration task. This is due to wasted time and effort during the interaction with the tool's user interface. Should the user be more efficacious with using the tool, she would be able to avoid some of the lost time and effort that an inefficacious user would spend. Here, effort is inherent in the effectiveness considerations, as more effort implies less productive or lower quality task performances (and vice versa). In contrast, the relationship between perceived ease of use and perceived learning cost should capture the considerations on the amount of effort put into learning. Studying how to use the tool is unproductive work that carries an opportunity cost, as discussed earlier.

The relationship between efficacy expectations and affective outcomes. Bandura (1982, pp. 133-135; 1991, p. 256) argues that people are more interested toward acts in which they expect to be efficacious in: people anticipate affective reactions (whether that is enjoyment, interest, excitement, or pleasantness) to one's own behavioral performance depending on how it measures up to one's internal standards. On the other hand, perceived inability to perform a wanted behavior raises an expectation of negative affective reactions, and refrains one from conducting such acts (Bandura 1982, p. 136; Bandura 1991, p. 256). Hence, the more or less able people perceive themselves to perform the behavior in question, the more or less interesting or enjoyable they expect the performance of the behavior to be (Bandura 1991, p. 256). Consequently, efficacy expectations are theorized to have an effect to the affective outcomes in addition to the evaluative outcomes. This relationship between the efficacy expectations and affective outcomes are empirically supported by the results of Davis et al. (1992), Compeau & Higgins (1999), and Chang & Cheung (2001) in the information systems acceptance literature.

Here, it's postulated that perceived effectiveness has a direct effect on perceived enjoyment, whereas perceived ease of use has a direct effect on perceived learning enjoyment. The rationale is based on the division of the technology acceptance process to the processes of learning and using. Enjoyment out of using the tool should not be derived out of the interaction with the tool directly, as feelings of enjoyment should be directly related to the task accomplishment.

In the use process context, the behavior in question is configuring products or services with the sales configurator (rather than solely the interaction with the tool), and enjoyment is derived from anticipated achievement of internal standards in the product or service configuration task accomplishments. In other words, the sales representative expects feelings of satisfaction and enjoyment, because (s)he expects herself to be able to configure products or services with the tool. However, in the learning process context, a sales representative anticipates affective emotions based on how well (s)he is able to interact with the tool, as the expected ease or difficulty of interaction sets the basis for the anticipated learning efficacy (see chapter 4.1).

The lack of typology between different types of perceptions is a source of some misunderstandings in the information systems acceptance literature. For example, Venkatesh (2000, p. 351) argues an opposite flow of causation to that of SCT, by basing his argumentation on the empirical results presented earlier in chapter 4.1: "*…there is some recent evidence that favors a causal flow from perceived enjoyment to perceived ease of use (Venkatesh 1999). By manipulating the level of system-specific enjoyment through training, not only was it found that perceived ease of use could be enhanced but also the salience of perceived ease of use as a determinant of intention increased (Venkatesh 1999), thus suggesting that perceived ease of use could certainly be influenced by system-specific perceived enjoyment.*" There are some problems with this argumentation, however.

First of all, one should be wary of making any causal assumptions based on empirical results without any theoretical justification. After all, innovation characteristics research studies should predict, rather than simply explain in post-hoc fashion, the critical events of the phenomenon (Tornatzky & Klein 1982, p. 29). Second, the fact that perceived enjoyment wasn't measured in the Venkatesh's (1999) study (but instead the nature of the training experience was manipulated) signifies that these results can't be taken as concrete evidence for the above reasoning of the causal dependence between the two variables. Third, from a theoretical perspective, perceived enjoyment as a cause to perceived ease of use represents a different theoretical mechanism than perceived enjoyment as an effect of perceived ease of use.

As discussed, people feel positive affective emotions when they perform well in matters that are important to them (Bandura 1991). Furthermore, people take this performance accomplishment as a proof of their efficaciousness (1977). Therefore, it is expected that when people feel enjoyment or satisfaction out of an act, they also feel better able to perform the behavior successfully in the future. Importantly, there's a huge conceptual difference between this type of a mechanism, and the one where people *expect* affective reactions out of their actions.

The former type of a mechanism would suggest that at first, when people are only shortly introduced to the system, perceived enjoyment would not seem to cause perceived ease of use, as feelings of satisfaction and enjoyment out of performance accomplishments haven't occurred yet. However, if measured in the future, a positive relationship between perceived enjoyment and perceived ease of use is expected, as earlier performance accomplishments have led to enjoyment and further strengthened one's perception of self-efficacy. This is also exactly what Venkatesh (2000), and Venkatesh & Bala (2008) found: at first (at T1), perceived enjoyment didn't seem to be a determinant of perceived ease of use, but this changed after experience with the system was gained (at T2 and T3).

However, when anticipatory affective reactions are measured, it should be postulated that the perceived efficaciousness causes one *to expect* positive affective self-reactions. It is very important that the measurement items take this difference between the theoretical mechanisms into account. Misuse of conceptual constructs may result in questionable, or even fallible implications. For example, Venkatesh (2000, p. 359) concludes:

"*This research has further refined our understanding in this regard by suggesting that general computer playfulness and perceived enjoyment are determinants of perceived ease of use. One example is "fun icons" like the ones introduced in MS-Office 97. A similar example is the use of "warm and fuzzy" screen savers (e.g., flashing cartoons on the screen, some action related to your favorite basketball team, etc.) as a way to cause perceived ease of use of specific systems (used by the individual) to be more favorable.*"

Support for implications such as these have not been presented by Venkatesh (2000), however, as – based on the mechanisms postulated by SCT and the empirical results presented in the study – the measured constructs had probably very little to do with funny looking icons, but instead with the satisfaction and enjoyment derived out of task accomplishment. Indeed, many of us still remember Mr. Clippy and the notorious "help" he offered with using the MS Office tools. In order to avoid such design catastrophes, one should be extra vary when interpreting causal relationships between the measured variables.

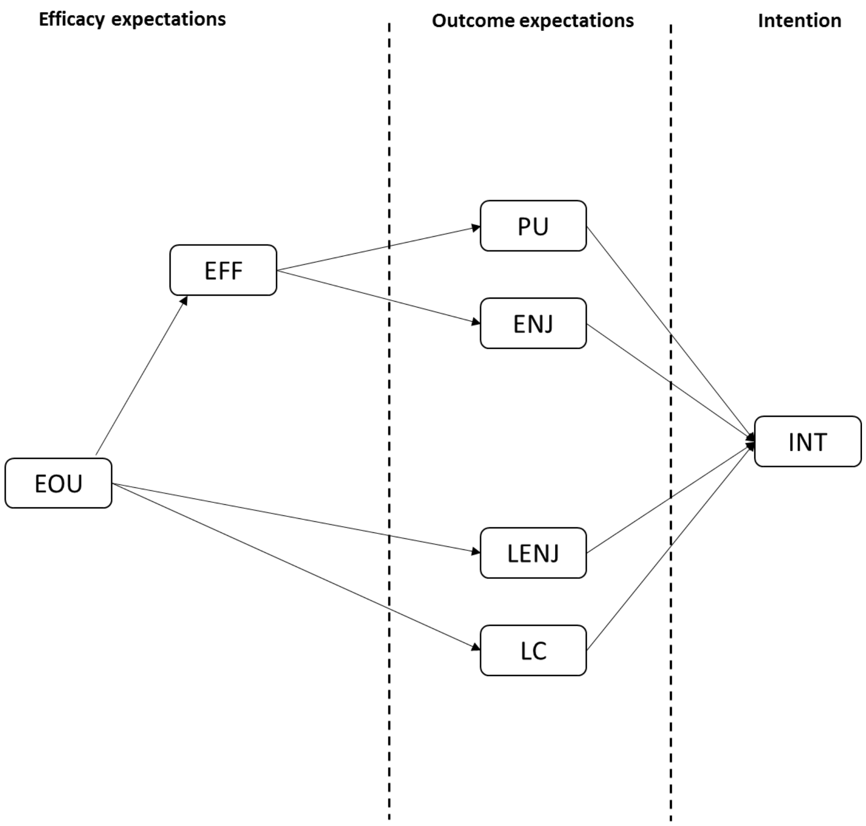


Figure 17. *Perceived effectiveness (EFF), perceived ease of use (EOU), and their hypothesized relationships with the outcome expectations.*

The two efficacy expectations, and their relationships with the outcome expectations have been depicted in figure 17. In summary, the relationships between perceived ease of use and the two outcome expectations (perceived learning enjoyment and perceived learning cost) reflect the learning process, while the relationships from ease of use to effectiveness, and from effectiveness to the other two outcome expectations reflect the use process. As the two constructs have differing antecedents, their separation should enable the researcher to get more detailed results for the determinants of behavioral decisions.

4.3 Control factors

Control factors make performing the behavior easier or more difficult (Ajzen 2002a, p. 668). As discussed earlier, they form the efficacy expectations. Such a factor can be a variety of things: a lack of equipment, lack of skill, lack of training, etc.

Mathieson et al. (2001, pp. 90-92) divide information system usage control factors into three distinct categories: (1) user attributes, (2) system attributes, and (3) support from others. Their user attributes category relates to internal control factors, and contain items such as educational level of the user, analytic sophistication, and ability. The other two categories relate to the external control factors, and include items such as technical and organizational support, system accessibility, and availability of the system. Notably, however, Mathieson et al. (2001) do not include any design features of the system in the system attributes category, but the category represents factors external to the system itself.

Conceptually, it makes no difference whether it’s due to internal or external reasons that respondent assesses an act easy or difficult to perform. As Ajzen (2002a, p. 676) explains:

“*The ease or difficulty of performing a behavior is conceptually independent of internal versus external locus. I may believe that it would be easy for me to eat a low-fat diet because I have familiarized myself with the fat contents of various foods (an internal factor) or because low-fat foods are readily available (an external factor). Similarly, I may believe that I have limited control over eating a low-fat diet because I have little willpower (an internal factor) or because the dining hall where I have most of my meals provides no information about the fat content of the food that is served (an external factor).*”

Similarly, it’s unnecessary to restrict control factors to represent only personal or organizational resources: a control factor is <u>any</u> factor that makes an act easier or more difficult to perform (Ajzen 2002a). Specifically, in the information system context, a control factor is any factor that makes the interaction between the user and the system easier to perform (measured by perceived ease of use), or a factor that makes it easier or more difficult to use the system for the tasks it’s meant to be used for (as measured by perceived effectiveness). For example, Wixom & Todd (2005) support empirical evidence for the relationship between system design features and efficacy expectations (between perceptions of system quality and perceived ease of use), while Mathieson et al. (2001) provide evidence for the relationship between internal and external resources and efficacy expectations (between the constructs of perceived resource and perceived ease of use).

Earlier it was discussed (see chapter 3.1), that people attribute outcomes (or behavioral performance) to internal factors when they think that they fare better or worse than their peers due to their personal capabilities, and to external factors when they believe that others would fare equally well in a given situation. Control factors also vary in their degree of stableness and generalness: for example, when a student fails in a math test, (s)he may attribute it to not having the necessary knowledge at this particular time (an unstable factor), or that (s)he’s stupid and unable to get the necessary knowledge even though (s)he would try to do so (a stable factor). However, the lack of knowledge is an internal factor in both the cases as it makes the student to fare worse than her peers. In contrast, should the person perceive the math test to be unfair, it’s should be unfair for all. Consequently, all of her relevant others would fail the test (or at least fare poorly), and the unfairness of the test would represent an external factor. (Abramson et al. 1978, pp. 56-57) An individual does not, however, base her attribution to the capabilities of every person in the world. Rather, people evaluate their performances in relation to certain classmates, colleagues, and so on: people, who are important for comparison. (Bandura 1982, pp. 254-255)

An example of external control factors are the design features of the system: user-interface design is perceived as poor if the respondent perceives that her relevant others would think so too. For example, when a respondent perceives that (s)he would be unable to use a system's user-interface, (s)he does not necessarily think that "*I wouldn't be able to use the system, and thus the user-interface is poorly designed*", but the perception of the system's design quality would be based on the capabilities of others as well. The fact that the respondent perceives the user-interface as difficult to use would not automatically imply that the design is poor, as this could be attributed to internal reasons as well. Should nobody be able to utilize the system's user-interface effectively (as perceived by the respondent), the inability would most likely be completely attributable to the poor user-interface design, however. Thus, considerations of system design features can be separated from the ease of use or effectiveness considerations.

It's a rather typical misconception in the information system acceptance literature to contrast efficacy expectations with the control factors. For example, the concept of perceived ease of use is often interpreted to reflect perceptions of the system's design features, as if perceived ease of use was an attribute of the system. However, as argued above, this is not what is being measured by the measurement items. For example, the 6th item ("I would find [information system] easy to use") does not measure the respondent's perceptions of how well the information system is designed (which is a control factor), but simply how easy or difficult it would be for her to interact with the system (which is an efficacy expectation).

Goodhue & Thompson's (1995) task-technology-human fit conceptualization provides an explanation for the relationships between the design features of the system, and the two types of efficacy expectations. As argued by Goodhue & Thompson (1995, p. 218), task-technology-human fit reflects the correspondence between task requirements, individual capabilities, and the functionality of the technology. Furthermore, the antecedents of task-technology-human fit are the interactions between the task, the technology, and the individual (more specifically, interaction between the technology and the individual, and the interaction between the technology and the task, see figure 18 below) (p. 218).

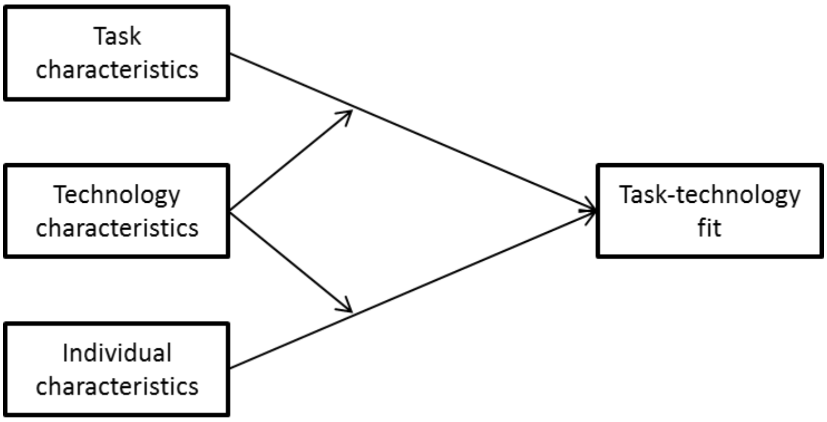


Figure 18. *The core part of the task-technology fit model (Adapted from source: Goodhue & Thompson 1995, p. 217).*

Goodhue & Thompson (1995, p. 216) define task-technology-human fit as "*the degree to which a technology assists an individual in performing her portfolio of tasks*". In contrast, perceived effectiveness was defined earlier as the perceived degree to which the respondent is able to conduct the tasks in question effectively and efficiently with the information system in her work, following Bandura´s (1982) conceptualization of efficacy expectations. Understood from these perspectives, the two constructs are very similar, although not entirely the same: task-technology-human fit is centered around the characteristics of the technology, while perceived effectiveness includes considerations of every possible control factor that may inhibit task accomplishment.

As discussed earlier, Mathieson (1991, p. 179) argues that the perceived ease of use construct in TAM refers to the match between the respondent's capabilities and the skills required by the system. In contrast, Goodhue & Thompson (1195, p. 216) argue that the characteristics of an individual could affect how easily (s)he will utilize the technology. As such, the conceptual similarity between the two constructs (human-technology fit and perceived ease of use) is evident. Consequently, here the perceived ease of use construct is contrasted to Goodhue & Thompson's (1995) conceptualization of the human-technology fit.

Goodhue & Thompson (1995, p. 216) define technologies as tools used by individuals in carrying out their tasks. Tasks, on the other hand, are defined as the actions carried out by individuals in turning inputs into outputs. As the gap between the requirements of a task and the functionalities of a technology widens, task-technology fit is also subsequently reduced. (Goodhue & Thompson 1995, pp. 216-218)

Following Goodhue & Thompson's (1995) conceptualization, *information quality* and *system adaptability* constructs presented in chapter 3.6 relate to the fit between the technology and the task requirements: should the information or functionalities provided by the system be insufficient to the task requirements as judged by the respondent, (s)he should attribute the cause of her inefficacy to the system's poor fit with the requirements of the task. For example, a sales configurator could be attributed as having a low task-technology fit when it offers incorrect product information for the user. Specifically, in a sales configurator context, users may find it difficult to trust on the information provided by an automated expert system (Tiihonen 1996). Moreover, the sales configurator should provide the user with information that is relevant and on the right level of abstraction (Salvador & Forza 2007), as discussed in chapter 2.3.

Venkatesh & Davis (2000, p. 192) argue, that given a choice set containing multiple systems, one would be inclined to choose a system that delivers the highest output quality. Indeed, Calisir et al. (2014), Cheong & Park (2005), Davis et al. (1992), Seddon & Kiew (1996), Venkatesh & Davis (2000), and Venkatesh & Bala (2008) found a statistically significant relationship between output or information quality and perceived usefulness. Moreover, Davis et al. (1992) found a significant relationship between output quality and perceived enjoyment in one study, although they failed to find the similar relationship in another. The effect from output quality to outcome expectations shouldn't be conceptually direct, however. Instead, the more accurate, complete, current, precise, and configuring-relevant information the sales configurator offers, the more effective is the configuring of product and services with it. Thus, perceived effectiveness should mediate the effect from perceived information quality to perceived usefulness and perceived enjoyment.

Iivari & Koskela (1987) define *system adaptability* as the degree to which the system adapts to changes in task requirements. Clearly, the better the functionalities of the sales configurator adapt to the different steps of the configuration task – that is, selecting the components, determining parameter values for the components, designing the layout, determining component connections, checking for completeness and consistency of the configuration, etc. – in different conditions and situations, the more effective can the configuration task be performed. Therefore, similarly as with perceived information quality, the effect from perceived system adaptability to perceived usefulness and perceived enjoyment is mediated by perceived effectiveness.

From a conceptual point-of-view, perceived information quality and perceived system adaptability should not have any influence on the ease of use perceptions: even though the information that the system provides would be of high quality for the task requirements, it wouldn't affect how ease or difficult it is for the user to interact with the system per se. Similarly, even though the system would provide flexible functionality that adapts to different situations, it wouldn't make it any easier to interact with the system: the system may be flexible in a sense that it supports a wide variety of different task requirements, but difficult to interact with at the same time. Indeed, the system attributes that affect how easy or difficult it is to interact with the system (human-technology fit), are quite different from those that are related to the fit between the task requirements and the technology (Johnson 2010).

In fact, Mathieson & Kiel (1998) provide some empirical support for the argumentation that perceived effectiveness can be affected by manipulating task-technology fit, irrespective of user-interface design. Although they claim that they measure how manipulation affects the perceived ease of use construct as defined by Davis (1989), their measurement items (e.g. "*How easy was it for you to extract the information needed for question set X from the USWdatabase?*") reflect considerations of how easy or difficult it is to accomplish certain tasks with the information system, rather than the ease of interaction. Thus, they measure perceived effectiveness instead of perceived ease of use, as defined in this text.

In summary, some of the antecedents to perceived effectiveness are the factors reflecting the fit between the capabilities of the technology and the requirements of the task, and the factors reflecting the fit between the skills required by the technology, and the capabilities of the user (see figure 19). The first category of factors includes information quality and system adaptability, while the other set of factors is represented by the perceived ease of use construct. Therefore, perceived ease of use can also be interpreted as a control factor to perceived effectiveness in addition to an efficacy expectation on its own. As perceived ease of use refers to a behavior and not to the characteristics of a technology, it can be attributed further in the same manner as perceived effectiveness, however.

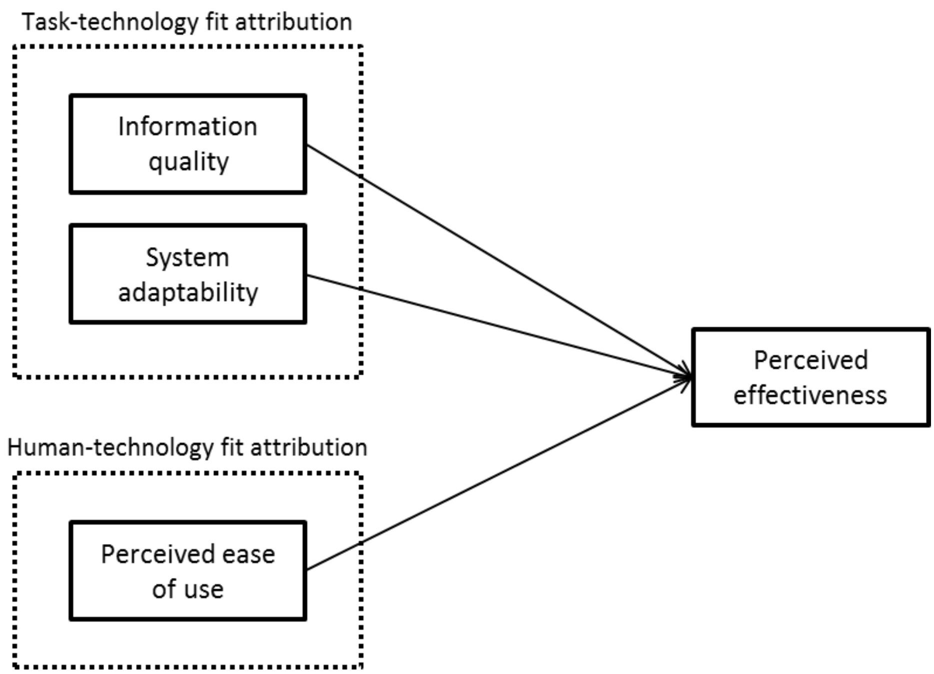


Figure 19. *Task-technology fit and human-technology fit attributions of perceived effectiveness.*

User-interface design relates closely to how ease or difficult the system is to interact with. Interaction is easy when the information provided by the system is structured in visual hierarchies, information is consistent, the using of the system does not require memorizing but is based on recognition, and so on. (Johnson 2010) An important aspect of a sales configurator is the way that it presents information to the user, especially as the user is unlikely to be a programmer or an IT specialist (Tiihonen 1996; Trentin et al. 2013, p. 438). Thus, the degree of *format quality* (or information interpretability) provided by the system affects how easy the system is to learn and to use (Bailey & Pearson 1983; Iivari & Koskela 1987; Saarinen 1995; Wixom & Todd 2005).

Similarly, the degree to which the system's user interface is easy to navigate should affect how easy it is to interact with (Aladwani & Palmia 2001; Palmer 2002). Thus, *ease of navigation* is hypothesized to affect perceived ease of use. Specifically, in the sales configurator context, Trentin et al. (2013, pp. 438-439) suggest that in order to make a sales configurator easier to use, it must allow focused and flexible navigation. By focused navigation they refer to the sales configurator's capability to quickly narrow down the user's search for the correct product space subset, whereas flexible navigation refers to the sales configurator's capability to allow easy modification of current or previous product configurations.

Individual's skill and experience affects how easy or difficult it is for the user to utilize the technology (Goodhue & Thompson 1995, p. 216; Mathieson 1991; Mathieson et al. 2001). Sales representatives from firms with adequate support are expected to become more proficient users and reduce the required effort to use the sales technology. Consequently, sufficient training and technical support should positively affect the ease of operating the information system in actuality. (Schwillewaert et al. 2005, p. 327; Thompson et al. 1991, p. 129) Furthermore, as training and support are expected to increase the level of skill obtained by the user, the mere expectation of training and support should increase the *expected* ease of interacting with the system in the user's mind, already before the actual learning process has even began. In other words, should the distributor representative expect that (s)he will get support in learning how to use the system, (s)he would be more confident of her ability to interact with it. Indeed, among the most frequently stated barriers for technology adoption were technical support and the lack of training, as reported by sales representatives in a study conducted by Buehrer et al. (2005, p. 395).

Both formal as well as informal support and training should be taken into account, as well as support provided by the organization and peers (Jasperson et al. 2005). *Informal support* refers different activities performed by coworkers that may help an employee interact with a new system, while *formal support* refers to training and technical support provided by the respondent's own company or the supplier providing the tool. Informal and formal support are hypothesized to affect perceived ease of use, because they raise the expectation of one's own capabilities and skills related to the system use. In contrast, format quality and ease of navigation represent attributions of perceived ease of use on technology; a reasoning according to which the inability to interact with the system is due to the poor user-interface design rather than one's own capabilities and skills (see figure 20).

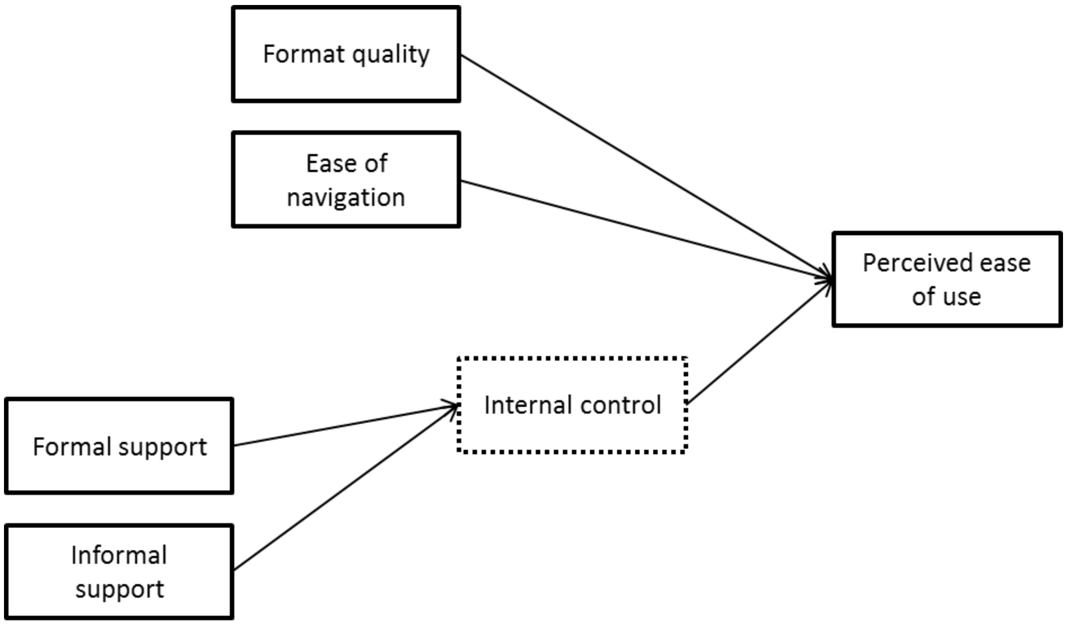


Figure 20. *Attributions of perceived ease of use.*

Internal control is not being measured in this text, as the measurement of them is quite controversial (see Ajzen 2002a, pp. 677-678 for further discussion). However, the two constructs affecting the perceived internal control can be measured with more confidence on their validity. The theoretical mechanisms postulated here explain that, first of all, the expectation of training and support affect the expected degree of perceived ease of use through an expected increase in internal control, before the actual learning even takes place. During the learning process, the actual training and support offered by peers and organization increase the perceived level of ease of use through the increase in internal control, due to actual performance accomplishments, vicarious experience (i.e. seeing others succeed), and verbal persuasion (see Bandura 1977 for further discussion on the sources of self-efficacy).

In addition to task-technology and technology-human fit attributions, there are other control factors that might affect the perceived degree to which configuring products is easy or difficult. *Level of customer interaction* refers to the degree to which the respondent feels able to get the necessary input information from the customer for the sales configurator. As discussed earlier in chapter 2.3, the customers vary in their level of technical sophistication, which has a potential of being a key challenge for the distributor's representative for determining the customer's technical requirements (Tiihonen 1996).

System accessibility, on the other hand, refers to factors such as the dependability of the system's operation, authorization, equipment, and other resources required for utilizing the application (Bailey & Pearson 1983; Goodhue & Thompson 1995; Iivari & Koskela 1987; Mathieson 2001). For example, a sales representative may require access to the system also in the customer's premises, where access could be more restricted than in the home office, or require some special equipment (such as portable devices) to use the system. Similarly, should there be many different sales configurators from many suppliers which the distributor representative should utilize, the representative may become easily frustrated should (s)he have to access all of the applications using different methods, passwords, etc. Thus, system accessibility should have an effect on perceived effectiveness.

4.4 The conceptual model of the study

Table 6 presents examples of different types of attribution related to the outcome attainment. The attribution matrix consists of two axes, one following the internal-external dichotomy of Abramson et al. (1978), while the other corresponds to the task-technology and human-technology dichotomy by Goodhue & Thompson (1995). In present study, the internally attributed factors are not directly measured. Out of the externally attributed control factors, information quality and system adaptability relate to the task-technology fit, while format quality and ease of navigation are related to the human-technology fit.

The lower-right corner of the matrix represents a situation where the sales configurator's fit with the task requirements is low due to incorrect product information or insufficient functionalities provided by it. As this lowers the work performance outcomes for all, this is a case of an external attribution. Poor navigability or format quality offered by the sales configurator's user-interface is also a case of an external attribution, but it relates to the human-technology interaction instead of the interaction between the technology and the task requirements. The upper-left corner represents internal attribution: this is the case where the respondent feels incapable of using the sales configurator while others could benefit from using it. Lastly, internal attribution is irrelevant for the task-technology fit considerations (upper-right corner), as the perceived inconsistency between the task requirements and the capabilities of the technology can't be attributed to internal reasons.

Table 6. *Examples of attributions related to work performance outcome attainment by using a sales configurator.*

	Human-technology fit	**Task-technology fit**
Internal attribution: Outcome attainment is not contingent on any response in her repertoire.	Respondent feels incapable of using the sales configurator due to lack of personal capabilities.	
External attribution: Outcome attainment is not contingent on a response in the repertoire of aynone.	Sales configurator's user-interface is poorly desgined.	Sales configurator provides poor quality information or insufficient functionailites.

Perceived usefulness and perceived enjoyment differ from the learning-related outcomes in their attribution scope. Specifically, perceived learning cost should be the same irrespective of whether the system provides high information quality or offers sufficient functionality to the user in every situation, as these factors are not related to the amount of effort required to learn how to use the tool. Similarly, perceived learning enjoyment should be concerned only with how easy the system is to interact with, and not with how good an output or adaptable a functionality one expects to get out of the system. When it comes to learning, a sales representative anticipates affective emotions based on how well (s)he is able to interact with the tool, whereas affective emotions related to use are based on how well the sales representative is able to accomplish her tasks with the tool (see chapter 4.2). Therefore, the attribution of the learning-related outcomes is only concerned with the human-technology aspect of fit.

In summary, the conceptual model divides variables into four distinct categories depending on the type of the perception:

1. **Intention** is assumed to capture the motivational factors that influence a behavior. It is an indication of how hard people are willing to try and of how much of an effort they are planning to exert in order to perform the behavior in question.
2. **Outcome expectations** are defined as a person's estimate that a given behavior will lead to certain outcomes. It is postulated that people form their intention based on their expectation of the outcomes that they would attain by conducting the behavior.
3. **Efficacy expectations** are defined as the conviction that one can successfully execute the behavior required to produce the outcomes. It is postulated that people expect certain level of outcome attainment out of a behavior based on their expectation on how well they are able to perform the behavior in question.

4. **Control factors** make performing the behavior in question easier or more difficult. It is postulated that people base their efficacy judgements on control factors by attributing the causes of their efficacy expectations onto external or internal sources of control.

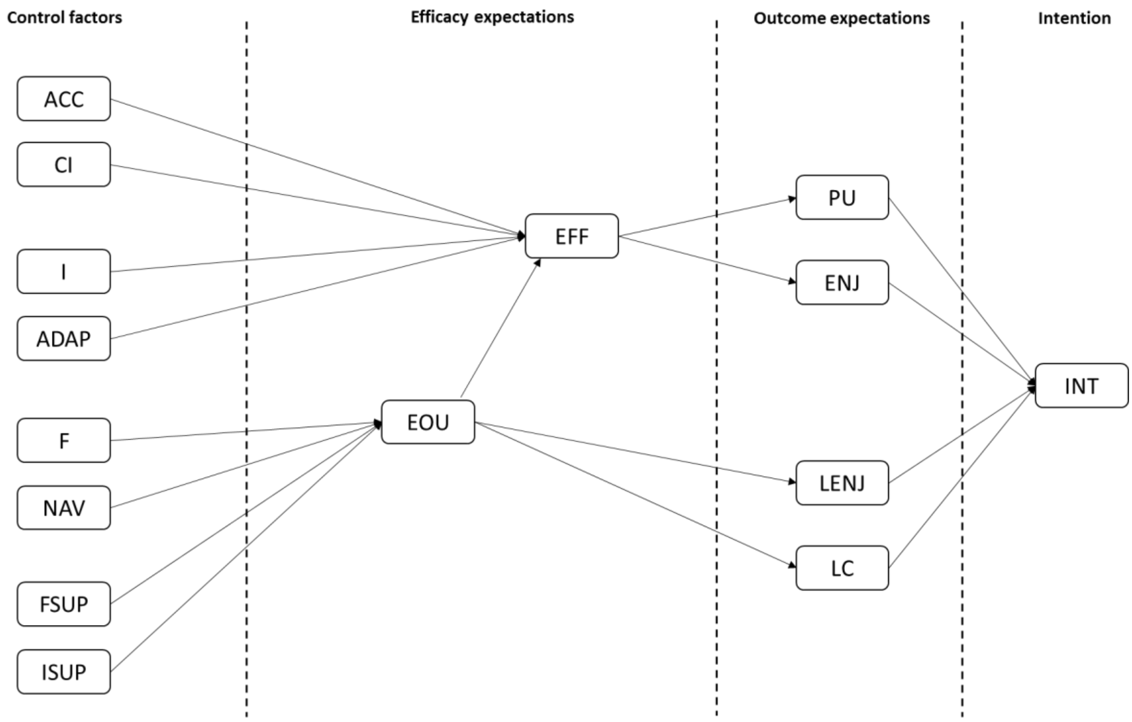


Figure 21. *The conceptual model of the study (INT = intention, PU = perceived usefulness, ENJ = perceived enjoyment, LENJ = perceived learning enjoyment, LC = perceived learning cost, EFF = perceived effectiveness, EOU = perceived ease of use, ACC = system accessibility, CI = Level of customer interaction, I = information quality, ADAP = system adaptability, F = format quality, NAV = ease of navigation, FSUP = formal support, ISUP = informal support).*

The effect from efficacy expectations to outcome expectations is two-fold: evaluative, in which case perceived outcomes are cognitively justified by the perceived level of efficacy, and affective, in which case affective responses are anticipated based on the comparison between the expected performance and the internal standards. The final conceptual model has been presented in figure 21.

4.5 The role of task importance

In addition to variables presented so far, perceived importance of the configuring task is likely to have a role to play in the intention formation process. The theoretical mechanism how it should affect it is, however, a difficult matter.

Ajzen (1991, p. 189) argues that behavior is a function of only salient information, or beliefs, relevant to the behavior. However, if a person believes that configuring products is of no relevance to her, then any belief concerning the system characteristics or other control factors is also of no relevance to her, nor to her behavior. In other words, it wouldn't matter to the person whether the system is the best tool ever created for configuring products, she would still choose not to configure products with it. Thus, when trying to predict the behavior of a target population, Ajzen (1991; 2002a; 2002b) recommends that salient beliefs would be elicited from the population itself: for example, the respondents could be asked to list all of the outcomes that are related to the target behavior, and only the most cited outcomes would be elicited for the actual measurement. Subsequently, the measure would contain two components, where importance represents the second component in addition to the belief strength (see chapter 3.2).

However, when the main interest is not on predicting the behavior of a target population, but to explain why the use of a particular system is seen positively or negatively by those who are the most potential users of it, a more suitable approach might be to remove any respondents to whom the behavior itself is of no importance out from the target population. Otherwise the beliefs of those who cannot relate to the target behavior might introduce bias to the correlations between intention, outcomes, efficacy expectations, and control factors.

Indeed, one of the reasons why perceived usefulness might have fared so well in attempts to predict behavioral intention in the information systems acceptance context is that it might tolerate respondents who think that the system or its use does not relate to them. After all, the respondents who cannot relate to the behavior in question would logically respond that the use of the system does not improve their productivity or work performance, and thus, perceived usefulness would correlate with behavioral intention even in this case. In fact, task importance has been shown to affect perceived usefulness in the information systems acceptance literature by Davis et al. (1992), Seddon & Kiew (1996), Venkatesh & Davis (2000), and Venkatesh & Bala (2008). Thus, low levels of perceived usefulness may not always be attributable to poor system design, but it can be attributed to the unimportance of the behavior to the respondent.

Importantly, although perceived usefulness has been shown to be the strongest predictor of behavioral intention in numerous studies, none of them seem to have excluded respondents to whom the behavior in question is irrelevant. In fact, many of the TAM studies have involved students as respondents, all of whom may not see the target technologies as a matter of importance to them. Interestingly, those studies involving students tend to more homogenous with their results, however, than studies involving respondents from a work context. (Legris et al. 2003, p. 202) This might suggest that TAM predicts behavioral intention well when some of the respondents perceive the target behavior as irrelevant to them, but fares less well when the target behavior is actually relevant for all the respondents.

Interestingly, when Taylor & Todd (1995b) grouped their 786 student respondents into two groups based on whether they had had prior experience with the target technology or not, they found that the success of their TAM-based model in explaining behavioral intention varied significantly: their model fared much better in explaining behavioral intention for the inexperienced users (60 % of the variance) than for the experienced group of respondents (43 % of the variance). Specifically, they found that perceived usefulness – intention link was the source of this difference. Consequently, they concluded that it is experience that has something to do with the intention formation process.

Taylor & Todd (1995b) might have missed an important factor that could have explained their results, however: they didn't take into account that people who have varying experience on the usage of a particular technology probably vary in the degree to which they think that the technology is actually relevant to them, too. Notably, while Davis et al. (1989) (who found quite the opposite effects between experience and the hypothesized linkages in TAM) studied the perceptions of the same sample population at three distinct points in time, Taylor & Todd (1995b) took a snapshot of the sample population and divided it based on earlier hands-on experience.

Thus, it could very well be that perceived usefulness predicted behavioral intention better for the inexperienced users as it might carry the meaning of task importance: that is, the respondents didn't think that the tasks that could be accomplished with the system would be relevant to them, and disagreed with the statements implying the attainment of separable outcomes. Consequently, high correlations between usefulness and intention would be expected, as they wouldn't intend to use the system either. In contrast, task importance might not have been such a strong factor among the experienced users: after all, these respondents probably wouldn't have used the systems before if the task it enables to accomplish would have been irrelevant to them. Consequently, as the perceived usefulness might not have carried the meaning of task importance anymore (or it wasn't as strong), a weaker correlation with behavioral intention might have been observed as a result. Therefore, it would be interesting to find out whether perceived usefulness is still the strongest predictor of behavioral intention, when only the respondents who can relate to the behavior are included in the sample population. After all, Ryan & Deci (2000) theorize that intrinsic motivation is, in fact, the strongest form of motivation.

If the above reasoning were true, it would be quite problematic for TAM. After all, what's the point of a model that best succeeds at predicting behavioral intention when the respondents don't have anything to do with the system? This would contradict with the very goals of the model, as its purpose is not only to predict behavior, but to assist the system designers by explaining the antecedents of the behavioral intention. Ideally, one would want to explain the observed level of intention with the characteristics of the technology, and not with the salience of the perceptions to the respondents. Thus, measuring perceived task importance is interesting not only for its implications for the overall distributor perceptions on the configuration task, but also for its potential role in the behavioral intention formation context.

5. METHODOLOGY

The current study focuses on the analysis of individual variables related to the research questions presented in chapter 1.2. As one of the objectives of the study was to provide a basis for further statistical analyses, however, methodological factors affecting the reliability and replicability of future analyses were also considered in the research design. The following chapters present the research setting and participants (chapter 5.1) and measures utilized in the study (chapter 5.2), and discusses the reliability of the measurement constructs (chapter 5.3).

5.1 Setting and participants

The research's target population is Finnish business-to-business distributor companies' workers who take part in the company's ordering or the selling processes. Target population's sampling unit consists of companies that sell capital goods, industrial components, or industrial services. Target population was restricted by company size and includes only companies that employ 5 to 100 workers.

Sample frame is a representation of the elements of the target population, and consists of a list or set of directions for identifying the population (Malhotra & Birks 2000, p. 67). In this study, sampling frame was a list acquired from *Finnish national authority for collecting and compiling statistics on various fields of society and economy* (a.k.a. Tilastokeskus). The list contained company information (e.g. company name, size, industry, contact details etc.) that was utilized for contacting the potential respondents. Sample frame was consisted of data from 1059 distributor companies.

When determining sample size, one should consider factors such as the nature of the research, the number of variables, the nature of the analysis, sample sizes used in similar studies, completion rates, as well as resource constraints (Malhotra & Birks 2000, p. 350). The sample sizes in technology acceptance studies vary from 50 participants all the way to Taylor & Todd's (1995a) total of 786 students, with Brown et al. (2010) representing one of the more recent studies with their sample of 447 workers. Two of the most similar studies in terms of the technology, Keil et al. (1995) and Agrawal & Prasad (1998) had samples of 118 salespersons and 76 salespersons respectively in their studies regarding configurator use. Two of the most well-known studies, Davis (1989) and Davis et al. (1989) had sample sizes of 112 workers and 107 students respectively. Indeed, literature review conducted by Legris et al. (2003) reveals that sample sizes are typically in the range of 50 to 300, with 22 out of 32 studies tapping into this range.

As the current study's data analysis is not as sophisticated in terms of statistical techniques as in the majority of information systems acceptance studies, a relatively small sample size would be acceptable (Malhotra & Birks 2000, p. 351). If it's assumed that the summated Likert scale responses are normally distributed in the target population, the required size of the sample can be estimated by calculating the (student's distribution) confidence intervals for the mean. Table 7 gives examples of the confidence intervals (with 95 %) with different standard deviations with a sample size of 100 for a summated Likert scale with scores ranging from 4 (1 times 4) to 28 (7 times 4). As can be seen from the table, a sample size of 100 would be reasonable for the purposes of this study, taken that the population variance is not especially high. Thus, taking the confidence intervals for the mean and the resource constraints into account, a sample size target was set around 100 units (for the final sample).

Table 7. *Confidence interval 95 % for the mean with differing standard deviations.*

stdev	n	t(0,025; n)	+/-
2	100	1,984	0,397
4	100	1,984	0,794
6	100	1,984	1,190
8	100	1,984	1,587

Sample itself was obtained from the sample frame by simple random sampling method. In simple random sampling, each element in the population has a known probability of selection. Furthermore, each possible sample of a given size (n) has a known and equal probability of being the sample actually selected. Some of the benefits of simple random sampling include that it is easily understood, the sample results may be projected to the target population, and most approaches to statistical inference assume that the data have been collected by simple random sampling. (Malhotra & Birks, pp. 357-358) Probability sampling, such as simple random sampling, is preferable (to non-probabilistic sampling techniques) from a statistical viewpoint, as it is the basis of most common statistical techniques (Malhotra & Birks 2000, p. 365).

Out of the 1059 companies included in the sample frame, 712 were contacted prior to sending the questionnaire by phone. The respondents were contacted in order to identify the suitable respondents within the companies. After contacting each company, individual respondents were contacted (also by phone) to get their commitment for completing the survey. The questionnaire was sent only to those who agreed to complete the questionnaire. In total, the questionnaire was sent to 353 respondents who agreed to participate in the survey. Follow-ups were sent to the respondents three times after the initial request in order to increase response rates. The requests to take part in the survey were sent via e-mail, and the actual questionnaire took part in a web-service (which the participant could access via her web-browser).

Out of the 353 respondents, 147 participants (41,6 %) sent their responses for analysis. A questionnaire returned from the field may be unacceptable, however, if the pattern of responses indicates that the respondent didn't understand the question, there are responses missing, or the responses show little variance (Malhotra & Birks 2000, p. 427). Three responses showed unacceptable levels of variance, as almost all of the given values were put in the middle of the Likert scale. Subsequently, the responses were discarded from the final sample. Furthermore, pretests indicated that should the questionnaire be completed with reasonable thought, it couldn't be done in less than 10 minutes. Consequently, responses completed in under 10 minutes (13 in total) were discarded from the final sample, leaving 130 units for further analysis.

Out of the 130 respondents, 29 didn't answer to all of the questions, leaving either single items within a scale unanswered, of didn't answer to a particular measure at all. These type of cases may be handled either by assigning missing values, or by discarding unsatisfactory responses. However, treatment of missing responses poses problems, particularly if the if the proportion of the missing responses is more than 10 percent (Malhtora & Birks 2000, p. 435).

By substituting an imputed response, the respondents' pattern of responses to other questions is used to impute or calculate a suitable response to the missing questions. This approach, however, can introduce bias. In casewise deletion, cases or respondents with any missing responses are discarded from the analysis. Because many respondents may have some missing responses, this approach could result in a small sample. Furthermore, respondents with missing responses could differ from respondents with complete responses in systematic ways. If so, casewise deletion could also bias the results. In pairwise deletion, instead of discarding all cases with any missing values, the researcher uses only the cases or respondents with complete responses for each calculation. (Malhotra & Birks 2000, pp. 435-436)

In order to avoid serious bias in the results, imputed response was substituted only in cases where one of the several scale items was left unanswered; after all, the items within a scale should correlate highly with each other. This was done by calculating the mean of the other scale responses, and substituting the result with the missing value. In cases where the whole scale or majority of scale items were left unanswered by the respondent, pairwise deletion was utilized. Utilizing these methods, 25 missing responses were substituted with mean values of other items within the same scale, while 11 responses to complete scales were deleted altogether from further analyses. Consequently, after mean value substitutions and pairwise deletions, final response rates to single scale items ranged from 127 to 130 (out of 130).

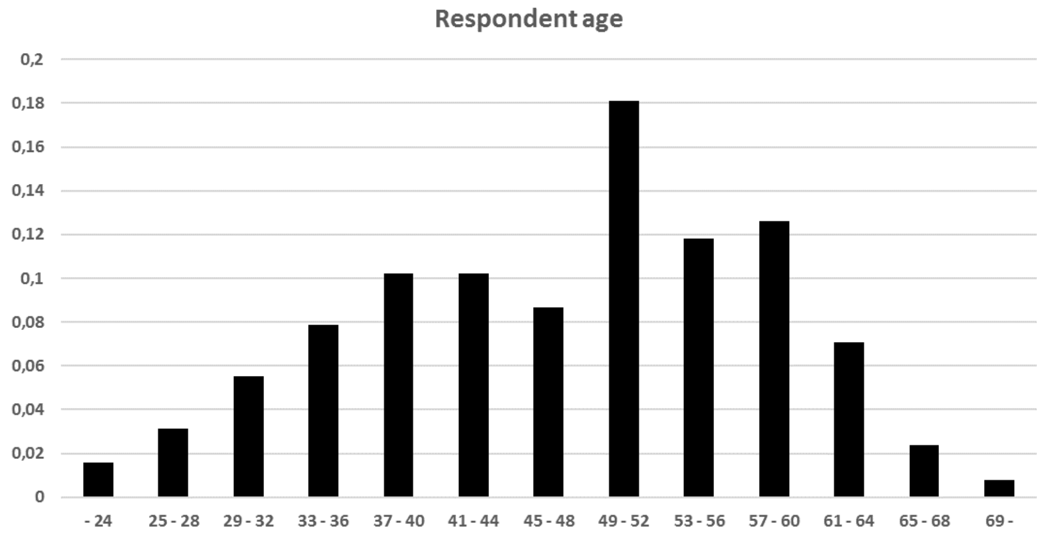


Figure 22. *Age distribution of the respondents (N = 130).*

Out of the 130 respondents, 94 were men (72,3 %) and 36 (27,7 %) were women. Majority of the respondents were between 41 and 60 years old (61,4 %). Respondents' age distribution is presented in the above graph. Respondents represented a variety of industries – e.g. machine tools, automation, hydraulics and pneumatics, electronics, ICT and software, paper, construction, office appliances, marine industry, etc. – with industrial machinery, electronics, and information & communication technology being the most frequently represented industry sectors in the sample. Figure 23 shows distribution of different industries, categorized according to the classification of *Finnish national authority for collecting and compiling statistics on various fields of society and economy* (a.k.a. Tilastokeskus).

Other industrial machinery B2B-sales category includes companies selling machine products utilized directly in production – such as robots, process machinery, printing machinery, etc. *Other non-classified machinery B2B-sales* category includes companies selling machine products utilized in other types of professional business than direct production, such as forklifts, cranes, hydraulic devices, pumps, cleaning appliance, safety equipment, etc. Businesses in *machine tools B2B-sales* category sell mainly machine tools and their appliances for a variety of industrial uses, including lathes, drilling machines, etc. *Mining and construction machinery B2B-sales* category consists of businesses which sell heavy machinery such as mining machinery and bulldozers for the mining and construction industries, but also lighter equipment such as power tools, scaffolding, etc. (Tilastokeskus 2016)

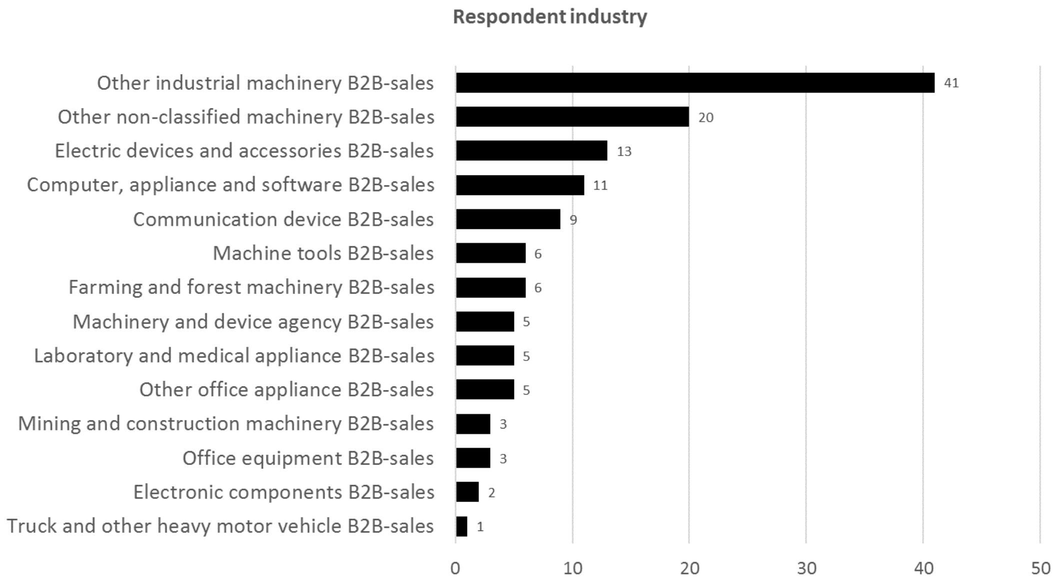


Figure 23. *Respondent industries according to the classification of Finnish national authority for collecting and compiling statistics on various fields of society and economy (a.k.a. Tilastokeskus) (N = 130).*

Electric devices and accessories B2B-sales category includes companies that sell mainly electrical equipment, accessories, motors, generators, transformers, etc. Companies in the *electronic components B2B-sales* category sell equipment such as vacuum tubes, semiconductors, circuit boards, etc. Businesses in *computer, appliance and software B2B-sales* category sell computers and appliances, as well as software for other businesses, while businesses in *communication device B2B-sales* category sell phones, radios, and other communication equipment to other businesses. (Tilastokeskus 2016)

Farming and forest machinery B2B-sales category includes companies that sell machinery such as harvesters, tractors, milking machines, forest machines, etc. for agriculture. Businesses in *laboratory and medical appliance B2B-sales* category sell different kinds of products for medical and laboratory applications, such as dentist instruments, prosthetics, orthopedic devices, hospital equipment, etc. Businesses in the categories of *office equipment B2B-sales* and *other office appliance B2B-sales* sell various products for business premises, such as office furniture, counters, office printers, cash registers, etc. Finally, businesses in the *truck and other heavy motor vehicle B2B-sales* category sell heavy motor vehicles for other businesses, such as logistics companies. (Tilastokeskus 2016)

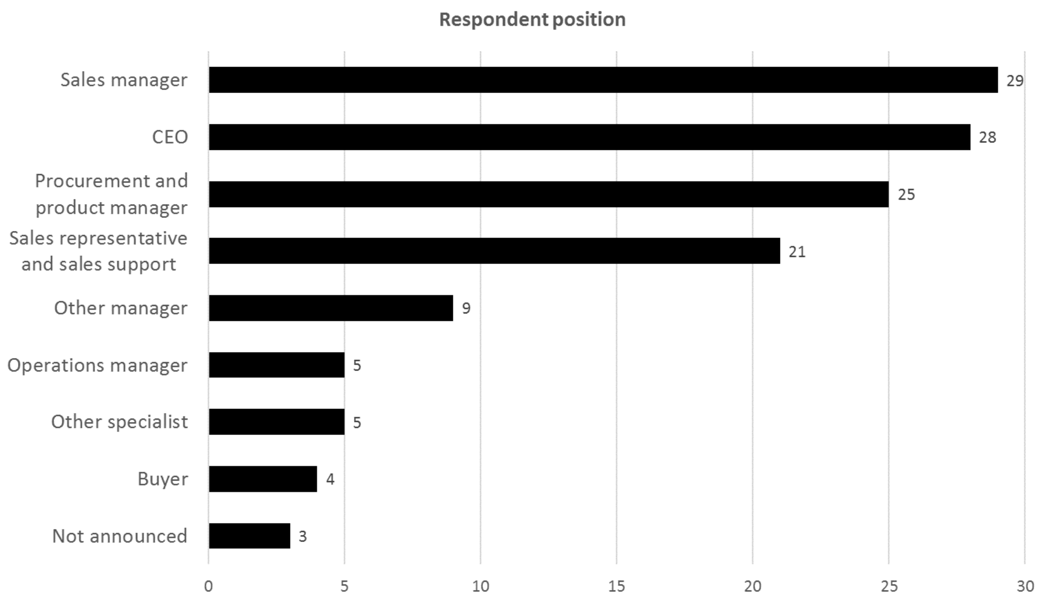


Figure 24. *Respondents' work position distribution (N = 130).*

The respondents reported their work title at the beginning of the questionnaire, and the respondents were divided into nine categories based on their answers. The sales managers category includes those who reported themselves to be account managers, sales managers, area or territory managers, marketing managers, or customer service managers. The procurement and product manager category includes respondents who reported their work title to be a head of customer solutions, a product manager, a technical manager, a procurement manager, or a maintenance manager. The sales representative and sales support category includes respondents with a self-reported titles of a salesperson, a sales assistant, a sales engineer, or a sales support worker, whereas the buyer category includes those with a title of a buyer. The operations manager category includes those who were a head of logistics, an operation manager, or a department manager. CEOs were categorized into their own category, as their job description includes a great variety of roles and responsibilities. Those who did not fit into any of these categories was categorized either to the other manager or other specialist category depending on whether they were in a managerial position or not.

Majority of the respondents were working in some type of a managerial position in their companies. 21,5 % of the respondents were their company's CEO, 22,3 % were included in the sales managers category, and 19,2 % of the respondents reported themselves to work as a procurement manager, a product manager, or the like. 16,2 % of the respondents reported that they were working as a sales representative, or in a sales supporting role. The remaining respondents were either operations managers or the like, other managers, buyers, other specialists, or did not announce their role in their company. The respondents' work position distribution is depicted in figure 24.

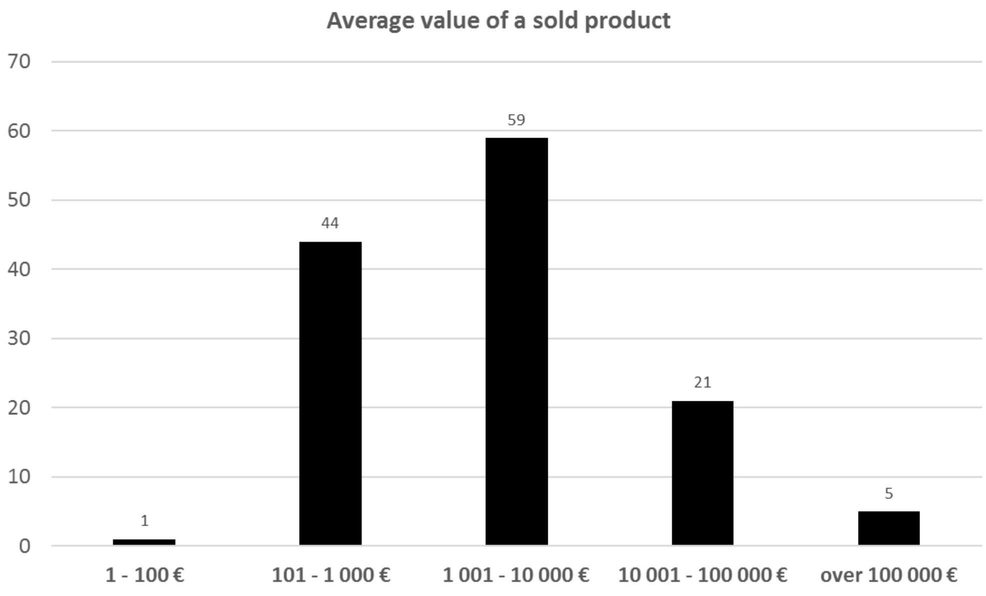


Figure 25. *Average value of a sold product by the respondents' company (N = 130).*

The respondents were also asked what is the average value of the products the respondent's company sells, with most of the companies (61,5 %) falling in the range between 1.001 and 100.000 euros. The distribution of the average value of the products sold is depicted in figure 25.

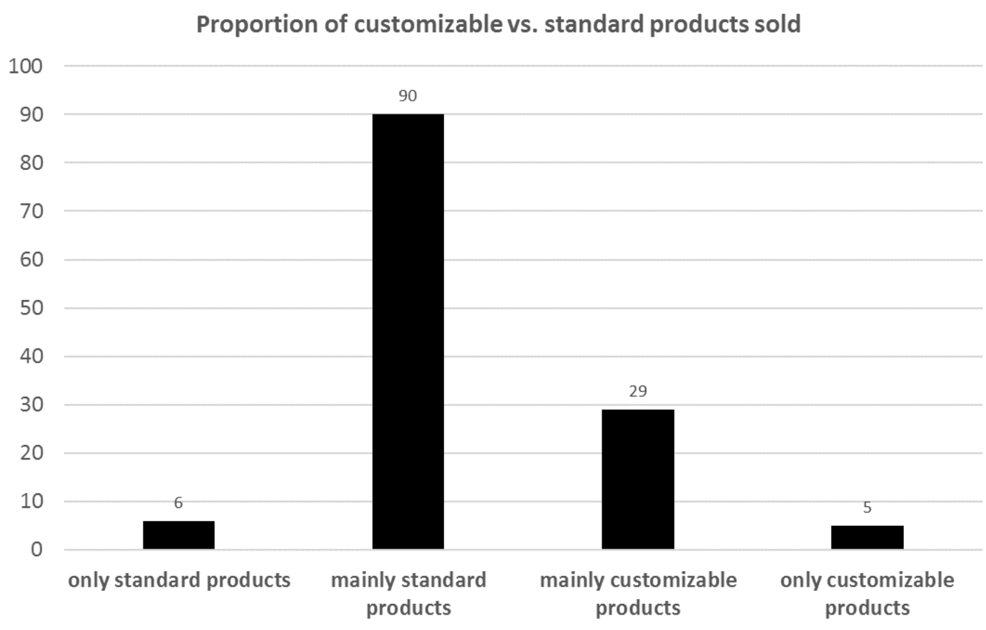


Figure 26. *Type of the products sold by the respondents' company in terms of whether the product is a standard off-the-shelve product or a case-by-case customizable product (N = 130).*

Most of the companies (69,2 %) were reported by the respondents to sell mainly standard off-the-shelve products, with 20 % reporting that they sold mainly or only customizable products. 4,6 % of the respondents reported that they sell only standard products. The distribution of the product type is depicted in figure 26. When asked how much configuring is included in one's work, 21,5 % of the respondents indicated that their job includes configuring either quite much or very much, with 78,5 % responding not at all, somewhat little, or not little nor much. The distribution of responses is depicted in figure 27.

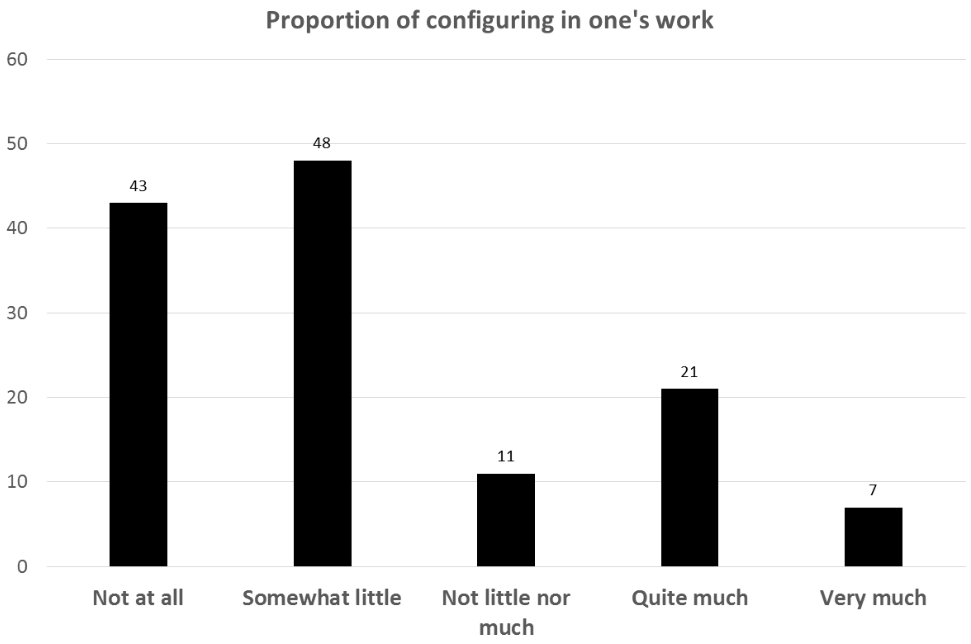


Figure 27. *Proportion of configuring in one's work. (N = 130)*

Next, measurement methodology and measures are discussed in more detail.

5.2 Measurement

Ideal innovation characteristics studies should utilize replicable and potentially reliable measures of innovation characteristics. Unless other researchers can replicate a given study's operations and instrumentation, the comparability of the findings cannot be assessed. (Tornatzky & Klein 1982, p. 29) Mere reliability, however, is not enough: the measurement scales should be valid.

The validity of a scale may be defined as the extent to which differences in observed scale scores reflect true differences among objects on the characteristic being measured, rather than systematic or random error (Malhotra & Birks 2000, p. 307). Content validity is a subjective but systematic evaluation of how well the content of a scale represents the measurement task at hand. In order to amplify content validity, researchers should begin by formulating conceptual definitions of what is to be measured and preparing items to fit the construct definitions. (c.f. Davis 1989, p. 323) Following this recommendation, measurement scales have been developed based on their conceptual definitions, as depicted in tables 8 and 9.

The development of the survey items included several steps. First, definitions for the underlying latent variables were specified. Based on the definitions, validated measurement items were compiled from the literature when the construct allowed it, and wording was modified to fit the sales configurator context. Questionnaire items were developed while keeping in mind that they should be focused, brief, simple, and unambiguous (Burns & Bush 2006, p. 303; Davis 1989, p. 328). Before implementing the survey, the researcher and two academics (with knowledge of survey design) tried to identify any problems with instruments' wording, content, or format, and as a result, any constructs or items that were poorly defined or worded were removed or reworded. The final items within each scale have some overlap in their meanings, which is consistent with the fact that they are intended as measures of the same underlying latent variable. The goal of this approach is to allow idiosyncrasies to be cancelled out by other items in order to yield a purer indicant of the conceptual variable. (Davis 1989, p. 324)

All the measurement items presented in tables 8 and 9 utilized a seven-point Likert scale ranging from strongly disagree to strongly agree, which corresponds to several other studies in the information systems acceptance literature (e.g. Brown et al. 2010; Cheung & Vogel 2013; Grandon & Pearson 2004; Jelinek 2006; Keil et al. 2005; Moore & Benbasat 1991; Schwillewaert et al. 2005; Venkatesh & Davis 2000; Venkatesh & Bala 2008). The Likert scale's advantages include that it's easy to construct, and that the respondents readily understand how to use the scale, making it suitable for various types of interview contexts (Malhotra & Birks 2000, p. 297).

As discussed in chapters 3.2 and 3.4, Ajzen (1991, 2002) calls for a measurement approach where two variables are multiplied together to form an index in determining the belief and its self-stated strength. However, this poses several problems as discussed by Davis (1993, p. 477). First, multiplying two variables together assumes the variables are scaled at the ratio level of measurement, which is not usually the case with psychological ratings (Ajzen 2002b, pp. 10-11). Second, people may not combine expectancies and values multiplicatively. In order to avoid these problems, Davis (1993, p. 477) argues for the use of statistically estimated weights, especially as they have been shown to predict attitude as well as or better than self-stated measures. Following Davis's (1993) argumentation, and keeping further statistical analyses in mind, this study employs measures that permit the use of statistically estimated as opposed to self-stated weights.

Table 8 depicts the constructs for intention, outcome expectations, and efficacy expectations, along with the sources of the measurement items. Measurement items for measuring intention were developed utilizing Ajzen's (2002b) instructions and examples. Several studies in the information systems acceptance literature measure intention, and usually the items have been worded as "*I intend to use* [information system]" or in a similar manner. Sometimes the time of use (e.g. "*…this term*", or "*…over the next year*", see Taylor & Todd 1995a and Wixom & Todd 2005), or frequency of use (e.g. "*…at every opportunity*" or "*…regularly*", see Jelinek et al. 2006 and Wixom & Todd 2005) has been explicitly included in the items. In addition, comparisons (e.g. "*I will use* [information system] *rather than manual methods…*", see Mathieson 1991 and Dishaw & Strong 1999) have sometimes been added to the measurement items.

Table 8. *Measures' definitions for intention, outcome expectations, and efficacy expectations, and the sources for the questionnaire items.*

Construct	Definition	Measurement items
Intention	Indication of how hard people are willing to try, and of how much of an effort they are planning to exert, in order to perform the behavior in question.	*Adpated from:* Ajzen (2002b)
Perceived usefulness	The degree to which an individual believes that using the system for her work tasks will help her to attain gains in work performance.	*Adapted from:* Davis (1989) Keil et al. (1995) Venkatesh & Bala (2008)
Perceived enjoyment	The degree to which using the system is perceived to be more enjoyable than other methods for the individual, apart from any performance consequences that may be anticipated.	*Adapted from:* Chang & Cheung (2001)
Perceived learning cost	The degree to which an individual believes that learning to use the system will (not) cause opportunity costs because of lost time and effort.	*Self-developed*
Perceived learning enjoyment	The perceived degree to which the learning of how to use the system is enjoyable for the individual in its own right, apart from any performance consequences.	*Adapted from:* Chang & Cheung (2001)
Perceived effectiveness	The respondent's perception of how well (s)he is able to perform the tasks in question with the information system in her work.	*New scale based on:* Mathieson & Keil (1998)
Perceived ease of use	The respondent's perception of how well (s)he is able to interact with the information system.	*Adapted from:* Davis (1989) Venkatesh & Bala (2008)

Here the time of use is not relevant, as only general attitudes toward the sales configurator are being measured: adding "*…over the next year*" in the end of the question wouldn't make the answer any more interesting nor informative. Similarly, frequency of use is not something of interest in the context of this study. Including the concept of frequency in the question would be based on the assumption that more frequent use is necessarily better. This is not, however, always the case, as only productive use is valuable (Ahearne et al. 2005; Seddon 1997). Consequently, asking how strongly the respondent feels that he or she would use the sales configurator *at every opportunity* is not very interesting. The comparison aspect is also unnecessary (or even fallible), as intention measures the absolute effort one expects to exert to the behavior in question. Thus, intention is measured here by four relatively short items listed in Appendix A (along with all of the measurement scales and items).

Perceived usefulness items were adapted from Davis (1989). The scale was shortened to four instead of six items, which corresponds with TAM3 (Venkatesh & Bala 2008). The 6^{th} item of TAM ("*I would find* [information system] *useful in my job*") was removed from the scale as it's not explicitly an outcome expectation. Moreover, the term "useful" can be assessed along many different dimensions and thus may also be too general a question (Chin & Gopal 1995, p. 55). The item was replaced by item "*using a sales configurator for configuring products would increase the quality of my work*" adapted from Keil et al.'s (1995) perceived usefulness measurement scale utilized in a configurator context in their study.

Perceived enjoyment items were adapted from Chang & Cheung (2001). A four-item scale was used for measuring the expected feelings of enjoyment, pleasantness, interest, and excitement out of sales configurator use. It is worth noting that the perceived usefulness items represent a comparison between the current and expected future states: for example, the item ("*using [information system] in my job would improve my work performance*") implies that there will be an increase in work performance in the future. However, typical measures of perceived enjoyment simply imply that certain behavior is either enjoyable or unenjoyable (e.g. Chang & Cheung 2001; Compeau & Higgins 1999; Davis et al. 1992). However, as perceived enjoyment is an outcome expectation, it might be more appropriate to use measures that imply an improvement to the current state of affairs. Specifically, the information system is usually a substitute for some other means when accomplishing certain tasks. Therefore, the degree to which the sales configurator would make the task of product or service configuring more enjoyable *than with the current methods*, is measured. All else being equal, the user should prefer to use the method that is more enjoyable than the other, even though the method in question would not be characterized as *enjoyable in its own right* by the respondent.

Perceived learning cost items were self-developed, although they were somewhat motivated by Thompson et al.'s (1991) measurement items for their complexity construct. They (p. 129) conceptualize complexity as an opposite to perceived ease of use, but include measurement items such as "*using a PC takes too much time from my normal duties*" and "*it takes too long to learn how to use a PC to make it worth the effort*", both of which could (quite rightfully) be interpreted as negative outcome expectations as opposed to efficacy expectations. Perceived learning cost is measured by a four-item scale (see Appendix A).

Perceived learning enjoyment items were adapted from Chang & Cheung (2001) in a similar manner as perceived enjoyment items. However, here the four items do not measure comparison to other configuration methods, as the other methods – if they exist at all – are likely to be in use already, and do not necessitate learning. Therefore, the learning of a new system is likely to be considered as an extra effort, the attractiveness of which is partly determined by the perceived enjoyment derived out of the learning in its own right.

Perceived effectiveness was measured by a five-item scale that was self-developed, although the scale was based on the scale developed by Mathieson & Keil (1998). As discussed earlier, their perceived ease of use scale did not fall in the domain of interacting with the information system, but accomplishing tasks with it. Here the perceived effectiveness scale items refer to the perceived efficacy in configuring products quickly and efficiently, creating accurate and high-quality product configurations, and showcasing products to the customer with the sales configurator. Perceived ease of use items were adapted from Davis (1989) and Venkatesh & Bala (2008), and the construct was measured with a four-item scale.

Table 9 depicts the control factors along with the sources of their measurement items. System accessibility scale is a new scale that is primarily based on Bailey & Pearson's (1983) *convenience of access* (i.e. the ease or difficulty with which the user may act to utilize the capability of the computer system) scale. Another basis for the scale is Mathieson et al.' (2001) perceived resource scale, that includes items referring to the equipment required to utilize the information system. Furthermore, Taylor & Todd's (1995a) facilitating conditions scale includes items referring to the ease or difficulty of accessing the system. A four-item scale was developed in order to measure the construct.

No pre-defined measurement scales related to the level of customer interaction measure could be found from the literature. This is somewhat surprising, as the inability to get proper input information (when the task accomplishment requires information from others) might be one of the underlying reasons for low utilization for many information systems. Although concepts such as task interdependence (i.e. dependence on others in task accomplishment) exist in the information systems acceptance literature, the construct is associated with information seeking from knowledge repositories. When task interdependence is associated with information seeking from such systems, higher task interdependence would imply more usage. (see Järvenpää & Staples 2000; Kankahalli et al. 2005) However, task interdependence in this regard is conceptually very much different a construct than level of customer interaction. Thus, a new four-item scale was developed for measuring the perceived degree to which getting the desired product specifications from the customer is easy or difficult.

Table 9. *Measures' definitions for the control factors and the sources for the questionnaire items.*

Construct	Definition	Measurement items
System accessibility	The perceived ease of accessing the information system.	*New scale based on:* Bailey & Pearson (1983) Mathieson (2001) Taylor & Todd (1995)
Level of customer interaction	The perceived ease of getting the required product specifications from the customer.	*Self-developed*
Information quality	The perceived degree to which the information system provides information that matches with the requirements of the task in question.	*Adapted from:* Seddon & Kiew (1996) Kankahalli et al. (2005)
System adaptability	The perceived degree to which the system adapts to changes in task requirements.	*New scale based on:* Bailey & Pearson (1983) Iivari & Koskela (1987) Wixom & Todd (2005)
Format quality	The preceived degree to which the information that the system provides is easy to interpret.	*New scale based on:* Bailey & Pearson (1983) Iivari & Koskela (1987) Wixom & Todd (2005)
Ease of navigation	The perceived degree to which the information system allows easy navigation.	*New scale based on:* Aladwani & Palvia (2001) Palmer (2002) Yang et al. (2005)
Formal support	The perceived degree to which the organization or the supplier offers training and technical support to assist the respondent when facing difficulties in configurator operation.	*New scale based on:* Bailey & Pearson (1983) Compeau & Higgins (1995) Goodue & Thompson (1995) Schwillewaert et al. (2005)
Informal support	The perceived degree to which the respondent's co-workers would assist the respondent when facing difficulties in configurator operation.	*New scale based on:* Compeau & Higgins (1995)

Measurement scale for information quality was adapted from Seddon & Kiew (1996) and Kankahalli et al. (2005). Seddon & Kiew's (1996) scale included items referring to information accuracy, completeness, comprehensiveness, currency, timeliness, and preciseness (among others), while Kankahalli et al.'s (2005) scale was consisted of items referring to trustworthiness, accuracy, relevancy, currency, and timeliness of output information. An eight-item scale was formed out of the two scales including items referring to information comprehensiveness, completeness, preciseness, relevancy, accuracy, trustworthiness, correctness, and currency.

A four-item measurement scale was developed for measuring system adaptability. The scale was based on Bailey & Pearson's (1983) and Wixom & Todd's (2005) flexibility scales, as well as on Iivari & Koskela's (1987) concept of system adaptability. The flexibility and adaptability concepts both refer to the information system's capability to adapt to new conditions, demands, or circumstances. Thus, the adaptability items refer to the degree to which the sales configurator functionality meets with and adapts to varying configuring needs and situations.

Like system adaptability scale, format quality scale was developed by utilizing Bailey & Pearson's (1983) and Wixom & Todd's (2005) format quality scales as a basis, as well as Iivari & Koskela's (1987) conceptualization of information interpretability. While information quality refers to the information content, format quality refers to the way information is presented by the system. Format quality is measured by a four-item scale that refers to the expected clearness and understandability of information presented by the system, as well as the ease of interpreting the information.

Ease of navigation scale was developed on the basis of navigability scales proposed by Aladwani & Palvia (2001), Palmer (2002), and Yang et al. (2005). However, whereas Yang et al. (2005) utilized items measuring perceptions on specific design characteristics of the user-interface (such as the organization of hyperlinks), a scale with such a low level of abstraction is not feasible here, as the measurement items cannot refer to any specific system, but sales configurators in a more general sense. Thus, a three-item scale was developed measuring the expected ease, fluentness, and effortlessness associated with navigating a sales configurator.

Measurement scale for formal support is based on the training scales developed by Bailey & Pearson (1983), Goodhue & Thompson (1995), and Schwillewaert et al. (2005), technical support scale developed by Schwillewaert et al. (2005), and organizational support scale developed by Compeau & Higgins (1995) that measures the extent to which assistance is available in terms of hardware and software difficulties, among others. A six-item scale was developed in order to measure the aspects of formal support in information system learning and usage.

Informal support scale is also based on the organizational support scale developed by Compeau & Higgins (1995): as a part of the scale, they asked the respondents the extent to which their coworkers were a source of assistance in overcoming difficulties. Here, however, informal support scale is separated from formal support and extended to a three-item scale, referring to the expected degree to which one's co-workers would readily support leaning and assist in difficulties related to configurator operation.

Other measures than those listed in tables 8 and 9 (and chapter 5.1) included measures for configuration task importance, as well as questions for whether the respondent has heard of sales configurators before, has one used a sales configurator before, and has one used a sales configurator before in her work for submitting orders. In addition, the respondents were asked to report their usage intensity of digital tools related to their supplier relationships. Measurement scale for task importance is extended and adapted from Davis et al.'s (1992) measurement scale, and is measured here by four items utilizing a seven-point Likert scale (from strongly disagree to strongly agree).

Simple yes-no scaling was utilized with questions regarding whether the respondent has heard of sales configurators before, and whether (s)he has used one before. The respondents were also asked to pick the technologies which they had used previously in their work for submitting product orders, with one of the options being a sales configurator. The digital tools usage intensity in supplier relationships was measured by a five-point Likert scale ranging from "not at all" to "very much".

Questionnaire itself was divided into several parts. Questions early in the sequence were relatively simple and easy to comprehend, and the complexity of the questions gradually increased toward the end. All the questions that dealt with a particular topic were asked before beginning a new topic. When switching topics, brief transitional phrases were used to help respondents switch their train of thought, as recommended by Malhotra & Birks (2000, p. 333). The idea of sales configurators was introduced to the respondents with a brief illustration (see Appendix B) accompanied by an explanation before the respondents were asked to answer questions related to the issue. On average, completing the questionnaire took around 20 to 25 minutes by the respondents.

5.3 Construct reliability

Reliability refers to the extent to which a scale produces consistent results if repeated measurements are made. Reliability is assessed by determining the proportion of systematic variation in a scale. This is done by determining the association between scores obtained from the different administrations of the scale. If the association is high, the scale yields consistent results and is therefore reliable. Internal consistency scale is used to assess the reliability of a summated scale where several items are summed to form a total score. A popular approach to assess the reliability of a summated scale is to use the coefficient alpha (i.e. Cronbach's alpha). This coefficient varies from 0 to 1, and a value of 0.6 or less generally indicates unsatisfactory internal consistency reliability. (Malhotra & Birks 2000, pp. 305-307) Cronbach's alpha can be calculated using the following formula:

$$\alpha = \frac{K}{K-1}\left(1 - \frac{\sum_{i=1}^{K} \sigma_{Y_i}^2}{\sigma_X^2}\right) \tag{7}$$

where σ_X^2 is the variance of the observed total test scores, $\sigma_{Y_i}^2$ is the variance of component *i* for the sample of respondents, and *K* is the amount of measurement items.

The summated scales' internal consistency coefficients have been presented in table 10. As can be seen from the table, the coefficient alphas are very high, suggesting high reliability of the measurement scales. For the summated scales not included in the model presented in chapter 4.4, task importance attained Cronbach's alpha of .94.

Table 10. *Measurements scales' internal consistency coefficients (Cronbach's alpha). Only respondents with complete answers to all of the questions were included in the analysis (N = 101).*

Measurement scale	Cronbach's alpha
System accessibility	0,92
Level of customer interaction	0,95
Information quality	0,93
System adaptability	0,92
Ease of navigation	0,97
Format quality	0,95
Formal support	0,92
Informal support	0,97
Perceived ease of use	0,93
Perceived effectiveness	0,94
Perceived learning enjoyment	0,92
Perceived learning cost	0,95
Perceived enjoyment	0,94
Perceived usefulness	0,96
Behavioral intention	0,96

High coefficient alpha values are common in the information systems acceptance literature, as well. For example, Davis' (1989) perceived usefulness scale attained Cronbach alphas of .97 in two studies, Keil et al.'s (1995) scale .94 and .95 in pre- and post-deployment studies, while Venkatesh & Bala's (2008) perceived usefulness scale attained Cronbach alphas of .92, .94, and .94 at T1, T2, and T3. Perceived enjoyment scale by Davis et al. (1992) attained Cronbach alphas of .81 and .92 in two distinct studies, Compeau & Higgins's (1995) affect scale attained Cronbach's alpha of .87, while Chang & Cheung's (2001) affect scale attained Cronbach alpha of .83.

For perceived ease of use, Davis' (1989) scale attained Cronbach alphas of .86 and .91, while Venkatesh & Bala's (2008) scale achieved .93, .90, and .93 at T1, T2, and T3. Mathieson & Keil's (1998) measurement scale attained Cronbach's alpha of .90. For information quality, Kankahalli et al.'s (2005) scale (termed as perceived output quality) attained Cronbach's alpha of .97, while Seddon & Kiew's (1996) scale attained coefficient alpha value of .95. Thus, alpha values attained in the present study are similar to those of reported in the information systems acceptance literature.

6. RESULTS

The results for the corresponding research questions are presented in this chapter. First, chapter 6.1 presents the results related to the first research question, that is "*What is the degree of familiarity of sales configurators to the distributor representatives in the Finnish B2B-market?*". The second chapter presents the results for the measured attitudes toward a sales configurator, and thus it relates to the second research question: "*How do the distributor representatives perceive sales configurators?*".

Chapter 6.3 examines the results for the factors that divide the research population into distinct groups with respect to their attitudes toward a sales configurator. Particularly, two factors – previous hands-on experience with a sales configurator, and perceived importance of the configuring task in one's work – are examined. As this examination will reveal that perceived task importance has a strong influence on the way a sales configurator is perceived by a distributor representative, the factors influencing task importance are examined in chapter 6.4. Finally, chapter 6.5 sums up the most important results of the study, before discussing them in depth in chapter 7.

6.1 Sales configurator familiarity

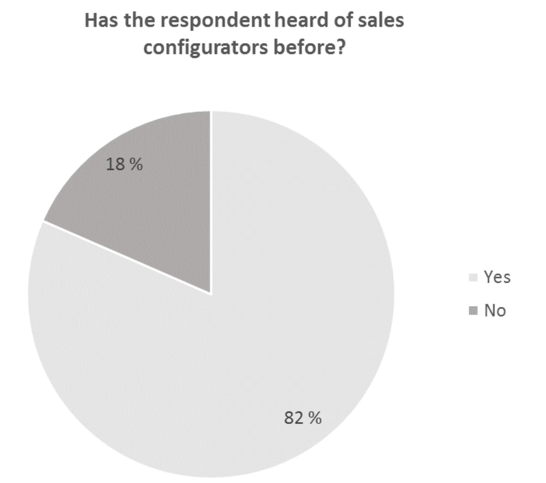
First, the respondents were asked what is their usage intensity of digital tools in general. The type of the digital tools was not specified in any other means than that the tools should somehow be related to the management of the supplier relationship. The results showed that 71,5 % of the respondents use digital tools in their supplier relationships either quite or very much, while only 16,9 % of the respondents use digital tools in their supplier relationships either somewhat little, or not at all.

When asked whether the respondent had heard of sales configurators before, 81,5 % of the respondents (106 out of 130) answered "yes", with rest of the respondents answering "no". When asked whether the respondent had used a sales or a product configurator before, 60,9 % of the respondents responded "yes", while 39,1 % responded "no" (see figure 28).

The 95 % confidence interval for a binomial distribution can be calculated with the following formula:

$$\textit{Confidence interval} = p \pm 1{,}96 \times \sqrt{\frac{p(1-p)}{n}} \qquad (8)$$

where *p* denotes the percentage answering "yes", and *n* denotes the sample size (Burns & Bush 2006, pp. 368-370). Thus, for the question whether the respondent has heard of a sales configurator before, the 95 % confidence interval was 81,5 ± 6,8 %. Similarly, the 95 % confidence interval was 60,9 ± 8,5 % for the "yesses" to the latter question: thus, it is safe to say that within the population, over half of the respondents have use a sales or product configurators before.



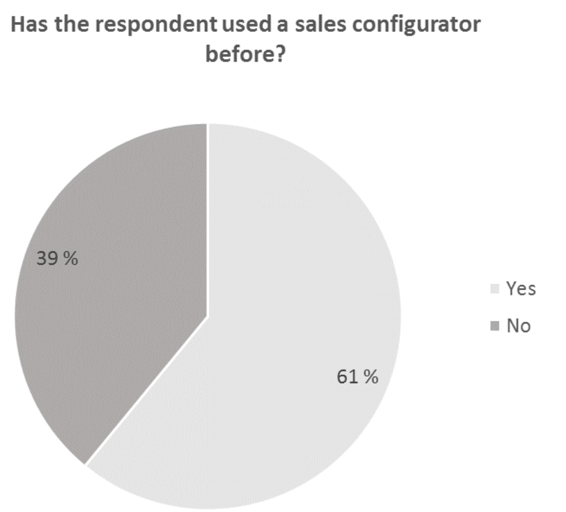


Figure 28. *The results for whether the respondent has heard of sales or product configurators before (N = 130), and whether the respondent has used a sales or product configurator before (N = 128, two respondents didn't respond to the question).*

When asked which methods or technologies the respondents had used for submitting product orders to the supplier in their job, 24,6 % (32 out of 130) responded that they had used a supplier's sales configurator (see figure 29). With a sample size of 130, the 95 % confidence interval for the result was 24,6 ± 7,4 %.

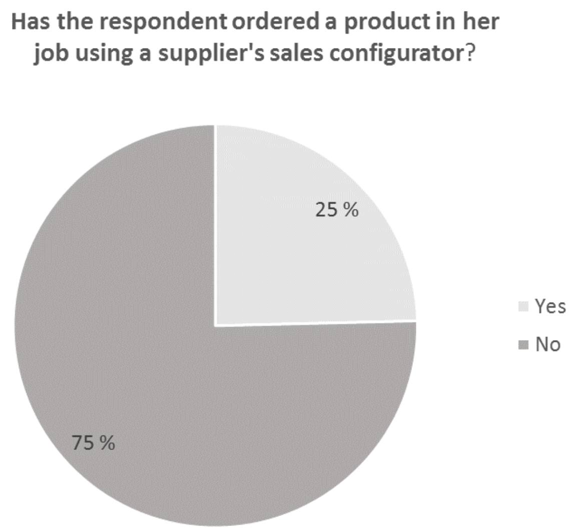


Figure 29. *Has the respondent used a supplier's sales or product configurator in her job before for ordering products? (N = 130)*

Quite surprisingly, the type of the work position of the respondent didn't seem to affect whether the respondent picked a sales configurator from the list much at all. For example, when sales managers and product- or procurement managers were compared, 82,8 % (24 out of 29) out of the sales managers had heard of a sales configurator before, 65,5 % had used one before, and 24,1 % had used one before for submitting product orders to the supplier, while the same percentages for product- or procurement managers were 92,3 % (24 out of 26), 65,4 % and 30,8 % respectively. All of the respondents picked at least one of the given options.

6.2 Attitudes toward a sales configurator

One's **intention** to use a sales configurator in one's work was measured by a four-item Likert scale. Values of the scale ranged from 1 to 7 for the individual questions, and the values of the summated scale ranged from 4 to 28. The summated scale's mean was 21,1 and its median was 22. The standard deviation of the summated scale distribution was 4,6 with a 95 % confidence interval for the mean of 21,1 ± 0,8.

When the respondents were asked whether they would intend to use a sales configurator in their jobs (should they have a chance to do so), 76,2 % at least somewhat agreed, 16,2 % were neutral, and only 7,7 % disagreed (see figure 30). The most common answer was "agree" with 50 responses out of 130 responses altogether (38,5 %). When scored from 1 to 7, the mean value of the responses was 5,2. Distributions of other intention items have been depicted in Appendix C, along with the summated scale scores.

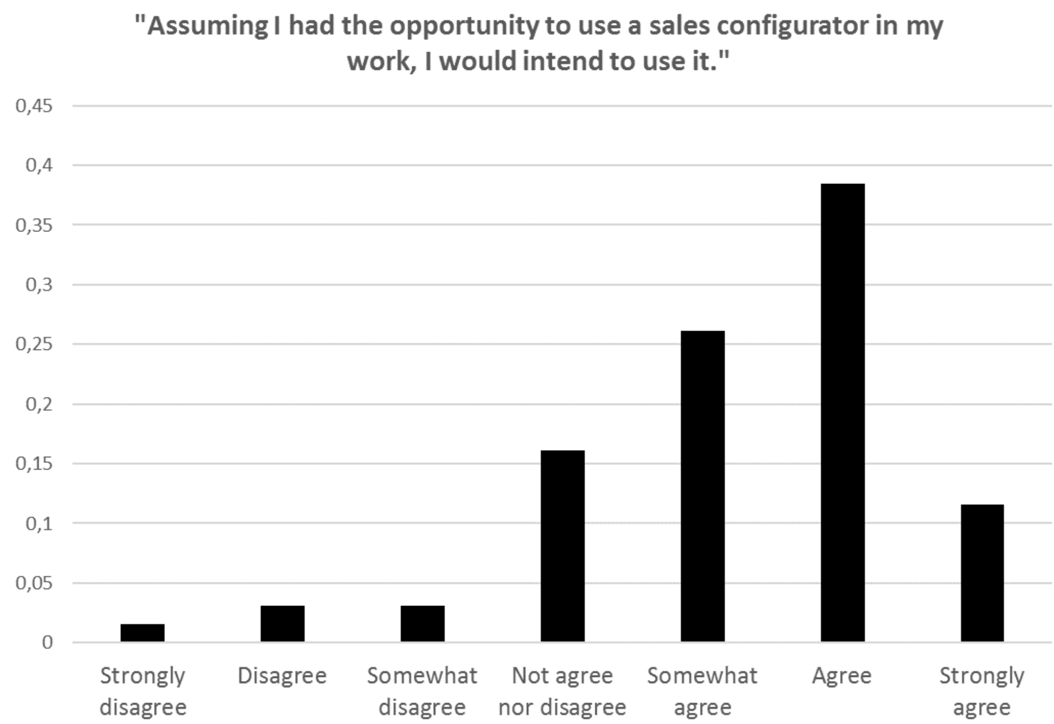


Figure 30. *The proportions of respondents (N = 130) who think they would intend to use a sales configurator should they have the chance.*

Perceived usefulness was measured by a four-item Likert scale with a range of 1 to 7 for the individual questions, and from 4 to 28 for the summated scale. The summated scale's mean was 18,0 and its median was 18. The standard deviation of the summated scale distribution was 4,9 with a 95 % confidence interval for the mean of 18,0 ± 0,8. Examining one of the scale items in isolation, namely "using a sales configurator for configuring products would increase my work performance", the results show that 55,5 % agreed with the statement, 32,8 % were neutral, and 11,7 % disagreed (see figure 31 for the distribution of the responses).

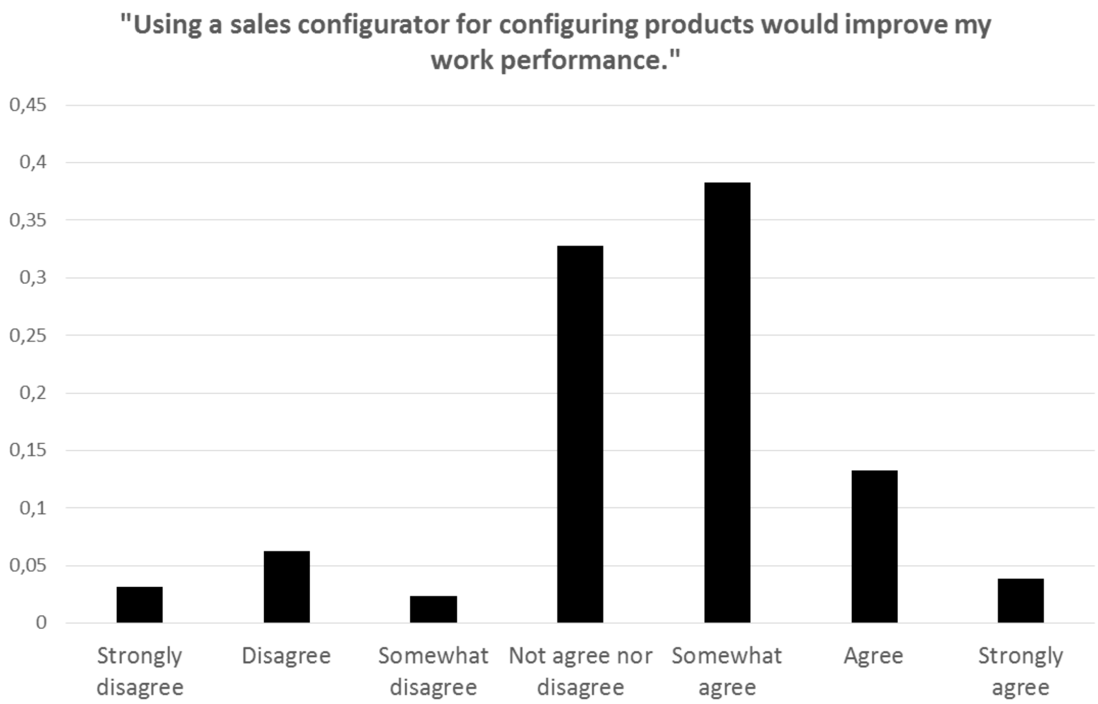


Figure 31. *The proportions of respondents (N = 128) who think that configuring products with a sales configurator would improve their work performance.*

As perceived usefulness, **perceived enjoyment** was also measured by a four-item Likert scale. The scale's range was from 1 to 7 for the individual questions, and from 4 to 28 for the summated scale. The mean of the summated scale was 18,1 while its median was 17. The standard deviation of the summated scale distribution was 4,1 with a 95 % confidence interval for the mean of 18,1 ± 0,7.

When the results for the scale items were examined in isolation, quite many of the responses were neutral: for example, out of the responses for the first question ("I believe, that when compared to other configuration methods available to me, using a sales configurator would be more enjoyable") as much as 49,6 % (64 out of 129) were neutral (i.e. "Not agree nor disagree"). Out of the four items used to measure perceived enjoyment, the question referring to interest got the most positive responses, with 48,8 % at least somewhat agreeing with the statement (see figure 32).

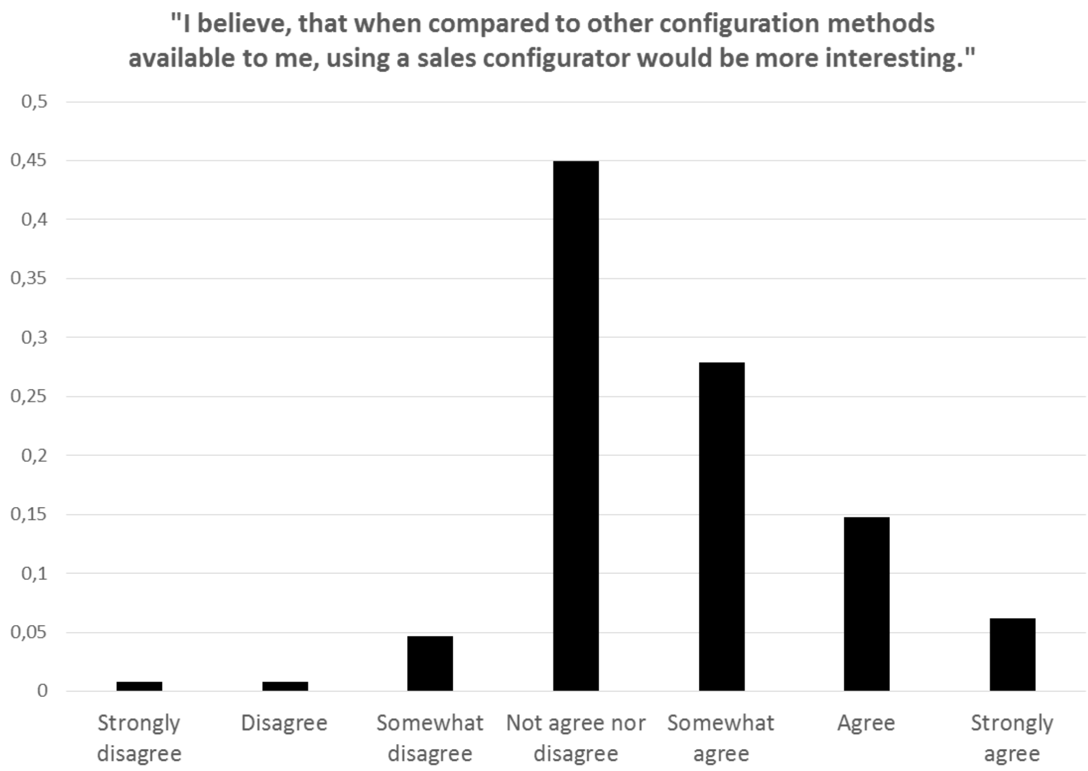


Figure 32. *The proportions of respondents (N = 129) who think that using a sales configurator would be interesting when compared to other configuring methods available to the respondent.*

Perceived learning cost was measured by a four-item Likert scale with scale values ranging from 1 to 7 for the individual questions, and from 4 to 28 for the summated scale. The summated scale's mean was 16,1 and its median was 16. The standard deviation of the summated scale distribution was 5,4 with a 95 % confidence interval for the mean of 16,1 ± 0,9. Here higher scores imply *less* associated learning costs. Distributions for the individual question items have been depicted in Appendix C.

As perceived learning cost, **perceived learning enjoyment** was measured by a four-item Likert scale. The distribution's mean was 18,8 with a standard deviation of 4,3. The 95 % confidence interval for the mean was 18,8 ± 0,8. When the four scale items were examined in isolation, the question referring to interest received the most positive responses: as much as 76,2 % of the respondents agreed that learning how to use a sales configurator would be interesting (while only 6,2 % disagreed). As for the other questions, 66,2 % of the respondents agreed that learning how to use the system would be exciting (10 % disagreed), while 46,2 % of the respondents agreed that learning would be enjoyable (23,1 % disagreed). 46,2 % of the respondents considered that learning would be pleasant (while 18,5 % disagreed).

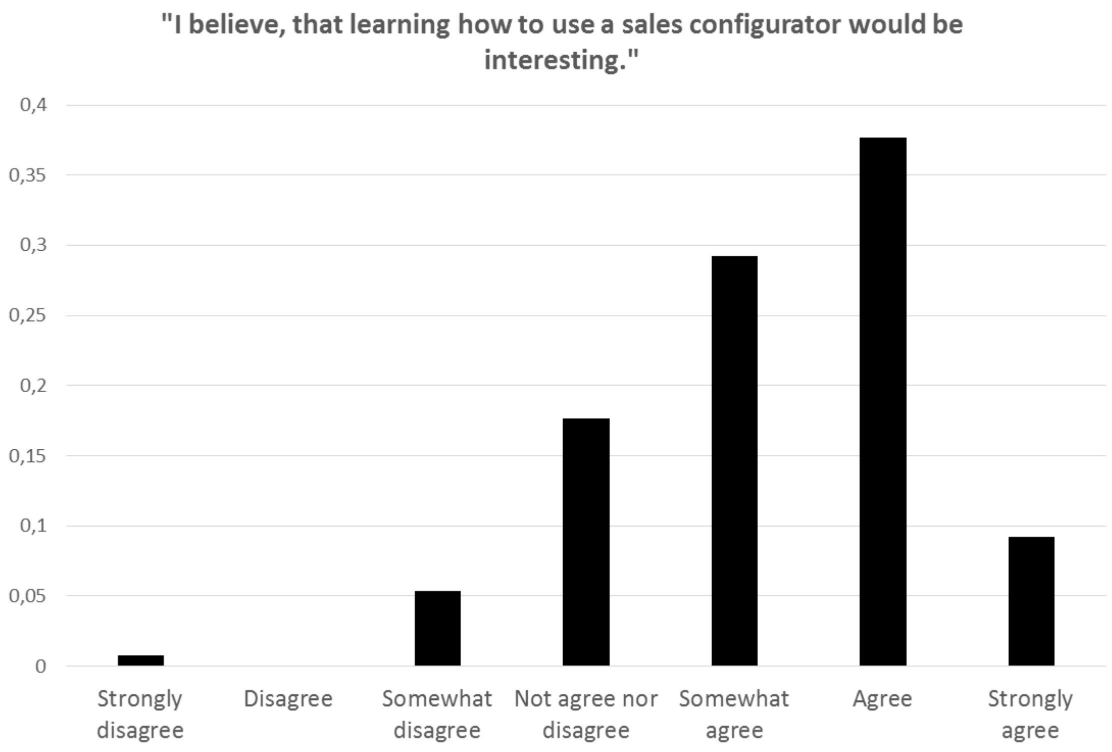


Figure 33. *The proportions of respondents (N = 130) who think that learning how to use a sales configurator would be interesting.*

Perceived effectiveness was measured by a five-question summated Likert scale. The scale values ranged from 1 to 7 for the individual questions. The values of the summated scale ranged from 5 to 35. The median of the summated scale's distribution was 28, while the mean of the distribution was 26,5 (with a standard deviation of 5,2). The 95 % confidence interval for the mean was 26,5 ± 0,9. When the individual scale items were examined in isolation, the fifth question ("*I believe, that with a sales configurator I could easily showcase product solutions to my customers*") had the highest mean value of 5,5 with 81,5 % of the respondents agreeing with the statement (7,7% disagreed) (see figure 34).

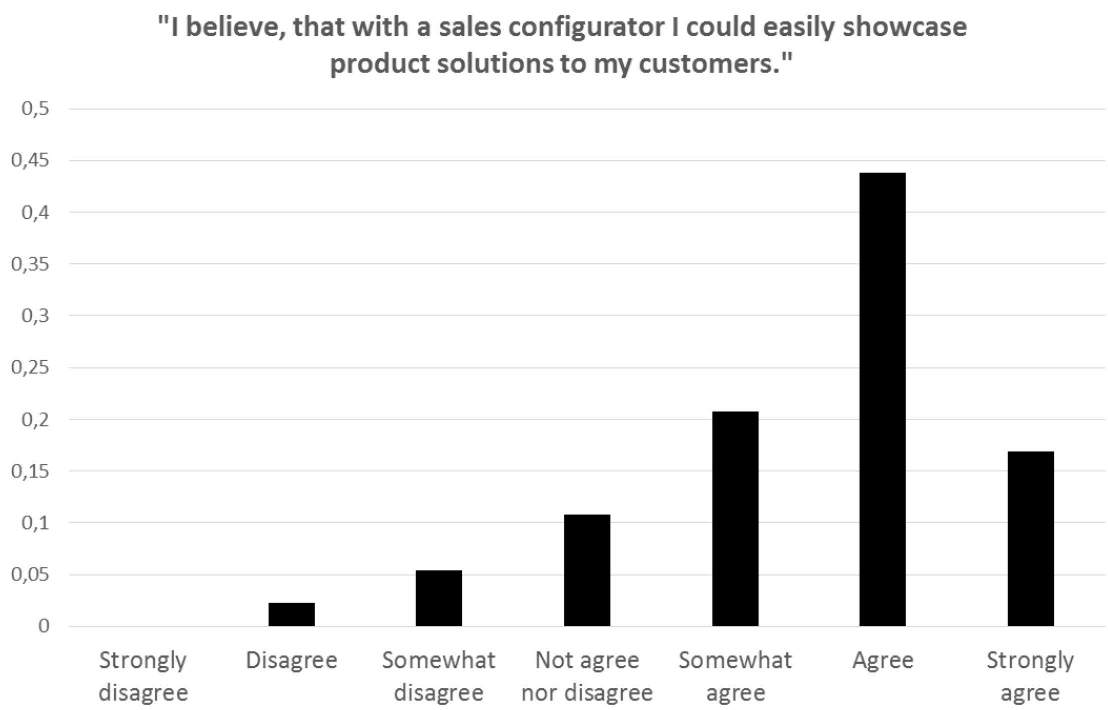


Figure 34. *The proportions of respondents (N = 130) who think that with a sales configurator they could easily showcase products to their customers.*

Perceived ease of use was measured by a four-item Likert scale with scale values ranging from 1 to 7 for the individual questions, and from 4 to 28 for the summated scale. The mean of the summated scale's distribution was 20,1 with a standard deviation of 4,6. The 95 % confidence interval for the mean was 20,1 ± 0,8. Examining the fourth question in isolation ("*my interaction with a sales configurator would be clear and understandable*"), 65,1 % of the respondents agreed with the question statement, 26,4 % were neutral, and only 8,5 % disagreed (see figure 35).

Information quality was measured by an eight-question summated Likert scale. The scale values ranged from 1 to 7 for the individual questions, and the values of the summated scale ranged from 8 to 56. The mean of the summated scale's distribution was 42,4 with a standard deviation of 8,0. The 95 % confidence interval for the distribution's mean was 42,4 ± 1,4.

When the questions were examined individually, the mean scores varied from 5,0 to 5,5 for the sample population, with expected information correctness having the lowest and expected trustworthiness of the information having the highest mean score. Interestingly, some quite systematic differences between the distribution of scores could be observed when the scores were tabulated (see Appendix C). Specifically, questions one to four seemed to have a rather similar pattern of scores, as did the questions from five to eight: the latter group of questions had a lot more "*strongly agree*" and negative responses than the former group, whereas the responses for the former group of questions were quite strongly centered around the "*somewhat agree*" and "*agree*" options.

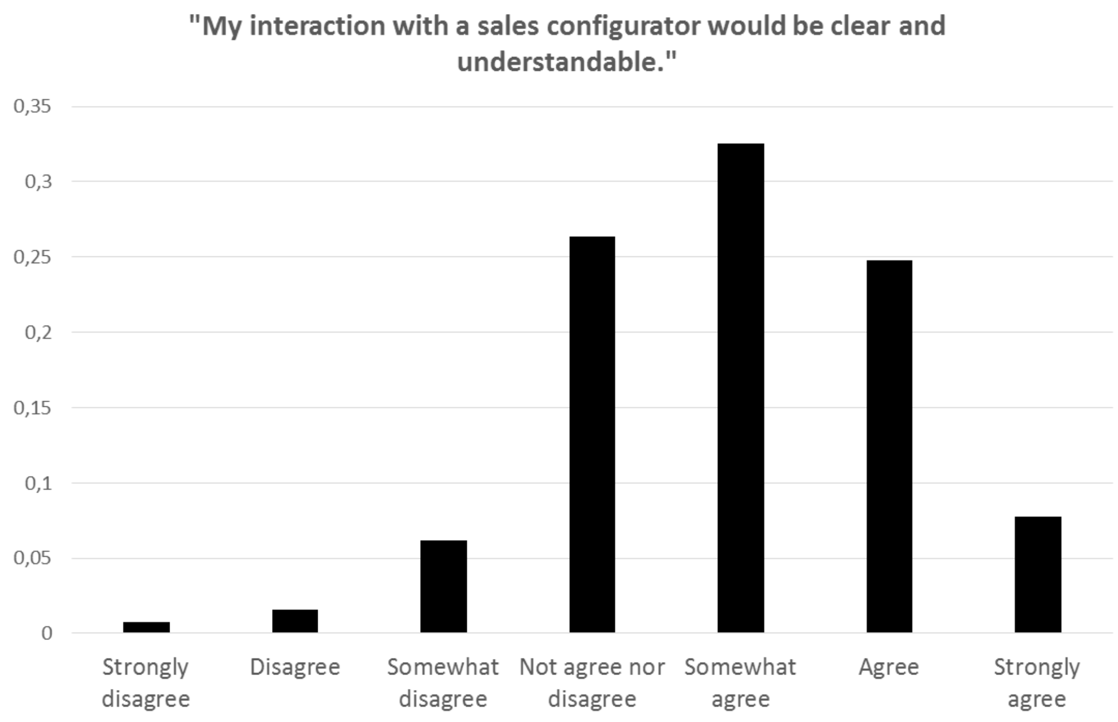


Figure 35. *The proportions of respondents (N = 130) who think that their interaction with a sales configurator would be clear and understandable.*

System adaptability was measured by a four-question summated Likert scale. The scale values ranged from 1 to 7 for the individual questions, and the values of the summated scale ranged from 4 to 28. The mean of the summated scale's distribution was 20,0 with a standard deviation of 4,0. The 95 % confidence interval for the mean was 20,0 ± 0,7. As can be seen from Appendix C, most of the responses for the individual questions fell on the "*somewhat agree*" and "*agree*" options.

Format quality was measured by a four-question summated Likert scale with scale values ranging from 1 to 7 for the individual questions, and from 4 to 28 for the summated scale. The mean of the summated scale distribution was 21,7 with a standard deviation of 3,9. The 95 % confidence interval for the mean was 21,7 ± 0,7. As can be seen from Appendix C, the answers to the individual questions were highly positive with 80,0 % to 82,3 % at least somewhat agreeing with the question statement depending on the question.

Ease of navigation was measured by a three-question summated Likert scale. The scale values ranged from 1 to 7 for the individual questions, and the values of the summated scale ranged from 3 to 21. The mean of the summated scale's distribution was 15,6 with a standard deviation of 3,2. The 95 % confidence interval for the mean was 15,6 ± 0,5. Again, the perceptions were highly positive, with 73,9 % to 75,4 % of the respondents at least somewhat agreeing with the question statements (see Appendix C).

System accessibility was measured by a four-question summated Likert scale with scale values ranging from 1 to 7 for the individual questions, and from 4 to 28 for the summated scale. The mean of the summated scale's distribution was 21,5 with a standard deviation of 4,2 and a median of 22. The 95 % confidence interval for the mean was 21,5 ± 0,7. The respondents were very positive about their ability to access the system, with 73,1 % to 83,9 % of the respondents at least somewhat agreeing with the statements depending on the question (see Appendix C).

Level of customer interaction was measured by a four-question summated Likert scale with scale values ranging from 1 to 7 for the individual questions, and from 4 to 28 for the summated scale. The mean of the summated scale's distribution was 19,9 with a standard deviation of 4,9 and a median of 21. The 95 % confidence interval for the mean was 19,9 ± 0,8. Overall, getting the necessary input was not seen as a major problem by the respondents, as can be seen from Appendix C.

Formal support was measured by a six-question summated Likert scale with scale values ranging from 1 to 7 for the individual questions, and from 6 to 42 for the summated scale. The mean of the summated scale's distribution was 29,4 with a standard deviation of 6,9 and a median of 30. The 95 % confidence interval for the mean was 29,4 ± 1,2.

Table 11. *Summary of the perception measure results. The summated mean and standard deviation values have been divided by the number of the questions in the scale.*

Measure	Mean	Stdev
Intention	5,27	1,16
Perceived usefulness	4,50	1,21
Perceived enjoyment	4,53	1,02
Perceived learning cost	4,03	1,36
Perceived learning enjoyment	4,71	1,08
Perceived effectiveness	5,31	1,05
Perceived ease of use	5,03	1,14
Information quality	5,30	1,00
System adaptability	4,99	0,99
Format quality	5,44	0,96
Ease of navigation	5,21	1,05
System accessibility	5,38	1,05
Level of customer interaction	4,97	1,22
Formal support	4,90	1,16
Informal support	5,39	1,13

Informal support was measured by a three-question summated Likert scale. The mean of the informal support distribution was 16,2 with a standard deviation of 3,4 and a median of 18. The 95 % confidence interval for the mean of the summated scale was 16,2 ± 0,6. Thus, the expectations related to support were highly positive.

The summary of the perception measure results have been depicted in table 11. In the table, the summated scale scores have been divided by the number of the measurement items of the scale for easier comparison. Results for the individual question items have been depicted in Appendix C.

6.3 The effects of previous hands-on experience and task importance on the attitudes toward a sales configurator

Here, the influence of prior experience and task importance on distributor representatives' perceptions is examined. The influence of prior experience is interesting, because a significant difference in perceptions with respect to it would suggest that encounters with a sales configurator have been either positive or negative in actuality. On the other hand, influence of task importance on perceptions is investigated in order to shed more light on its role in an individual's adoption decision formation context.

The examination is carried out by dividing the research population into two groups, and by comparing the mean values of the two distributions to one another. In order to test whether the difference in the calculated means is statistically significant, either Student's t-test or Welch's t-test can be performed, depending on whether the two distributions have equal or unequal variances. While Student's t-test assumes normally distributed values and equal variances, Welch's t-test assumes that the two distributions are normal, but that they have unequal variances. F-test, on the other hand, can be performed to test the probability of which the variances are equal (Malhotra & Birks 2000). Welch's t-test's *t* statistic can be calculated by the following formula:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s_1^2}{N_1} - \frac{s_2^2}{N_2}}} \tag{9}$$

where $\bar{X}_1$ and $\bar{X}_2$ are sample means, s_1^2 and s_2^2 are sample variances, and N_1 and N_2 are sample sizes. The degrees of freedom *v* can be approximated with the formula:

$$v \approx \frac{\left(\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}\right)^2}{\frac{s_1^4}{N_1 v_1} + \frac{s_2^4}{N_2 v_2}} \tag{10}$$

where v_1 and v_2 are the degrees of freedom associated with the two variance estimates.

Table 12 shows the difference between the means in all of the perception scales when the respondents were grouped based on their previous sales configurator hands-on experience. Group 1 is consisted of those respondents who had used a sales configurator before, while group 2 is consisted of respondents without previous hands-on experience.

The table also presents F-test scores, Welch's t-test scores, and Student's t-test scores for each group.

Table 12. *Mean scores for the summated scales when the respondents are divided into two groups based on how whether they have used a sales configurator before. Group 1 is consisted of respondents with previous hands-on experience (sample size varies from 76 to 78), and Group 2 is consisted of those who have not used a sales configurator before (sample size varies from 49 to 50). The summated mean values have been divided by the number of the questions in the scale.*

Hands-on experience	**Group 1**	**Group 2**			
Measure	**Mean**	**Mean**	**F-test , two-tailed**	**Welch's t-test, two-tailed**	**Student's t-test, two-tailed**
Intention	5,37	5,11	0,32	0,19	0,21
Perceived usefulness	4,61	4,31	0,12	0,16	0,18
Perceived enjoyment	4,54	4,54	0,11	0,99	0,99
Perceived learning cost	4,29	3,61	0,87	**0,01**	**0,01**
Perceived learning enjoyment	4,65	4,75	0,32	0,60	0,61
Perceived effectiveness	5,40	5,14	0,72	0,18	0,17
Perceived ease of use	5,18	4,74	0,11	**0,03**	**0,04**
Information quality	5,42	5,06	0,77	**0,05**	**0,04**
System adaptability	5,04	4,88	0,93	0,39	0,39
Format quality	5,44	5,41	0,15	0,84	0,85
Ease of navigation	5,28	5,05	0,70	0,25	0,25
System accessibility	5,52	5,11	0,71	**0,03**	**0,03**
Level of customer interaction	5,01	4,87	0,34	0,53	0,54
Formal support	4,85	4,95	0,30	0,64	0,65
Informal support	5,41	5,35	0,52	0,80	0,80

Overall, it can be seen from the table that those who had had previous hands-on experience with a sales configurator (Group 1) had slightly more positive perceptions in most of the measurement scales than the second group. Statistically significant differences between the means can be observed with perceived learning cost, perceived ease of use, information quality, and system accessibility.

When the respondents were divided into two groups based on whether they perceived configuring as important in their jobs or not, there were statistically significant differences in the summated scales in almost every case. In fact, the only exceptions were the informal support scale and the system adaptability scale, although the probability for the null hypothesis to be correct was still quite low even for these two scales (10 % and 8 % respectively). F-test scores, Welch's t-test scores, and Student's t-test scores have been depicted in table 13 along with the mean values.

The mean scores were higher (i.e. more positive) in every single case for the group who perceived configuring products as important in their jobs. Moreover, for some of the scales, the difference in means is quite substantial. Specifically, perceived usefulness seems to be most affected by the division of respondents, while the two efficacy expectations (perceived ease of use and perceived effectiveness) along with one's intention were much affected as well.

Table 13. *Mean scores for the summated scales when the respondents are divided into two groups based on how they responded to the first question of the perceived task importance scale. Group 1 is consisted of respondents who at least somewhat agree (responses 5 to 7) with the question statement (sample size varies from 78 to 80), and Group 2 is consisted of those who either disagreed or didn't agree (responses 1 to 4) with the question statement (sample size varies from 48 to 50). The summated mean values have been divided by the number of the questions in the scale.*

Task importance	**Group 1**	**Group 2**			
Measure	**Mean**	**Mean**	**F-test , two-tailed**	**Welch's t-test, two-tailed**	**Student's t-test, two-tailed**
Intention	5,62	4,71	0,0001	**0,00001**	**0,00001**
Perceived usefulness	4,89	3,85	0,0005	**0,000001**	**0,000001**
Perceived enjoyment	4,75	4,17	0,86	**0,001**	**0,001**
Perceived learning cost	4,36	3,51	0,46	**0,001**	**0,0004**
Perceived learning enjoyment	4,88	4,44	0,52	**0,03**	**0,02**
Perceived effectiveness	5,65	4,76	0,03	**0,00001**	**0,000001**
Perceived ease of use	5,31	4,56	0,15	**0,0005**	**0,0002**
Information quality	5,46	5,04	0,04	**0,03**	**0,01**
System adaptability	5,11	4,79	0,18	0,08	0,07
Format quality	5,64	5,12	0,17	**0,004**	**0,002**
Ease of navigation	5,35	4,97	0,86	**0,04**	**0,04**
System accessibility	5,61	5,02	0,38	**0,003**	**0,002**
Level of customer interaction	5,27	4,50	0,05	**0,001**	**0,0004**
Formal support	5,12	4,55	0,37	**0,01**	**0,01**
Informal support	5,53	5,17	0,02	0,10	0,08

As task importance seemed to have such a strong effect on almost every perception scale, one could argue that the results observed with regards to previous hands-on experience could be explained by task importance: after all, it might be that previous hands-on experience and task importance are in fact strongly related. Indeed, prior experience with sales configurators was significantly associated with the perceived configuration task importance.

When respondents were categorized with respect to how important they perceived the configuring task to be, a clear pattern in hands-on experience could be observed. Specifically, the more important the configuration task was perceived to be, the more likely it was that the respondent had used a sales configurator before (see table 14). The pattern was especially clear with the last two groups of respondents (those who either agreed or strongly agreed). As a chi-square statistic value of 21,386 can be calculated from the table, the association is statistically significant (critical value for 95 % confidence level and six degrees of freedom is 12,592).

Table 14. *The total amount of respondents (N = 128) categorized into seven groups based on the degree to which configuring products is considered important in one's job, and the and the proportion of respondents who have ("Yes") or have not ("No") used a sales configurator before.*

	"Configuring products is important in my job."							Total
	Strongly disagree	Disagree	Somewhat disagree	Not agree nor disagree	Somewhat agree	Agree	Strongly agree	
"Yes"	3	6	6	8	18	27	10	78
	75,0 %	46,2 %	46,2 %	40,0 %	50,0 %	90,0 %	83,3 %	60,9 %
"No"	1	7	7	12	18	3	2	50
	25,0 %	53,8 %	53,8 %	60,0 %	50,0 %	10,0 %	16,7 %	39,1 %
Total	4	13	13	20	36	30	12	128

Thus, further examination on the relationship between previous hands-on experience and perceptions on sales configurators was conducted. Table 15 presents the F-test scores, Welch's t-test scores, and Student's t-test scores along with the mean values, when only the respondents who think that configuring is important in their work were included in the sample population.

Table 15. *Mean scores for the summated scales when the respondents are divided into two groups based on how whether they have used a sales configurator before. Group 1 is consisted of respondents with previous hands-on experience (sample size varies from 54 to 56), and Group 2 is consisted of those who have not used a sales configurator before (sample size varies from 23 to 25). The sample population includes only respondents who perceived configuring as at least somewhat important. The summated mean values have been divided by the number of the questions in the scale.*

Hands-on experience / High task importance	**Group 1**	**Group 2**			
Measure	**Mean**	**Mean**	**F-test , two-tailed**	**Welch's t-test, two-tailed**	**Student's t-test, two-tailed**
Intention	5,71	5,41	0,08	0,21	0,15
Perceived usefulness	4,94	4,77	0,12	0,37	0,42
Perceived enjoyment	4,69	4,97	0,27	0,21	0,25
Perceived learning cost	4,50	4,00	0,57	0,09	0,11
Perceived learning enjoyment	4,78	5,01	0,32	0,34	0,37
Perceived effectiveness	5,63	5,65	0,77	0,91	0,91
Perceived ease of use	5,39	5,05	0,17	0,14	0,18
Information quality	5,55	5,17	0,76	0,09	**0,04**
System adaptability	5,12	5,06	0,21	0,76	0,79
Format quality	5,55	5,79	0,0003	0,15	0,27
Ease of navigation	5,35	5,30	0,80	0,85	0,86
System accessibility	5,55	5,65	0,17	0,67	0,71
Level of customer interaction	5,19	5,38	0,01	0,38	0,47
Formal support	5,01	5,33	0,02	0,16	0,24
Informal support	5,46	5,67	0,17	0,36	0,41

Some differences between the results presented in tables 12 and 15 can consequently be observed. For one, the statistically significant difference in the mean values of the system accessibility scale was no longer statistically significant. Moreover, the direction of the difference was the opposite. Second, the statistically significant differences in table 12 for the perceived learning cost and the perceived ease of use scales were no longer statistically significant. Finally, some of the differences between the means changed directions, although the differences in means were not statistically significant. Such scales included perceived enjoyment, perceived effectiveness, format quality, level of customer interaction, and informal support.

6.4 Configuration task importance

As task importance seemed to be such a strong factor influencing the distributor representatives' perceptions toward a sales configurator, factors influencing task importance were also examined. The perceived configuring **task importance** in one's job was measured by a four-item Likert scale with scale values ranging from 1 to 7 for the individual questions, and from 4 to 28 for the summated scale. The distribution's mean was 17,2 and its median was 18. The standard deviation of the summated scale's distribution was 6,2 with a 95 % confidence interval for the mean of 17,2 ± 1,1.

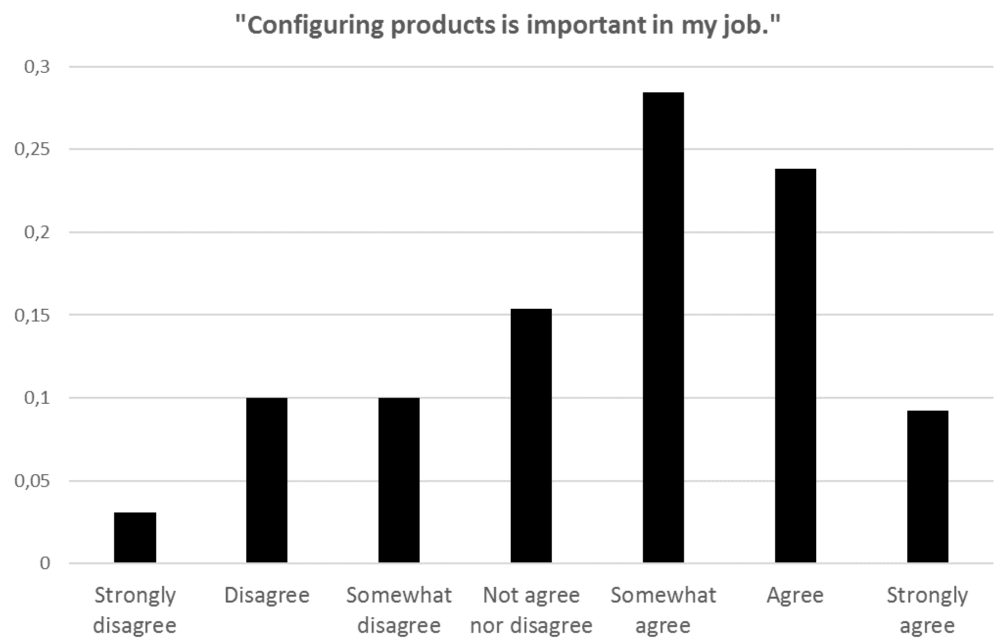
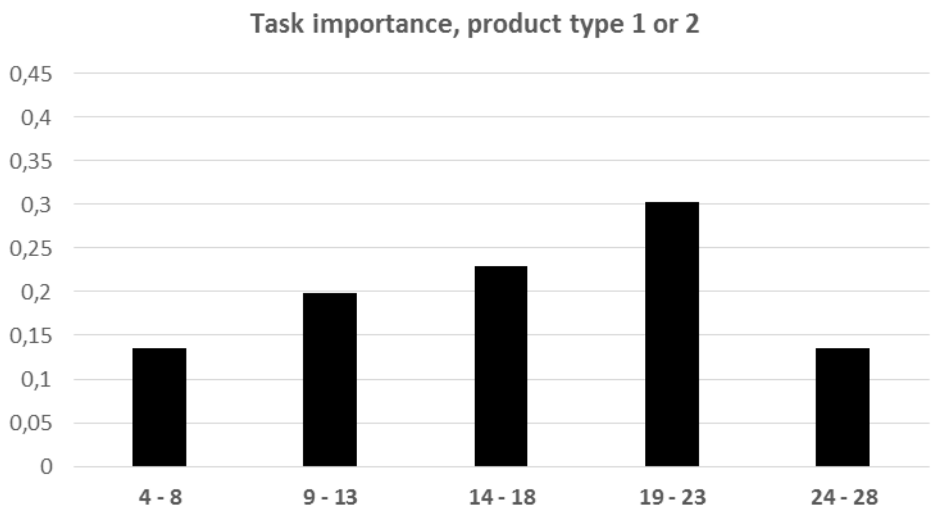


Figure 36. *The proportions of respondents (N = 130) who think configuring is important in their work.*

When one of the questions was examined in isolation, it could be concluded that 61,5 % of the sample at least somewhat agreed that configuring is important in their work, 15,4 % were neutral, and 23,1 % disagreed. The distribution for the isolated task importance question is depicted in figure 36. The mean value for the distribution was 4,6 while the most frequent answer was "somewhat agree" (28,5 % of the answers). This particular question was also used to divide the respondents into two groups in the previous sections.

When the summated task importance scores were categorized into two groups based on the type of the products that the company sells, the two distributions had unequal means. Specifically, the respondents whose company sells only or mainly standard off-the-shelve products had a distribution with a mean of 16,5 (with a standard deviation of 6,3) while the other group's mean was 19,5 (with a standard deviation of 5,6). The distributions have been depicted in figure 37.



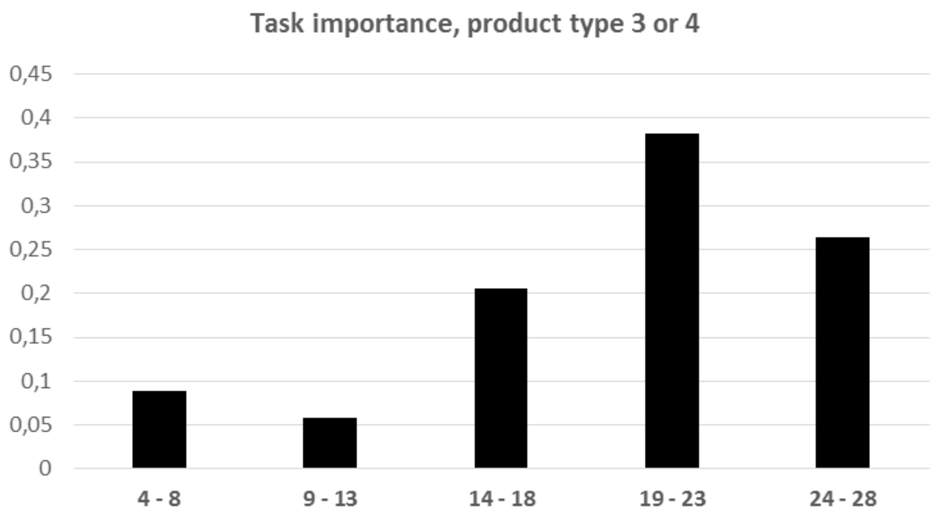


Figure 37. *Distributions of perceived configuring task importance per product type (1 = company sells only standard products, 2 = company sells mainly standard products but also products that are customizable, 3 = company sells mainly customizable products, 4 = company sells only customizable products) ($N_{1,2}$ = 96, $N_{3,4}$ = 34).*

When compared to the average value of products sold by the respondents' company, no significant relationship could be observed. For example, if the results for task importance were divided into two categories based on whether the average value of products sold is over 1.000 euros or under, the difference in means (16,5 for under 1.000

euros and 17,6 for 1.001 euros and over) was not statistically significant as shown by the Welch's t-test. Thus, while it seems that the value of the products that the distributor sells forward is not related to whether the configuring task is important for the distributor representative or not, the type of the product – with respect to whether it's customizable or not – is.

6.5 Summary of the results

The summary of the results have been presented below. The results have been categorized into three classes, namely familiarity with sales configurators, attitudes toward sales configurators, and task importance, following the structure of the chapter.

Familiarity with sales configurators. The results for the distributor representatives' familiarity with sales configurators include:

- 81,5 % had heard of sales configurators before.
- 60,9 % had used a sales configurator before.
- 24,6 % had used a sales configurator before for submitting product orders to their suppliers in their work.

Attitudes toward sales configurators. The results for the perception measures include:

- 76,2 % of the respondents at least somewhat agreed that they would intend to use a sales configurator in their work.
- 55,5 % of the respondents at least somewhat agreed that using a sales configurator in their work would improve their work performance.
- 76,2 % of the respondents at least somewhat agreed that learning how to use a sales configurator would be interesting.
- 81,5 % of the respondents at least somewhat agreed that they could easily showcase product solutions to their customers with a sales configurator.
- 61,5 % of the respondents at least somewhat agreed that their interaction with a sales configurator would be clear and understandable.

Distributor representatives' perceptions on sales configurators were positive in general, regardless of whether the representatives had used one before. Moreover, perceptions were substantially more positive for those who perceived configuring as important in their work. In addition, those who scored highly on task importance had a better chance of having previous hands-on experience with a sales configurator than those who scored low on the scale.

Task importance. Factors influencing task importance were examined after it became clear that it has a strong influence on the distributor representatives' perceptions. Two factors were examined, namely product type and product value. While the monetary value of the products that the representatives' companies sell didn't seem to matter, the type of the products (with regards to whether they are customizable or not) did. When respondents were grouped based on product type, those whose company sold mainly or only customizable products scored 19,5 while the rest of the respondents scored only 16,5.

7. DISCUSSION

Following the structure of the results section, distributor representatives' familiarity with sales configurators is discussed first, followed by a discussion of the distributor representatives' attitudes toward a sales configurator. Thus, chapter 7.1 answers the first research question, while chapter 7.2 answers the second. Chapter 7.3 discusses about the conceptual contributions of the study, while limitations of the study have been discussed in chapter 7.4. Finally, future research directions have been proposed in chapter 7.5.

7.1 Familiarity with a sales configurator

The majority of the representatives had used a sales configurator before, and almost everyone had at least heard of one before. Thus, it can be concluded that the Finnish B2B-distributors are in fact quite familiar with at least the concept of a sales configurator. However, although the number of respondents who had used a sales configurator was relatively high, one should note that there are hundreds or even thousands of sales configurators available to consumers in the Internet, and thus the context of prior use may have been something else than in a work setting for some.

When it comes to using such tools in a work setting, only about one fourth of the respondents had actually submitted a product order via a supplier's sales configurator. However, a larger proportion of distributor representatives may be using a sales configurator in only some of the earlier parts of the guided selling process. For example, some suppliers might offer a sales configurator via their website without an actual integration to their ERP, but to help with the configuration of products or services. Moreover some suppliers might provide their distributors with simple spreadsheet-based configurators that the representatives might attach to their E-mail messages when they are submitting their orders to the supplier. Still, judging by the results, it seems likely that the utilization of sales configurators within the supplier distributor relationship context is still somewhat uncommon, or at least that the relationships do not take advantage of all the possibilities that the tools could offer.

7.2 Attitudes toward a sales configurator

Beginning with intention, the perceptions were very positive. In fact three out of four respondents at least somewhat agreed when asked whether they would intend to use a sales configurator at work. Moreover, previous hands-on experience with a sales configurator didn't have a significant effect on one's intention, suggesting that previous encounters with such a system couldn't have been very negative. In fact, although the difference in means is not statistically significant, the sample group with previous hands-on experience was – on average – more likely to have positive intentions than the other group.

As the results for intention were very high, one would expect similar results out of perceived usefulness and perceived enjoyment. The expected pattern of results were also observed, as both the measures achieved mean scores well above the middle point of the summated scale. Moreover, both the perceived usefulness and perceived enjoyment perceptions were largely unaffected by earlier hands-on experience with a sales configurator. Thus, it seems that the distributor representatives have similar outcome expectation related to the use, irrespective of previous hands-on experience. Furthermore, this perception is in fact quite positive. Only few distributor representatives in the population would disagree with that using a sales configurator for configuring products would improve their work performance.

The perceived enjoyment scale received substantially more neutral responses than the perceived usefulness scale, however. Notably, it seems that many of the respondents who didn't perceive the configuring task as particularly important in their jobs tended to give a neutral response for the enjoyment scale. When only the respondents who perceived configuring as important were included, the amount of neutral responses was somewhat less (around 6 to 11 percentage points depending on the question). In contrast, perceived usefulness scale received proportionally more negative responses when the scores were mirrored against task importance. As can be seen from table 13, the mean value for the second group is actually *below* the middle point of the scale. Indeed, the proportion of negative responses is clearly higher within group 2 for the perceived usefulness scale (from 23 to 31 % depending on the question) than the perceived enjoyment scale (from 12 to 18 % depending on the question). Thus, it seems that while both the scales are affected by the perceived task importance, the perceived usefulness scale captures the negative effect much more effectively than perceived enjoyment scale.

Two new outcome expectation measures were developed for this study, namely perceived learning enjoyment and perceived learning cost. The results for perceived learning enjoyment were quite positive: in fact, three out of four respondents at least somewhat agreed that learning to use a sales configurator would be interesting. Thus, it's fair to say that learning how to use a sales configurator was perceived as an act that in general evokes positive feelings in the distributor representatives. When it comes to the perceived learning cost, however, the scale received results that were quite evenly distributed around the neutral response.

Interestingly, however, the users who had prior sales configurator experience expected lower learning costs than those who didn't have used a sales configurator, although the effect was statistically insignificant when task importance was taken into account. Still, one is tempted to conclude that the experience with a sales configurator has shown that learning to use one is, in fact, easier than first expected. An alternative explanation might be that previous experience is perceived as beneficial when it comes to learning: that is, previous experience could be seen as a generalizable skill.

The results for the two efficacy expectation measures, namely perceived effectiveness and perceived ease of use, were positive overall. Interestingly, the fifth question of the effectiveness scale had the highest mean value of the individual effectiveness scale questions, suggesting that the respondents perceived a sales configurator as very capable tool in helping to showcase product solutions to customers. Thus, the result provides some further evidence on the sales configurator's applicability in the personal selling context. Moreover, very high scores for the effectiveness scale were attained with respondents scoring highly on task importance, thus suggesting that the respondents perceived a sales configurator to be a very effective tool for configuring products and services. When respondents were grouped based on prior experience and task importance, no practical difference between the means could be observed.

Information quality results showed two distinct patterns when the questions were analyzed in isolation. Although the mean scores were about the same – and very positive for both of the groups of items – the accuracy, trustworthiness, correctness, and currency items received substantially more "*strongly agree*" responses, but also more negative responses than items referring to completeness, comprehensiveness, preciseness, and relevance of information. Thus, it seems that while the respondents feel that the contents of the information are generally of good quality, the degree to which it's correct and up-to-date worries at least some of the respondents. Interestingly, the respondents who had used a sales configurator before generally thought a bit more highly of the quality of information received from a sales configurator than the rest of the respondents, and the difference in means was also statistically significant. The differences in means of system adaptability, format quality and ease of navigation scales were not statistically significant, however, when the respondents were grouped based on previous hands-on experience. Still, all four scales referring to the characteristics of the technology, namely information quality, system adaptability, format quality, and ease of navigation were highly positive.

When examining the results for other control factors, namely system accessibility and level of customer interaction, they first seemed to be perceived more positively by those who had prior hands-on experience with a sales configurator than the rest of the distributor representatives. However, when task importance was taken into account, the results were the opposite: respondents who had used a sales configurator before expected slightly more difficulties than those who hadn't yet had a chance to use a sales configurator. It might be, for example, that those without prior experience hadn't yet stumbled into any difficulties with getting the necessary input for the sales configurator or in accessing the system in their work, and thus had a hard time imagining such difficulties. Representatives who had used a sales configurator before might in fact encountered such difficulties, and thus had a more negative perceptions as a result.

Quite similar results than with accessibility and customer interaction could be observed with the two support measures, namely informal and formal support. In fact, it seems that those without prior experience had more positive expectations toward the degree to which they could get assistance when they would require it. Overall, the representatives had very positive perceptions toward system accessibility, level of customer interaction, and the two forms of support, however.

The effect of task importance on the average values of some of the perception scales was a strong one. In fact, there was a statistically significant difference between the means for all but two of the perceptions (system adaptability and informal support). For some scales, such as for perceived usefulness, the difference between the two means was quite substantial. In every single instance, the direction of the effect was positive: that is, more task importance implied a more positive a perception.

When it comes to the task importance itself, the majority of the representatives perceived configuring products or services at least somewhat important in their jobs. As expected, the perceived importance of the configuration task was significantly related to the actual hands-on experience with a sales configurator. Unsurprisingly, those respondents whose company sold products that are customizable to a large degree perceived the configuration task to be more important than those whose company sold mainly standard off-the-shelve products. However, when the importance was measured against the average value of the products that the respondent's company sold, no significant difference could be observed. This suggests, that while customizability is closely related to task importance, the configuration of products is perceived to be worthwhile even when the value of the products is in fact quite small.

In summary, taking into account that only one fourth of the representatives had used a sales configurator for submitting product orders to the supplier, but as much as almost two thirds perceived configuring products at least somewhat important in their work, there seems to be much potential in increasing the amount of sales configurator utilization within supplier-distributor relationships. As one would definitely not intend to use such a system if (s)he would perceive it to be pointless, the positive results for the perception measures are very encouraging.

Thus, future research could examine the use context more closely; questions such as "In which stages of the guided selling process a sales configurator could be utilized?", "How could a sales configurator support the sales representative at particular stages of the guided selling process?", and "Why would a sales configurator be useful in particular situations?" could be examined in more detail in the supplier-distributor relationship context.

7.3 Conceptual contributions

Arguably some of the most important contributions of this thesis work are conceptual. For one, the thesis can potentially help explain how people form their technology adoption decision by dividing different types of beliefs into distinct categories. The categorization is based on some of the most important theories in social psychology. This contribution is particularly important, as at times it seems that the flow of causation has been misinterpreted in the literature. Indeed, as Delone & McLean (2002, p. 44) note, "*cause can too easily be confused with effect*".

The proposed categorization of beliefs is simple, but allows the researcher to follow the flow of causality all the way from the characteristics of a particular technology to behavioral intention. Beginning from the end, intention is assumed to capture the motivational factors that influence a behavior. Furthermore, it is postulated that people form their intention based on their expectation of the outcomes that they would attain by conducting the behavior. Efficacy expectations, on the other hand, are defined as the conviction that one can successfully execute the requisite behavior. It is postulated that people expect certain level of outcome attainment out of a behavior based on their expectation on how well they are able to perform the behavior in question. Finally, control factors make performing the behavior easier or more difficult. It is postulated that people base their efficacy judgements on control factors by attributing the causes of their sense of efficacy onto external or internal sources of control.

By categorizing the types of beliefs into intention, outcome expectations, efficacy expectations, and control factors, this thesis work can potentially help researchers to determine the flow of causation in their study setting, as well as to predict and explain their results with theoretical mechanisms founded in the social psychology research. Moreover, the categorization helps researchers understand what exactly is being measured by their measurement items: perceptions on outcomes, perceptions on efficacy, or perceptions on external or internal control factors. Far too often are the internal control factors confused with efficacy expectations, and efficacy expectations with outcome expectations. Furthermore, too often are outcome expectations being modelled as control factors, and their theoretical mechanisms misunderstood.

The second conceptual contribution relates to the relationship between perceived usefulness and perceived ease of use. As Kiel et al. (1995, p. 89) already over two decades ago conclude:

"*Usefulness and ease of use (EOU) are both believed to be important factors in determining the acceptance and use of information systems. Yet, confusion exists among both researchers and practitioners regarding the nature of the relationship between these two constructs and the relative importance of each in relation to use.*"

Still, 21 years later, the relationship between perceived usefulness and perceived ease of use has not become much clearer. The updated models of TAM – TAM2 and TAM3 – posit the very same relationships between the constructs as the original model already in 1989. Although there have been numerous attempts to supplement TAM ever since, the proposed constructs often fall short in their theoretical argumentation, and the relationships among perceived usefulness, perceived ease of use, and intention often remain as they are. Questions such as "*Why the effect from ease of use to intention gets weaker or disappears altogether after time passes?*" have been left unanswered, or have been answered without a solid theoretical justification.

This thesis work proposes that the process of forming a behavioral intention to adopt a technology should be conceptually divided into learning and use processes. While perceived ease of use represents an efficacy expectation related to learning, perceived effectiveness – a new construct proposed in this thesis – represents an efficacy expectation related to the use of the technology. Moreover, it is proposed that perceived ease of use should not be a direct determinant to intention, as it represents an efficacy expectation, and not an outcome expectation. In technology adoption context, the outcomes are related either to the learning of how to use a technology, or to the using of a technology. For instance, people might expect that they must sacrifice their time and effort in order to learn how to use a technology (which is a cost associated to learning), and at the same time expect that certain benefits would be attainable to them if they did (which is a benefit associated to using).

Consequently, the proposed framework can potentially help researchers and practitioners to track down whether it's due to factors related to learning or to using that inhibit the use of a particular technology. More importantly, however, the framework can potentially help researchers and practitioners to understand how and why perceived ease of use affects behavioral intention, and what is its relationship with perceived usefulness. Thus, future research should try to verify or falsify the relationship between the learning related outcomes and behavioral intention, and the relationships between the two efficacy expectations and the outcome expectations. Should behavioral intention be empirically affected by outcomes related to learning in addition to outcomes related to use, the technology adoption research would take another step forward.

The third conceptual contribution relates to the role of task importance. The thesis work raises a particular problem associated with TAM: the model might not predict behavioral intention very well when the technology in question is relevant to all the respondents. While perceived usefulness might very well explain why people who have got nothing to do with the technology don't intend to use it, the explanatory power of the construct may decrease when the sample population is consisted of people to whom the technology is actually relevant.

As demonstrated also in this thesis work, perceived importance of the task (to which the technology is related to) seems to have a strong effect on perceived usefulness. Thus, it is justifiable to ask to what degree does perceived usefulness explain behavioral intention when only potential users of the technology are included in the sample population. If the explanatory power gets substantially weaker, problems emerge: if perceived usefulness would not explain behavioral intention, then the most important determinants of it – the design characteristics of a technology – would certainly not affect behavioral intention either (not through perceived usefulness at least). In practice, this would mean that TAM couldn't be effectively used to trace the causal mechanisms from the characteristics of a technology to behavioral intention.

Indeed, the role of task importance and belief salience would explain why researchers have had so much difficulties in supplementing TAM with constructs relating to the characteristics of a technology. After all, when the statistical relationship between perceived usefulness and intention would be strong (as a result of perceived usefulness carrying the meaning of task importance), the effect from technology characteristics to perceived usefulness would be weaker, as low levels of perceived usefulness would not be attributable to poor system design (but to low levels of task importance).

Thus, future research should examine what is the predictive power of TAM and its related models when sample contains only people to whom the target behavior is salient. After all, belief salience is a boundary conditions also for the theory TAM is based on: that is, for the theory of reasoned action. Specifically, as intrinsic sources of motivation have been argued to be the strongest form of motivation by some authors (e.g. by Ryan & Deci 2000), the predictive power of affective and evaluative outcomes should be compared with each other in a setting where belief salience won't introduce bias to the results.

Lastly, the fourth conceptual contribution relates to the attribution of outcome attainment to external and internal control factors. As strange as it might sound – as one of the major research questions in information systems and technology adoption research has been to determine how the characteristics of a technology affect an individual's adoption decision – attribution theories from social psychology have not (at least to the authors knowledge) been adapted to the technology adoption domain. In this thesis work it is proposed that the theory of learned helplessness can be used to trace the outcome expectations to the internal and external control factors. Better yet, by applying the concept of task-technology-human fit by Goodhue & Thompson (1995), a two-way categorization of control factors is offered.

By categorizing task-technology and technology-human factors according to external and internal sources of control, three categories of control factors are introduced: (1) task-technology attribution category, which relates to external sources of control, and technology-human category, which relates to (2) external or (3) internal sources of control. This categorization can potentially help researchers and practitioners to explain why certain characteristics of a technology seem to affect behavior while others do not. For example, Venkatesh & Bala (2008, p. 300-301), raise two research questions related to the sources of control, namely:

- How and why does peer support enhance perceived usefulness and perceived ease of use of a system?
- How and why do different forms of organizational support (e.g., infrastructure, helpdesks, system and business process experts, and off-the-job training) influence the determinants of perceived usefulness and perceived ease of use?

The theoretical mechanisms postulated in this thesis explain that, first of all, the expectation of training and support affect the expected degree of perceived ease of use through an expected increase in internal control, before the actual learning even takes place. During the learning process, the actual training and support offered by peers and organization increase the perceived level of ease of use through the increase in internal control. Internal control, on the other hand, increases due to actual performance accomplishments, vicarious experience, and verbal persuasion.

Perhaps even more importantly, however, the categorization can potentially offer new understanding of how the characteristics of a technology affect behavioral intention. By categorizing the characteristics of a technology into task-technology, and technology-human factors, the researchers and practitioners can explore how and why certain characteristics of a technology affect behavioral intention at different stages of the individual's adoption process. For example, arguably it is the human-technology factors that affect how easy or difficult it is to learn how to use a particular technology. In contrast, task-technology factors affect what kind of benefits the potential users expect out of the use itself. Although some characteristics of a technology might still be difficult to categorize based on the proposed framework – as the concepts are always more or less subjective, as well as continuums rather than dichotomies – the framework offers the basic mechanisms how the characteristics of a technology are connected to the intention formation process and adoption decision.

7.4 Limitations

Before drawing any definitive conclusions based on the results, it's important to consider the limitations of the study. First, some of the drawbacks of the sampling method utilized in this study include that a given simple random sample may misrepresent the target population when it is small (Malhotra & Birks 2000, p. 358). As some of the sample sizes utilized in this study were in fact quite small (23 at the lowest), some of the results should be interpreted with caution. Furthermore, non-response bias may be present in the results due to the nature of the sampling method.

When it comes to the measurement scales used to measure the respondent's perceptions, some methodological limitations in construct development took place. As there were quite many new measurement scales, some further procedures in developing the scales would be preferable. For example, pretest interviews could have been conducted to assess the semantic content of the items. (Davis 1989, p. 323) Instead, the new scales were more or less developed on the basis of subjective evaluation by the author.

As nomological validity, convergent validity, nor discriminant validity weren't demonstrated in this study, overall construct validity couldn't be ensured. However, even though convergent, discriminant and nomological validity could seemingly be established, construct validity might still be questioned (e.g. see discussion of perceived enjoyment construct in Venkatesh & Bala's study in chapter 4.2). Thus, construct validity requires a sound theory of the nature of the construct being measured and how it relates to other constructs (Malhotra & Birks 2000, p. 308). Consequently, the building of the conceptual model has received special attention in this study.

When it comes to the questionnaire itself, the questionnaire items were not randomly distributed among the questions, although this practice is recommended by some authors (Adams et al. 1992, p. 229). This may affect the way how the respondents answered to items belonging to the same scale, and bias may have been introduced as a result. Furthermore, the pretest that was conducted for the questionnaire was fairly limited. Thus, it's difficult to say whether the respondents had any troubles understanding the questions the way they were meant to be understood by the researcher.

When considering the results related to the degree of familiarity with sales configurators, two limitations take place. First, the frequency of utilization was not measured in this study. It might very well be, for example, that out of those who had used a sales configurator for submitting product orders to their suppliers, only a handful actually uses one regularly. Second, the measure for previous sales configurator experience did not specify the context of use. For example, some respondents may have heard of or used a sales configurator at home, while others may have get acquainted with the a sales configurator at work.

7.5 Future directions

Construct validity was not demonstrated here, but left for the future. Indeed, the first step for the future research should be to verify or falsify the proposed mechanisms and the causal flow from one group of factors to the next. Although intention – outcome relationship have been demonstrated in numerous adoption studies, new outcome (perceived learning cost and perceived learning enjoyment) constructs were introduced. Thus, their alleged role in an individual's adoption decision formation should be either falsified or verified. Moreover, the relative importance of perceived usefulness and perceived enjoyment in intention formation process should be reconsidered in the light of task importance's effect, as discussed in chapter 7.3.

Second, future research should attempt to falsify or verify the relationship between outcome judgements and efficacy expectations. Although this relationship is proposed in the social cognitive theory, the theory of planned behavior explains that efficacy expectations should have a direct effect on intention. TPB postulates this relationship on the basis of empirical – rather than theoretical – factors, however (Ajzen 2002, p. 667). Moreover, a new type of an efficacy construct (perceived effectiveness) was introduced. Future research should continue developing the measure, as currently the semantic content of the measure was mainly based on the author's own subjective judgement. Naturally, its role could consequently be examined in technology adoption context.

Third, future research should attempt to falsify or verify the alleged relationship between efficacy expectations and control factors. The information systems acceptance literature has been divided into two: one stream investigating the factors predicting behavior, and the other concentrating on examining and categorizing the characteristics of the system itself. Still to date, an obvious gap between these two streams remains. By connecting the characteristics of the technology to the efficacy expectations, this thesis work attempts to justify the role of technology characteristics in an individual's adoption decision formation context.

If the conceptual model could be verified, it could fairly easily be adapted to different technology adoption research settings than the one examined here, as well. For example, in guided selling tool context, the target behavior could be specified differently to get more varied information of digital guided selling tool's potential in different use contexts. Questions such as "*In what way do the distributors use the sales configurators?*" could be answered more specifically. For example, do the distributor representatives prefer to use sales configurators as selling tools, or as an ordering tool?

General examples for the development of measurement items have been given below:

- **Intention:** I intend to use [information system] for [specified task].
- **Perceived usefulness:** Using [information system] for [specified task] improves my work performance.
- **Perceived enjoyment:** Accomplishing [specified task] with [information system] is more enjoyable than accomplishing [specified task] with my current methods and means.
- **Perceived learning cost:** Trying to learn how to use [information system] means that I have to sacrifice my time and effort.

- **Perceived learning enjoyment:** Trying to learn how to use [information system] would be enjoyable.
- **Perceived effectiveness:** With [information system] I would be able to conduct [specified task] effectively/efficiently/easily/effortlessly/accurately/etc.
- **Perceived ease of use:** My interaction with [information system] would be clear and understandable.

By substituting the target behavior and the examined system in question to the above items, researchers could fairly easily measure other types of behaviors relating to other kinds of technologies. In addition to the above, utilizing task-technology or human-technology fit measures the researchers could attempt to recognize the most important characteristics of a technology that contribute to an individual's adoption decision in a given context.

In summary, this thesis work offers several new interpretations of the previously presented results in the technology adoption literature, and, as a consequence, several interesting avenues for future research have been offered. By looking back at the social psychology literature, this text argues that some previously presented results may very well have been misinterpreted. Thus, the current technology acceptance models may be insufficient in explaining the connection between the characteristics of a technology and an individual's adoption decision. As now the first step toward a new conceptualization has been taken, further work may naturally follow in the future.

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APPENDIX A: QUESTIONNAIRE ITEMS

Intention
Assuming I had the opportunity to use a sales configurator in my work…
I would intend to use it.
I would probably use it.
I would try to use it.
I would be motivated to use it.

Perceived usefulness
I believe that…
Using a sales configurator for configuring products would improve my work performance.
Using a sales configurator for configuring products would increase my productivity.
Using a sales configurator for configuring products would improve my effectiveness in my work.
Using a sales configurator for configuring products would increase the quality of my work.

Perceived learning cost
I believe that…
Using my time for learning how to use a sales configurator would not affect the execution of my other work tasks.
Learning how to configure products with a sales configurator would not require significant effort from me in my work.
Spending time to learn how to operate a sales configurator wouldn't prevent me for doing anything important.
Learning how to configure products with a sales configurator wouldn't take much time away from my other duties in my job.

Perceived enjoyment
I believe, that when compared to other configuration methods available to me, using a sales configurator would be…
More enjoyable.
More pleasant.
More interesting.
More exciting.

Perceived learning enjoyment
I believe, that learning how to use a sales configurator would be…
Enjoyable.
Pleasant.
Interesting.
Exciting.

Perceived effectiveness
I believe, that with a sales configurator I could…
Configure products efficiently.
Configure products quickly.
Create accurate product configurations efficiently.

Efficiently create product configurations that are of good quality in every respect.
Easily showcase product solutions to my customers.

Perceived ease of use
I believe that…
Using a sales configurator would not require a lot of effort from me.
Using a sales configurator would be easy for me.
Configuring products with a sales configurator would be easy for me.
My interaction with a sales configurator would be clear and understandable.

Information quality
I believe, that…
A sales configurator would provide complete information for configuring products.
A sales configurator would provide sufficiently comprehensive information for configuring products.
A sales configurator would provide sufficiently precise information for configuring products.
A sales configurator would provide relevant information for configuring products.
A sales configurator would provide accurate information.
A sales configurator would provide reliable information.
A sales configurator would provide information that is always correct.
A sales configurator would provide information that is up-to-date.

System adaptability
I believe, that…
A sales configurator would provide sufficiently versatile functions keeping different configuring needs in mind.
A sales configurator would provide versatile functions for different configuring situations.
A sales configurator would flexibly adapt to different configuring needs.
A sales configurator would flexibly adapt to different configuring situations.

Ease of navigation
I believe, that…
Navigating a sales configurator would be easy.
A sales configurator could be navigated fluently.
Navigating a sales configurator would be effortless.

Format quality
I believe, that…
A sales configurator would present information in an understandable format.
A sales configurator would present information in a clear format.
A sales configurator would present information in an illustrative format.
A sales configurator would present information in a format that is easy to perceive.

System accessibility
If I had the opportunity to use a sales configurator in my work, I believe that…
I could access it wherever I would need it.
I could access it whenever I would need it.
I could access it fluently.

I would have sufficient equipment for using it.

Level of customer interaction

Detailed information about customer requirements is a necessary input for a sales configurator. I believe, that…

I would be able to get the necessary product specifications fluently from the customer.

Obtaining product specifications from the customer would be easy for me.

I would be able to obtain product specifications effortlessly from the customer.

I would be able to get sufficiently accurate product specifications from the customer.

Formal support

Assuming I ought to use a sales configurator in my work, I believe that…

I would receive a comprehensive training for how to operate it.

I would receive complete instructions for using it.

My company would support me if I required training in its use.

My supplier would support me if I encountered difficulties in learning how to operate it.

My supervisor would help me to arrange time for learning to operate it.

My supervisor would support me in learning to operate the tool.

Informal support

Assuming I ought to use a sales configurator in my work, I believe that…

My work colleagues would support me in learning to use it.

My work colleagues would readily help me should I require support related to its use.

I would receive guidance when required from my work colleagues should I encounter difficulties in its use.

Perceived task importance

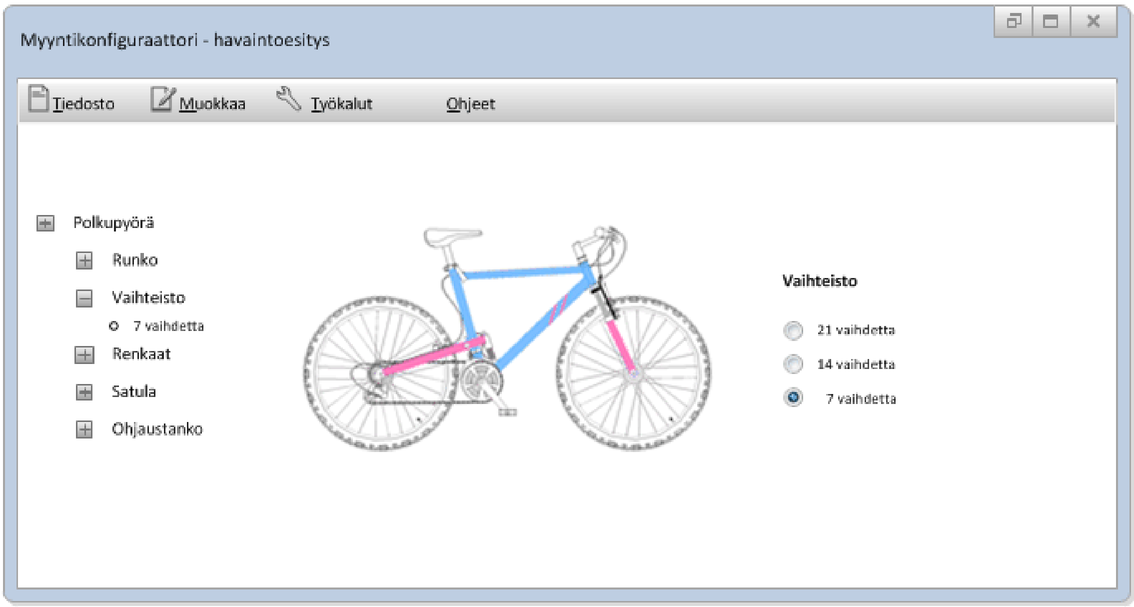
Configuring products is important in my job.

It is useful for me that I'm able to configure products in my work.

Configuring products is a relevant task for me in my work.

My work performance is dependent on my ability to configure products.

APPENDIX B: SALES CONFIGURATOR INTRODUCTION



APPENDIX C: DETAILED RESULTS FOR INDIVIDUAL QUESTIONNAIRE ITEMS

Intention	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Total**	**Mean**	**Stdev**
Q1	2	4	4	21	34	50	15	130	5,24	
Q2	2	4	4	16	42	47	15	130	5,25	
Q3	2	2	2	23	31	55	15	130	5,34	
Q4	2	2	3	25	33	52	13	130	5,25	
Summative scale*									**5,27**	**1,16**

Perceived usefulness	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Total**	**Mean**	**Stdev**
Q1	4	8	3	42	49	17	5	128	4,52	
Q2	5	7	6	42	42	21	5	128	4,50	
Q3	4	7	5	37	49	20	6	128	4,59	
Q4	4	10	8	44	41	14	7	128	4,39	
Summative scale*									**4,50**	**1,21**

Perceived enjoyment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Total**	**Mean**	**Stdev**
Q1	1	7	9	64	27	17	4	129	4,36	
Q2	1	7	6	62	29	19	5	129	4,46	
Q3	1	1	6	58	36	19	8	129	4,67	
Q4	1	2	5	61	34	19	7	129	4,63	
Summative scale*									**4,53**	**1,02**

Perceived learning cost	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Total**	**Mean**	**Stdev**
Q1	5	16	39	20	26	20	3	129	3,91	
Q2	4	12	29	28	33	19	4	129	4,14	
Q3	5	10	28	27	25	28	6	129	4,28	
Q4	8	18	36	20	28	16	3	129	3,79	
Summative scale*									**4,03**	**1,36**

Perceived learning enj.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Total**	**Mean**	**Stdev**
Q1	2	12	16	40	44	14	2	130	4,25	
Q2	2	9	13	46	34	24	2	130	4,39	
Q3	1	0	7	23	38	49	12	130	5,25	
Q4	2	4	7	31	37	39	10	130	4,95	
Summative scale*									**4,71**	**1,08**

Perceived effectiveness	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Total**	**Mean**	**Stdev**
Q1	1	2	5	14	41	54	13	130	5,35	
Q2	1	1	8	16	38	52	14	130	5,32	
Q3	1	3	6	20	38	50	12	130	5,22	
Q4	1	3	9	19	39	49	10	130	5,15	
Q5	0	3	7	14	27	57	22	130	5,49	
Summative scale*									**5,31**	**1,05**

Perceived ease of use	1	2	3	4	5	6	7	Total	Mean	Stdev
Q1	1	7	13	19	39	40	10	129	4,92	
Q2	1	3	8	16	38	47	16	129	5,26	
Q3	1	6	8	26	35	45	8	129	4,98	
Q4	1	2	8	34	42	32	10	129	4,94	
Summative scale*									**5,03**	**1,14**

Information quality	1	2	3	4	5	6	7	Total	Mean	Stdev
Q1	0	2	3	13	41	64	7	130	5,41	
Q2	0	3	5	21	39	52	10	130	5,25	
Q3	0	5	3	22	32	59	9	130	5,26	
Q4	0	2	2	20	37	58	11	130	5,38	
Q5	2	4	10	20	25	44	25	130	5,26	
Q6	0	1	6	21	30	48	24	130	5,46	
Q7	4	7	12	22	29	33	23	130	4,97	
Q8	0	3	7	19	34	41	26	130	5,39	
Summative scale*									**5,30**	**1,00**

System adaptability	1	2	3	4	5	6	7	Total	Mean	Stdev
Q1	0	6	9	15	47	47	3	127	5,02	
Q2	0	3	5	15	51	50	3	127	5,18	
Q3	0	5	10	24	46	38	4	127	4,90	
Q4	1	4	11	23	48	37	3	127	4,86	
Summative scale*									**4,99**	**0,99**

Format quality	1	2	3	4	5	6	7	Total	Mean	Stdev
Q1	0	1	7	15	29	66	12	130	5,45	
Q2	0	2	4	18	31	61	14	130	5,44	
Q3	0	2	3	19	27	65	14	130	5,48	
Q4	0	1	4	21	33	60	11	130	5,38	
Summative scale*									**5,44**	**0,96**

Ease of navigation	1	2	3	4	5	6	7	Total	Mean	Stdev
Q1	0	3	6	23	34	58	6	130	5,20	
Q2	0	3	4	27	31	58	7	130	5,22	
Q3	0	3	6	25	31	58	7	130	5,20	
Summative scale*									**5,21**	**1,05**

System accessibility	1	2	3	4	5	6	7	Total	Mean	Stdev
Q1	1	1	11	20	38	45	12	128	5,16	
Q2	1	2	8	17	34	54	12	128	5,27	
Q3	0	3	6	11	31	58	19	128	5,50	
Q4	0	3	8	8	22	64	23	128	5,60	
Summative scale*									**5,38**	**1,05**

Level of customer inter.	1	2	3	4	5	6	7	Total	Mean	Stdev
Q1	0	5	11	14	33	58	9	130	5,19	
Q2	0	11	12	21	33	43	10	130	4,88	
Q3	0	12	17	17	40	36	8	130	4,73	
Q4	1	5	11	14	42	48	9	130	5,08	
Summative scale*									**4,97**	**1,22**

Formal support	1	2	3	4	5	6	7	Total	Mean	Stdev
Q1	2	9	10	23	47	31	8	130	4,76	
Q2	2	8	15	25	44	30	6	130	4,65	
Q3	3	3	11	18	35	45	15	130	5,11	
Q4	2	0	7	23	38	46	14	130	5,22	
Q5	6	7	9	27	33	38	10	130	4,75	
Q6	5	5	9	25	34	41	11	130	4,88	
Summative scale*									**4,90**	**1,16**

Informal support	1	2	3	4	5	6	7	Total	Mean	Stdev
Q1	1	2	9	12	28	66	12	130	5,38	
Q2	2	1	6	15	28	66	12	130	5,40	
Q3	2	2	5	15	28	65	13	130	5,40	
Summative scale*									**5,39**	**1,13**

Perceived task imp.	1	2	3	4	5	6	7	Total	Mean	Stdev
Q1	4	13	13	20	37	31	12	130	4,65	
Q2	4	11	13	10	41	35	16	130	4,86	
Q3	10	21	22	15	26	27	9	130	4,10	
Q4	19	28	15	22	17	23	6	130	3,64	
Summative scale*									**4,31**	**1,56**

* The scale score has been divided by the number of scale questions.