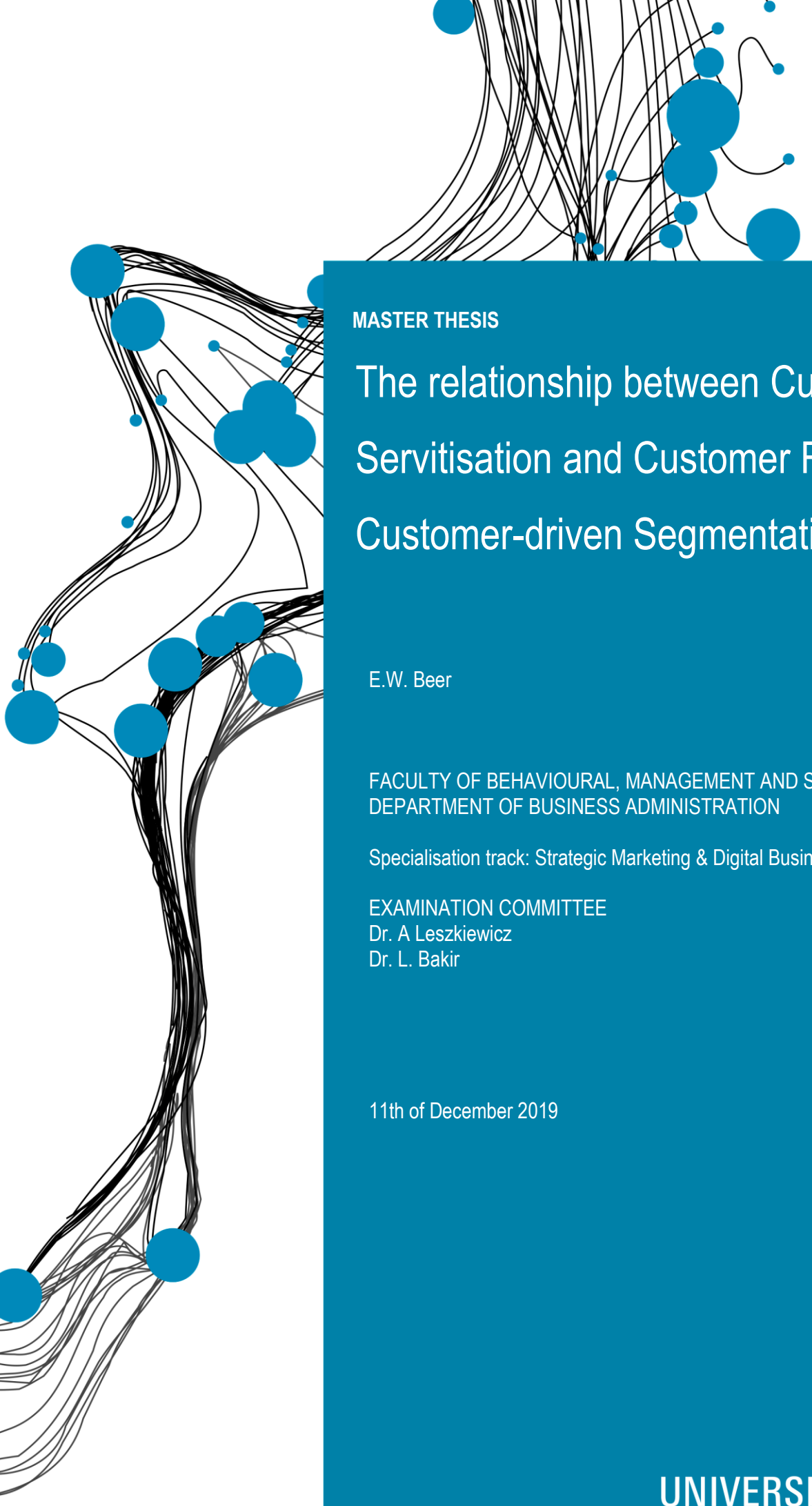

MASTER THESIS

The relationship between Customer Servitisation and Customer Revenue: A Customer-driven Segmentation of SaaS.

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I hope you enjoy reading it!

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Elise Beer

Abstract

The last decade is characterised by the upcoming importance of services and IT. Companies focus on customer-oriented strategies. In this case-study the link between customer servitisation and customer profit is explored. The research consists of two separate studies, using the same sample. Study 1 focuses on the intention to adopt Software-as-a-Service (SaaS) and perceived benefits and risks of SaaS. Study 2 focuses on the link between customer servitisation and customer profit. A market segmentation is part of study two. The results of study 1 show no significant relationship between the benefits and risks of SaaS on the adoption readiness. From the results of study two can be concluded that there is a significant relationship between customer servitisation and customer profit. Companies within the sample requesting for additional services around a core product are those who deliver a significant higher value to the firm.

KEYWORDS

Software-as-a-Service(SaaS), Servitisation, Customer Profit, Market Segmentation.

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1. Introduction

The interest of bundling products and services to create a customer-driven approach has grown rapidly over the last decade and is seen in manufacturing and software firms (Valtakoski & Witell, 2018). Software-as-a-service (SaaS) has been a new paradigm for delivering services, which provides access to applications to end users through the internet without upfront investment in infrastructure and software (Pang, Ren & Peng, 2018). The last decade is also characterized by the upcoming importance of information technology (IT) and SaaS is said to provide numerous benefits for software users, as well as risks (Benlian, Koufaris & Hess, 2012).

A customer-driven approach is linked to building strong relationships with customers, to retain and maintain value. Relationship marketing assumes that firms can by more profitable if they identify the most profitable customers (Malthouse & Blattberg, 2005). Nowadays, to create additional customer value, firms offer additional services to their core product, which is described as 'servitisation' (Vandermerwe & Rada, 1988). Evidence from several manufacturing industries suggests that this 'servitisation' strategy has the potential to generate more firm value, yet sometimes can also produce a decrease in firm value, for example in high growth industries (Eggert et al., 2014; Suarez et al., 2013). This is also called the service paradox in servitisation (Brax, 2005). For instance, manufactures move away from product-related services by extending their service offerings with customer-supporting services; which changes the focus of value proposition as the product becomes a part of the offering instead of being the centre of it (Gebauer et al., 2004; Gebauer et al., 2005).

This change of the focus of value proposition can be linked to a more customer orientated strategy (Visnic et al., 2013). Using this strategy, manufacturers can better meet customer needs and create more customer value. Hence, servitisation can be linked to customer value. The mixed evidence of the service paradox, with a servitisation strategy having the potential to increase or even decrease firm value, should be explored in terms of customer profit. The profit of a customer can increase or decrease the value of the firm whilst buying more additional services in combination with the core product.

Accordingly, the goal of this study is to test the relationship between customer profit and customer servitisation, which can be described as the impact from implementing additional services on revenue. Next, the degree of servitisation (low, medium or high) is linked to SaaS adoption readiness in the following way; A company with higher SaaS adoption readiness is willing to buy more additional services, thus more 'servitised'. To

identify the SaaS adoption readiness, the perceived benefits and risks of SaaS are explored. Regardless the research that investigated the outcomes of servitisation and its effect on financial performance, there are no studies focusing on the existence of the relationship between servitisation and customer profit (Ambrose et al., 2018; Eggert et al., 2014).

This case study research is conducted at a software company that has developed a platform for hosting various tooling/applications for a software development build street. Currently, little is known about the profitable and valuable customers for a full-operational SaaS. Therefore, the first step to identify potential and valuable customers' is set, by segmenting the market. The service is a full-operational service, which implies that customers (b2b) can outsource their entire tooling and applications of the software process to the software company, therefore the link to customer servitisation is made.

1.1. Focus of the research

The goal of this research is to segment a market based on two variables, customer servitisation and customer profit. Customer servitisation is defined as the impact on revenue from additional services and the focus of a business customer on service strategies. Customer profit is the revenue minus the costs, accounted for firmographic variables. This two-dimensional segmentation will analyse if business customers who provide the company more profit are also more servitised, or paradoxical. The research consists of two studies, both performed with the same sample.

The first study focuses on the link between SaaS adoption and the degree of servitisation. This study firstly explores the most common perceived benefits and risks in SaaS adoption with interviews and a survey is conducted to measure the impact of the perceived benefits and risks on the intention to adopt SaaS. This study is performed to verify the link between the perceived benefits and risk and the intention to adopt SaaS, to look at which business customer will potentially adopt more SaaS.

The second study focuses on the link between customer servitisation and customer profit. First, the customer profit of each business customer is calculated. Next, this customer profit is compared to the customer servitisation of each business customer. Last, a market segmentation is performed on the two variables to discover newly undiscovered market segments. The link between customer servitisation and customer profit has not been explored before and gives insight in the most profitable customers.

1.2. Research questions

This study consists of one central research-question, which is formulated as follows:

"How can the market for a Software-as-a-Service (SaaS) be segmented based on customer servitisation and customer value?

To answer this central research question there are three sub-questions formulated. The first sub-question is answered in study one, the second and third sub-questions are answered in study two. The answers to these questions will lead to a conclusion for the central research question.

1) What is in existing literature known about benefits and risks of SaaS and what benefits and risks of SaaS are frequently perceived by customers?
2) What is the relationship between customer servitisation and customer profit?
3) Which segments exist based on customer servitisation and customer profit?

1.3. Contribution

Academic

Servitisation is not new, since it is first described in literature in 1988 (Vandermerwe & Rada, 1988). A lot of articles have been published about this phenomenon and servitisation has become a growing trend (Zhang & Banerji, 2017). According to Lightfoot, Baines and Smart (2013), the studies on servitisation have grown from 22 in the period 1991 to 2000 to more than 100 in the period 2001 to 2010. Customer servitisation depends on the share of revenue spent on services, but more services bought from the provider do not automatically result in more profit created, as more services imply higher effort from the provider (Eggert et al., 2014). Theoretically, an implicit positive relationship between servitisation and a firm's financial performance has been posited (Antioco et al., 2008; Homburg et al., 2002; Malleret, 2006). However, empirical evidence regarding this relationship is quite inconclusive, as empirical results are far from convergent (Ambroise et al., 2018). The studies are presented in table 1 to address the academic contribution.

Table 1: Empirical Studies Financial Performance and Servitisation

	Servitisation	*Customer Servitisation*	*Financial Performance*	*CLV (CFP)*	*Industry*	*Contribution*
Antioco et al., 2008	Yes	No	Yes	No	Manufacturing	Services in support of the client's action leverage relative product sales, while services in support of the product generate service volume.
Homburg et al., 2002	Yes	No	Yes	No	Retail	A service-oriented business strategy positively affects company performance, and thus profitability
Mallaret, 2006	Yes	No	Yes	No	Industrial	Only companies with well thought-out policy for development of organisation of services can be profitable.
Ambroise et al., 2018	Yes	Yes	Yes	No	Manufacturing	all servitisation strategies can lead to increased performance, but only with specific COOD configurations
Master thesis Elise Beer (2019)	Yes	Yes	Yes	Yes	Software	Link customer servitisation to customer profit

The theoretical contribution of this study concerns the little existing evidence on the relation between customer profit and customer servitisation. Two studies, one on SaaS adoption and one on customer servitisation and customer profit, are central in this research. Additionally, a market segmentation is performed Although many theories and models are said to segment business-to-business (B2B) markets, a segmentation based on customer servitisation and customer profit is new. This new market segmentation is customer-driven, because the customers point of view is central, and therefore fits with servitisation.

Practical

Most marketers and managers feel comfortable with so-called accepted or recognized industry segmentations. These are mostly product-based rather than customer-based (Weinstein, 2007). Creativity in market analysis is highly encouraged. Thus, original and innovative segmentation bases as in this research help the company to find market segments and niches that competitors might have overlooked (Weinstein, 2007). Consequently, segmentation based on customer servitisation and customer profit could result in finding market segments that have not been explored before. Finding out which market segments possess a higher customer servitisation and provide more profit can help managers adapt to this and choose the right strategy to target most valuable customers. Furthermore, customers are asked which benefits and risks of SaaS they perceive as most important, and a link to SaaS adoption readiness is made. In doing so a confirmation of what is found in literature can contribute to the understanding of these benefits in a real-world context. This research is conducted at a software company and the results might therefore be interesting to other companies in this sector.

1.4. Outline of the thesis

The following section, chapter two, presents the literature review, which consists of two parts. The first part contains concepts for study one: SaaS, the intention to adopt SaaS and SaaS risks/benefits. The second part contains concepts for study two: customer servitisation, customer profit and market segmentation. Following, chapter three is the methodology chapter, which describes the case study and the two studies performed in this research. Chapter five presents the main findings of this research, whereas the last chapter presents the conclusions, limitations and directions for future research.

2. Conceptual framework

This chapter contains an introduction to the key concepts of this research. Firstly, the concepts which are central in study one are elucidated: SaaS, the intention to adopt SaaS and SaaS benefits/risks. Secondly, concepts central in study two are introduced: Customer servitisation, customer profit and market segmentation. An overview of the literature search queries can be found in appendix 1.

2.1. Software-as-a-Service (SaaS)

Foremost, it is important to acknowledge that Software-as-a-Service is part of cloud services, which are service solutions based on cloud computing (Catteddu & Hogben, 2009). Cloud computing refers to a computing model that enables the provision of ubiquitous, network-based and on-demand services to individual users and organisations (Gashami et al., 2016). The three predominant service models in cloud computing are infrastructure, platform and Software-as-a-Service, shortened to IaaS, PaaS and SaaS (ibid.). IaaS provides basic storage and computing capabilities as standardized services over the network (Bele, 2018). PaaS is a layer of software or development environment which is encapsulate and offered as a service (ibid.). However, SaaS is a model wherein a complete application is offered to the customer, as a service on demand (ibid.). Next to a SaaS-service, the firm offers the full-operational service on a private cloud, meaning that they are built exclusively for a single enterprise.

SaaS has been defined as "an application or service that is deployed from a centralized datacentre across a network, providing access and use on a recurring fee basis, where users normally rent the applications/services from a central provider" (Seethamraju, 2016, p. 484). In the case of this research, the 'central provider' is the focal company of this research. Some examples of well-known SaaS solutions for personal use are Yahoo Mail, Google Docs, Facebook and Twitter. For business users, examples include enterprise resource planning (ERP) software and customer relationship management (CRM) software. SaaS is perceived as an innovative technology that can provide its adopters with several strategic and operational advantages (Van De Weerd, Mangula & Brinkkemper, 2016). Often mentioned advantages include cost savings, increased flexibility and the reduced need for up-front investments or skilled IT workers (Benlian & Hess, 2011).

According to Bhardwaj, Jain & Jain (2010) SaaS is the most popular type of cloud computing service because of its high flexibility, scalability, high performance and less maintenance. SaaS enables service subscribers to access a software application from a

software vendor through the web (Wu, 2011). This software vendor offers access to this software as an online service (Huxtable & Schaefer, 2016). On the customer side, SaaS means no upfront investment in servers or software licensing; on the provider side costs are low compared to conventional hosting (Knorr & Gruman, 2008). SaaS has a big influence on clients and organisations. Namely, clients being able to access their data and documents from any device, and organizations can rent their computer power (both software and hardware) and storage from a service provider (Etro, 2009).

2.1.1. Intention to adopt SaaS

The analysis of risks and benefits of SaaS is a long-time issue in management (Kim, Jang & Yang, 2017). Organisations have doubts which factors should be mostly considered in the adoption of SaaS (Safari, Safari & Hasanzadeh, 2015). Firms decisions on adoption are shaped considering the specific environment where they are established (Oliveira et al., 2019). One firm could perceive something as a benefit, while another experiences a risk, depending on the environment they are established in. IT influences almost every aspect of organisational life and generally intend to contribute to performance and growth by increasing productivity, competitiveness, efficiency and effectiveness (Lee & Xia, 2006). Adoption is defined as "a decision to make full use of an innovation as the best course of action available" (Rogers, 1995, p. 21). There are various theories used to find factors that significantly or sometimes insignificantly influence SaaS adoption in organisations. Factors can be found within the organisation, but also in the organisation's environment and in the technological characteristics of SaaS. The Technology-organization-environment (TOE) framework, developed by Tornatzky and Fleischer (1990) covers all of these aspects and has been used extensively to investigate cloud services adoption (Van De Weerd, Mangula & Brinkkemper, 2016).

There are several theories and explanatory frameworks developed to analyse IT adoption, helping us to understand the technology itself and the effect on a firm's productivity and competitiveness (Oliveira & Martins, 2011). One often-used framework is the technology-organization-environment (TOE) model. This TOE framework explains the different factors that influence innovation adoption at a firm level taking into consideration the technological, organizational and environmental contexts (Oliveira et al., 2019).

2.1.2. SaaS benefits and risks

In latest years there are numerous articles written about the benefits and risks of cloud computing, or specifically SaaS. Literature emphasizes SaaS as a leading type of cloud service (Wu, Lan & Lee, 2011). The benefits and risks found in literature are split into three categories, following the TOE framework:

Technological

Technology-related factors encompasses the technical infrastructure and human knowledge that can influence the firm's adoption of an innovation (Oliveira et al., 2019). The architecture of SaaS shifts the responsibility of the maintenance, availability and security procedures from the client side to the supplier. Security risks are the main risks that users perceive of SaaS (Subashini & Kavitha, 2011). These risks are attached to the use of cloud services, so called cloud security risks. Tang and Liu (2015) asked security directors and managers about their main concerns. 49% of participants responded with data privacy issues as main concern. Compliance issues were placed second. Other technological drivers are simplicity, experienceability, compatibility and relative advantage (Yang et al., 2015). Reliability and features are also found to be drivers of the technological-related factors (Benlian, Koufaris & Hess, 2011).

Organisational

Top management support plays a vital role in the adoption of new technologies and several studies have been conducting using this variable for the study of IT diffusion.
Loukis, Janssen and Minchev (2019) recently conducted a research to uncover determinants of SaaS benefits and the impact on firm performance. They described and used two categories of benefits: operational and innovational. Operational benefits are related to a firm's existing operations/processes, and concern reduction of the cost and the improvement of the quality of their electronic support (Venters & Whitley, 2012). Innovational benefits are related to innovations in a firm's processes, product and services, and concerns their rapid and low-cost electronic enablement (Benlian & Hess, 2011).

Environmental

Research lacks for understanding on what extent institutional pressures influence cloud services (Oliveira et al., 2019). The environment context reflects the environment surrounding the firm's activity. Elements like the industry, competitors, and regulatory

bodies illustrate the environment context (Venkatesh & Bala, 2012). Interacting with these elements allows the firms to take advantages, but also constrains its activities (Damanpour & Schneider, 2006). Elements converted into institutional pressures are found to be significant for SaaS adoption (Yoon & George, 2013). Firms operate as part of a specific environment, and their decisions are shaped by its context (DiMaggio & Powell, 1983; Ke et al., 2009).

2.1.3. Degree of servitisation

The degree of servitisation can be linked to SaaS adoption readiness. Firms with higher SaaS adoption readiness, will have a higher level of servitisation, since adopting SaaS can be related to adopting additional services around the core product. Additional services of SaaS are for example outsourcing support, maintenance and updates (Bhardwaj, Jain & Jain, 2010).

2.2. Customer Servitisation

Since Vandermerwe and Rada (1988) exposed the servitisation phenomena, research has progressed steadily (Baines et al., 2017). Customer servitisation of implies "The innovation of an organization's capabilities and processes to better create mutual value through a shift from buying products to buying product service systems (PSS)." (Baines et al., 2009, p. 552) in which PSS are integrated product and service offerings that deliver value-in-use. The shift from buying core product only, to buying additional services is described as moving away from the goods-dominant logic to the service-dominant logic (Vargo & Lusch, 2004).

This service-dominant logic is in line with servitisation, meaning that a physical product is no longer the basis of exchange and the process of value creation that translates business strategies into value to customers and suppliers is changing dramatically (Rajala et al., 2013). Servitisation implies a strong relationship between provider and customer, since the dependency is higher the more firms can offer 'bundles' to their customers (Vandermerwe & Rada, 1988). Services developed will be closer to the current needs of customers and more likely to ensure market success (Gebauer et al., 2005).

In servitisation literature there are three common categories of services that firms can offer. These categories are distinguished on the basis of the value proposition of customers (Baines & Lightfoot, 2013). In the first category, customers 'who want to do it themselves' will own and repair products or assets themselves (Baines & Lightfoot, 2013). In the second category, customers 'who want us to do it with them', will carry out some maintenance

themselves, but engage the provider for more significant repair and overhaul. In the third category, customers 'who want us to do it for them', will contract for the capability offered through their use of the product or service, and have the provider take care for everything else (ibid.).

2.3. Customer profit

Prior studies have investigated the application of financial theories to marketing decisions (Tarasi et al., 2011). Any sustainable business first creates value for its customers through firm offerings and, in the process, derives value from its customers in the form of profit (Kumar, 2018). The value of a customer or profit made from a customer has been studied under a lot of different names. Examples are CFP (Customer future profitability), LTV (Lifetime Value), CLV (Customer Lifetime Value) and CE (Customer equity) (Kim & Kumar 2018). Accordingly, there are a lot of different accounting measures for customer value. This research draws on marketing literature for customer value.

A metric which is often used in the marketing field to measure the value of a customer is customer profit (Petersen et al., 2009). This implies the profit the customer brings to the company, referring to the economic value of the customer relationship to the firm, expressed as profit, net profit or contribution margin (Kumar, 2018). This is the direct economic value contribution of a customer. Determinants of customer assets, one of the approaches to value customers in a general form with customer future profitability (adopted from Kumar, 2018) can be formulated as follows:

Equation 1: Customer Future profitability

$$CFP = (Transaction\ behaviour, marketing\ costs, firmographic\ variables, economic\ variables)$$

Simply put, the future profitability or future profit of a business customer depends on their past and current transaction behaviours, the marketing costs to acquire this customer, the identify and profile of the firm (firmographic factors) and the economic environment of the firm. Transactions behaviour broadly includes all past and current transaction variables and marketing costs include past, current and future promotional costs (towards customer acquisition, retention and win-back) (Kumar, 2018). Firmographic variables include the type of industry, the size of the firm, the level of annual revenue and so on (Kumar, Zhang & Luo,

2014). Economic variables such as gross domestic product (GDP) per capita help determine the consumption pattern of a country (Sunder, Kumar & Zhao, 2016).

Retaining customers has been considered one of the most critical challenges among those included in Customer Relationship Management (CRM) and behavioural metrics for customer lifetime value or profit include acquisition rate, retention rate, acquisition channel, tenure, purchase frequency and value of purchases. The first purchase value is also a strong indicator, because it refers to trust and strength of the relationship between buyer and supplier (Kumar et al., 2010). This can be referred to as the total customer engagement value as well.

2.4. Market segmentation

A major facet of a marketing strategy is the notion of segmentation, where large overall markets are broken down into more manageable 'chunks' towards which the selling organization can better target its marketing efforts (Ellis, 2010). Segmentation helps organizations to manage diverse customer needs by identifying homogenous market segments (McDonald & Dunbar, 2004; Simkin, 2008). The outcome of segmentation is a better understanding of customers and better-tailored marketing programs (Albert, 2003). With more attention given to personalization and customer relationship management, segmentation is a key marketing activity to create value-enhanced experiences, but many B2B marketers do not see segmentation from a strategic perspective (Brotspies & Weinstein, 2019). Business markets can be segmented based on two core sets of characteristics: market characteristics (e.g. customer size and location) and buyer characteristics (e.g. purchasing strategies, decision-making process)(Ellis, 2010).

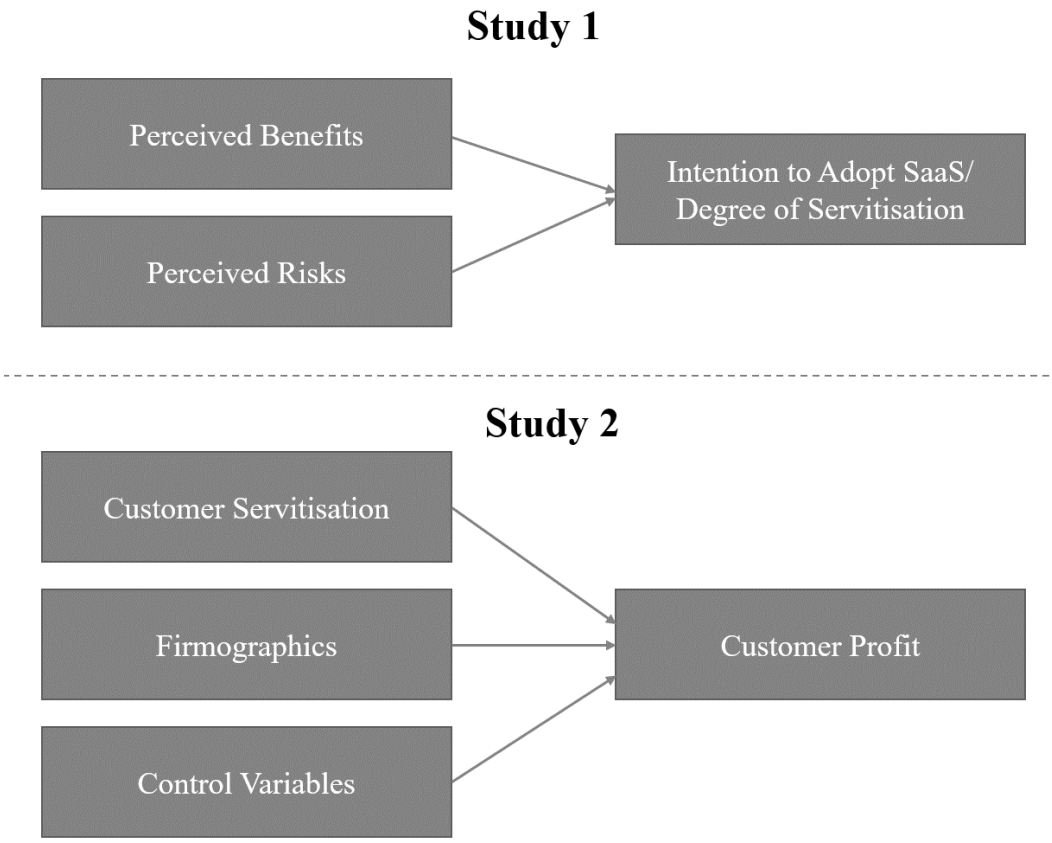
Segmentation on buyer characteristics is more common when collaborative relationships are the norm. Buyer characteristics in context of this research is the percentage of budget spent by a firm on additional services, thus customer servitisation. Since customer servitisation implies a collaborative relationship, because of the dependency between provider and customer, and customer profit relates to a collaborative relationship as well, buyer characteristics are used to segment the market.

2.5. Theoretical concepts

As mentioned above, the influence of perceived SaaS benefits and risks on the intention to adopt SaaS is empirically tested in this research in study one. The intention to adopt SaaS corresponds with the degree of servitisation of an organisation.

In study two a CRM data analysis is needed to explore the drivers of customer profit. Next to that, the relationship between customer profit and customer servitisation is explored. The market segmentation or cluster analysis, based on customer servitisation and customer profit will be realised, which is expected to result in multiple segments. The proposed research model is shown below in figure 1.

Figure 1: Conceptual Framework



3. Methodology

The research was based on non-experimental explorative single case study research and consisted of two studies with four mixed method elements. Study one consists of: First, orientation interviews to gain in-depth reconnaissance about SaaS benefits and risks, and a designed survey to measure the perceived benefits and risks and the degree of servitisation of business customers. Study two includes: A CRM-data analysis to calculate the profit of the business customers and link this to the customer servitisation and a b2b-market segmentation to create different market segments based on customer servitisation and the customer value. Using different mixed methods elements strengthens validity and triangulation. In table 2 data collection methods are displayed.

Table 2: Data Collection Techniques

Variables	Method	Data source	Sample size	Purpose	Study	Research Question
Perceived benefits and risks	Orientation interviews	Current business customers	6	(1) Discover frequently perceived benefits + risks (2) Description of constructs	1	1
Perceived benefits and risks, servitisation	Designed Survey	Current business customers	34	Rating constructs.	1	1
Servitisation, customer Profit	CRM data-analysis	CRM-system	34	(1) Link customer servitisation to customer profit. (2) Discovering drivers of customer profitability	2	2
Servitisation, customer profit	Survey + CRM data-analysis	Survey results + CRM-system	34	Identifying attractive segments	2	3

3.1. Research design

The study was conducted at a software company and its potential and current customers. The software company had a new platform service and wanted to identify market segments for this full-operational service in order to improve and use a customer-driven approach to potential customers. The research was a case-study and adopted an explorative approach since the research question was a how-question and there was no control over behavioural events since it was not an experiment (Yin, 2017). Next to that, the study focussed on a contemporary phenomenon's, i.e. customer servitisation and customer profit, within a real-life context (ibid.).

Both quantitative and qualitative data were used, in order to gain an in-depth and triangulated insight into this specific case. The data used in this research concerned primary and secondary data. Primary data was collected by performing orientation interviews and developing a survey filled in by Dutch current customers. Secondary data was collected by analysing books, journals and the data of the internal CRM system. First, a literature review on the main research constructs was conducted. Second, the perceived SaaS benefits and risks were tested in practice by conducting semi-structured orientation interviews with IT managers from current customers in different sectors. The most frequently perceived benefits and risks were used as input for the survey. The survey was sent to IT managers of current customers of the three teams. A list was compiled out of the CRM-data. It was important for segmentation that the customers consisted of diverse company sizes and were active in different sectors. Company size and level of annual revenue were also used as control variables.

3.2. Case Study (Confidenial)

3.3. Study one: Interviews and Survey

Study one consists of orientation interviews and a designed survey.

3.3.1. Orientation Interviews

Interviews were conducted until respondents did not mention any new benefits and risks as important. The interviewees were contacts (IT managers) of companies that were already customers of the SaaS or (potential) customers that have thought about using SaaS but decided not to or host the SaaS-applications themselves. IT managers were chosen since they are in the decision unit of the software department of a company and can decide about the extent of servitisation and have knowledge about possible risks and benefits. The candidates were sampled by willingness to participate and they all were from a different sector, to ensure a wide orientation on the perceived benefits and risks.

The interviews were not coded. Only the benefits and risks mentioned were counted. As data saturation was reached, the most frequently mentioned benefits and risks were used as input for the survey. The interviews were semi-structured, although a list of questions is created. Before starting the interview sessions, the interviewer introduced herself and explained the goal of the study and how the interview would be conducted. Also, permission to record the interview was granted. The interview questions can be found in appendix 2. First, some general information as company size, IT-department size and function of the interviewee were discussed. Next two open questions about possible benefits and risks of SaaS adoption were asked. By asking these open questions, an unaided recall, or top of mind recall is realised. These questions were followed up as probing questions.

Next, a list of the benefits and risk that were common in literature is walked through with the interviewees, as aided recall. The final question checked if all possible benefits and risks have been mentioned in the interview, or whether there was anything which had not been mentioned before. Below, the characteristics of the six companies that were interviewed are shown in table 3. Next, the perceived benefits and risks mentioned in the interviews are displayed in table 4.

Table 3: Interviewed Companies

Company	*Sector*	*Company Size*	*IT-employees*	*Team responsible*	*Function*
A	Finance	0-49	Medium (20)	*	Technical lead
B	Media	250+	Medium (30)	*	1. Vendor/contract manager 2. Technical control
C	Energy	50-249	Small (5)	*	QA Engineer
D	Retail	250+	Large (60)	*	Information analyst
E	Non-profit	50-249	Small (6)	*	Technical support analyst
F	Cultural	0-49	Micro (1)	*	Project manager

Table 4: Orientation Interviews

(Benefits and risks in order mentioned)

	Company A	*Company B*	*Company C*	*Company D*	*Company E*	*Company F*
Perceived Benefits	1 Quality improvements* 2 Unburden customers* 3 Focus on core* competences 4 Strategic flexibility* 5 Safer than on-premise 6 Cost advantages	1 Quality improvements* 2 Strategic flexibility* 3 Cost advantages* (Less IT-knowledge)	1 Quality improvements* 2 Focus on core competences* 3 Cost advantage* (Less IT-knowledge) 4 Strategic flexibility 5 Unburden customers 6 Customization	1 Focus on core competences* 2 Cost advantage* (Less IT-knowledge) 3 Strategic flexibility	1 Quality improvements* 2 Cost advantages* (Less IT-knowledge) 3 Strategic flexibility 4 Increased mobility and information availability	1 Quality improvements* 2 Focus on core competences* 3 Strategic flexibility 4 Cost advantages (Less IT-knowledge)
Perceived Risks	1 Trust in provider* 2 Economic risk* (actual costs are exposed 3 Strategic risk (Dependence of provider) 4 Performance risk (Less continuity)	1 Strategic risk* (Dependence on provider) 2 Trust in provider 3 Performance risk (Application availability)	1 Strategic risk* (Dependence on provider) 2 Performance risk* (Less continuity and loss of data) 3 Trust in provider	1 Performance risk* (Less continuity) 2 Strategic risk* (Dependence on provider) 3 Economic risks (hidden costs)	1 Strategic risk* (Dependence on provider) 2 Trust in provider* 3 Performance risk* (Less continuity) 4 Economic risk (Actual costs are exposed) 5 Finding the source of problems	1 Strategic risk* (Dependence on provider) 2 Economic risk (Actual costs are exposed) 3 Performance risk (Application availability)

* = unaided recall

3.3.2. Survey Design

After conducting interviews and analysing the results, the constructs for the survey were determined. The survey included the benefits and risks that were mentioned three times or more, meaning at least in half of the interviews. The four benefits mentioned in half of the interviews were strategic flexibility (6/6), cost advantages(6/6), quality improvements(5/6), and focus on core competences(4/). The four risks mentioned in half of the interviews were strategic risk(6/6), economic risk(4/6), performance risk(4/6) and a lack of trust in the provider(4/6). In table 5 the operationalization of all variables used in study one are shown.

The constructs used were pre-defined by other researchers to ensure validity, by actually measuring what is intended to be measured (Benlian & Hess, 2011). All items were answered using a Likert scale ranging from 1 to 7, where 1 refers to the lowest score (i.e. strongly disagree) and 7 to the highest score (i.e. strongly agree). The average time to fill in the survey was about 8 minutes. The complete survey is shown in appendix 4. The survey started with explaining the goal of the research and asked for permission to use the data for research purposes. Since no personal data is collected, except the name of the company the GDPR does not play a role in this part of the research. After participants gave permission to use their data, a hypothetical scenario was sketched to make the participants think in the right direction.

Starting the questionnaire general information as company size and employee function were asked. After that, general questions about the intention to adopt SaaS, perceived benefits and risks in general form were asked. This was done to correct for companies who did not perceive one or more benefits and risks, but rather give their general opinion about the benefit or risks of SaaS. Next, the perceived benefits and risk that were mentioned the most in the orientation interviews were asked. The final question was an open question to ask about their own thoughts regarding perceived risks and benefits. The survey was sent to current customers. To gather enough data, non-probability sampling was used, since current customers were asked to fill in the survey. The list of the sample was taken from of the CRM system of the company, filtered from the last contact moment, which had to be within the last 40 weeks (i.e. from January 2019 onwards).

Table 5: Operationalization Variables Study One.

Variable	*Based on*	*Indicator (All on a 7-point Likert scale)*	*Item*	α
Intention to increase SaaS adoption	Gewald & Dibbern (2009)	1 If there is a superior offer, a SaaS solution should be used for the application domain I am in charge of. 2 Our company should increase the existing level of adopting SaaS-based applications. 3 I support the further adoption of SaaS-based applications.	G1 G2 G3	0.92
Perceived risks general	Featherman & Pavlou (2003)	1 Adopting SaaS applications is associated with a high level of risk 2 There is a high level of risk that the expected benefits of adopting SaaS-based applications will not materialize 3 Overall, I consider the adoption of SaaS-based applications to be risky.	G4 G5 G6	0.93
Perceived benefits general	Gewald & Dibbern (2009)	1 Adopting SaaS applications has many advantages. 2 Adopting SaaS applications is a useful instrument for increasing operational excellence. 3 Overall, I consider SaaS adoption to be a useful strategic option.	G7 G8 G9	0.94
Benefits	*Based on*	*Items*		
Strategic flexibility	Whitten et al., (2010)	1 Adopting SaaS applications allows quicker implementation of applications and faster time-to-value. 2 By adopting SaaS applications, our company is better able to switch between IT providers 3 Adopting SaaS applications allows our company to reduce vendor lock-in due to lower sunk costs (e.g., past capital expenditures).	B1 B2 B3	0.93
Quality improvements	Gewald & Dibbern (2009)	1 A SaaS provider has the potential to deliver application services at a higher quality than our company can. 2 A SaaS provider is able to deliver application services in shorter release cycles and/or at a higher accuracy than our company can. 3 By using short-term subscription-based contracts in SaaS, SaaS providers are forced to respond to customer needs more frequently. 4 Overall, by adopting SaaS applications, the quality of application services will be improved.	B4 B5 B6 B7	0.96
Focus on core competences	Benlian & Hess (2011)	1 Adopting SaaS applications allows our company to enhance the individual capabilities that distinguish it from its competitors. 2 By adopting SaaS applications, our company can concentrate better on putting its strategies into action. 3 Overall, adopting SaaS applications is a good way to foster the company's concentration on its core competencies.	B8 B9 B10	0.96
Cost advantages	Benlian & Hess (2011)	1 A SaaS provider can deliver applications at lower costs than our company can. 2 Our internal production costs are higher than the price a SaaS provider charges for its services. 3 Adopting applications via a SaaS provider lowers the costs that arise from delivering application services. 4 Overall, I believe that adopting SaaS is an appropriate measure to lower costs of application service provision.	B11 B12 B13 B14	0.92
Risks	*Based on*	*Items*		
Strategic risk	Kern, Kreijger & Willcocks (2002)	1 through adoption of SaaS-based applications our company will lose its ability to react flexibly to changes in the market? 2 through adoption of SaaS-based applications, our company will depend highly on the sustainability (including bankruptcy) of the SaaS provider's business model? 3 through adoption of SaaS-based applications, our company will lose know-how that will be required to remain competitive in future markets?	R1 R2 R3	0.92
Performance risk	Gewald & Dibbern (2009)	1 the SaaS provider will not provide the promised service? 2 the SaaS provider will not perform the process to the desired quality (speed and reliability of network) and scope?	R4 R5 R6	0.94

		3 the service provider will not be able to ensure seamless interoperability with your homegrown applications?		
Economic Risk	Gewald & Dibbern (2009)	1 the originally calculated business case will not include all the actual costs? 2 unanticipated costs that reduce the calculated cost savings will emerge? 3 the anticipated cost savings will not be achieved?	R7 R8 R9	0.92
Trust in provider	Kim & Kim (2018)	How important are the following points? 1 The SaaS provider and our organization have a high level of mutual trust 2 The SaaS provider is well known for fair dealing 3 The SaaS provider stands by its word	 R10 R11 R12	0.89

The survey was sent to 156 contacts. After one week, the active response rate was about 16,3%. Then, a reminder was sent to customers, which increased the response rate up to 28,8%. After a period of two weeks the survey was ended. There were 41 responses in total. Unfortunately, 7 responses could not be used due to missing variables. Therefore, the final sample was 34. The Central Limit Theorem (CLT) states that the sampling distribution of the sample means approximates a normal distribution as the sample size gets larger, and sample sizes equal to or greater than 30 are considered sufficient for the CLT to hold (Dudley & Dudley, 1999). Since the sample size was greater than 30 (34), the sample size was sufficient and approximated a normal distribution. The descriptive statistics of the sample companies are shown below in table 6. Most companies were small (50-249 employees), although 38,2 % of the companies was of enterprise size, with more than 1000 employees. Companies were mostly active in the information technology (IT) industry (32,4%).

Table 6: Descriptive Statistics Study One + Two

Company Size (Number of employees)	*Percentage*
0-49	17,6%
50-249	41,2%
250-999	2,9%
1000+	38,2%
Level of Annual Revenue (In euro's)	
0-2 million	14,3%
2-5 million	7,1%
5-10 million	14,3%
10-50 million	27,3%
50+ million	27,3%
Missing	15,2%
Industry	
Information Technology	32,4%
Transport	17,6%
Industrial	14,7%
Financial	8,8%
Cultural, Government, Energy, Education	5,9%
Healthcare	2,9%

3.4. Study two: Customer Servitisation and Customer Profit

In this study the survey-data was merged with CRM-data of the sample. Customer servitisation was converted into a buyer-perspective, instead of a supplier-perspective (Calabrese et al., 2019), since the sample consisted of buyers of additional services. The CRM-data used to define customer profit (CP) were revenue minus costs. Firmographic factors were also taken into account as control variables for the analysis. The measurement of customer profit was taken from two articles of Kumar. (Kumar, Petersen & Leone, 2013; Kumar, 2018). In table 7 the operationalisation of variables used in study two are provided. The equation for customer *i*'s profit is as follows:

Equation 3: Customer Profit i

$$Profit\ (i) = b0 + b1 * Customer\ Profit_i + b2\ *\ Company\ size\_i + b3\ *\ level\ of\ annual\ revenue\_i + b4\ *\ first\ purchase\ value\_i + b5\ *\ tenure\_i + error\_i$$

Table 7: Operationalization Variables Study Two

Variable	*Based on*	*Abbreviation*	*Operationalization*
Customer Servitisation	Calabrese et al., 2019	CS	1 Emphasis/Focus on Share of Revenue from services: 'Evaluate on a 1-7 scale how strongly the implementation of additional services has an impact on overall company revenues.' 2 Emphasis/Focus on Service Strategies: 'Evaluate on a 1-7 scale how strongly you will pursue implementation of additional services in the near future.'
Customer Profit	Kumar (2018)	CP	The annual (2019) profit from the customer (euro's): Total revenue (R) – Total costs (C)
Revenue	CRM data	R	Revenue from purchases of customer in 2019 (euro's)
Costs	CRM data	C	Acquisition hours + No of Tickets + Support hours (2019)
Presale hours		C_1	Number of hours spent on pre-sale activities (hours)
Tickets		C_2	The number of tickets made to serve this customer (tickets)
Support hours		C_3	Number of hours spent on support of customer (hours)
Firmographics		F	Characteristics of the firm
Company size		CZ	Number of employees (1 = 0-49, 2 = 50-249, 3= 250-999, 4 = 1000)
Level of annual revenue		AR	In million euro's (1 = 0-2, 2 = 2-5, 3 = 5-10, 4 = 10-50, 5 = 50+)
Control variables		CV	
Tenure		T	Years the customer has been a customer (where 2019 = 1, 2018 =2, etc.)
First Purchase Value		FPV	Value of the first purchase made by customer (in euro's)

Simply put, the customer profit was calculated as revenue minus costs. Revenue was the total of purchases made in 2019 and the costs were the total hours spent on the customer by the two teams of the software company, unit costs are not published for confidentiality reasons. Since the data was extracted from the CRM-system, the data was not included in this document for privacy and security reasons. After the customer profit was calculated, the company name was removed from the dataset. The characteristics left per company were the industry, company size and the level of annual revenue. Tenure and first purchase value were used as control variables in the regression analysis.

3.5. Cluster analysis

For the market segmentation and cluster analysis, the constructs servitisation and customer profit are used. The cluster analysis is also performed in SPSS. The statistical method used for the segmentation is a hierarchical cluster analysis (Field, 2013). This is the most common method of clustering a dataset and useful to identify groups in the dataset. Hierarchical clustering does not require to pre-specify the number of clusters generated, therefore this method is chosen in this research (ibid.), since there is no predefined number of clusters based on the customer servitisation and customer profit, as there has never been a market segmentation based on these variables before. The result of hierarchical clustering is a tree-based representation of the objects, which is also known as s dendrogram. Using the dendrograms from a hierarchical cluster analysis is a suitable way to determine the number of clusters, due to the limited number of observations (<_300 observations) (Hair et al., 2013).

Observations (measurements) can be subdivided into groups by cutting the dendrogram at a desired similarity level (Field, 2013). Hierarchical clustering analysis follows three basic steps:

1. Calculate the distances.
2. Link the clusters.
3. Choose a solution by selecting the right number of clusters.

For the distance measures, intervals (scales) were chosen. This measure was used since customer servitisation (measured on a 7-point Likert scale) was ordinal since the distance between two data points was not clear. Nevertheless, the Likert scale was considered to be an interval variable since the average of two items was calculated (Boone & Boone, 2012) . This

added statistical power to use parametric statistical tests, rather than using non-parametric tests for an ordinal variable. Customer profit was also a scale variable. For ordinal and scale data, the most common distance measure is Square Euclidian Distance, which is based on the Euclidian Distance between two observations, which is the square root of the sum of squared distances (ibid.) Within hierarchical clustering there are several cluster methods (between-groups linkage, nearest neighbour, centroid clustering and more) and there are different methods used in the results section to analyse which method works best for the sample in this research, to create clusters for the market segmentation.

4. Results

Firstly, study one was performed with six interviews and a designed survey exploring the mostly perceive benefits and risks of SaaS in interviews. The sample consisted of 34 companies. In this chapter the main results of the research are elucidated. Firstly, the model was evaluated with a reliability analysis of the constructs. Secondly, the results of the study one, including the perceived benefits and risks, the intention to adopt SaaS are presented. Thirdly, the results of study two including customer servitisation and customer profit and a market segmentation are presented.

4.1. Model evaluation

To test the model, a reliability analysis was performed with two statistical tests. Firstly, the Cronbach's alpha was measured. The Cronbach's alpha showed acceptable reliability (>0.6) for all items as shown in appendix 3. Most measures were above 0.8, except strategic flexibility and strategic risk which were respectively 0,630 and 0,602. Since the reliability was already ensured in previous research for the constructs, they were still used. Secondly, a factor analysis was performed to verify how the items load on their constructs. Factor loadings have to be above 0.5 to be acceptable. There were two items having a factor loading that did not meet this norm. These items (B1 and R2) were excluded from the constructs, created after the reliability tests. The constructs were created using the sum of the items, using standardisation to correct for the number of items. The results of the reliability analyses are shown in appendix 3 Next, the regression analysis was performed.

4.2. Study one

First, the influence of the four perceived benefits and four perceived risks on the intention to adopt SaaS are tested. To analyse whether higher perceived benefits (strategic flexibility (1a), quality improvements (1b), focus on core competences (1c) and cost advantages (1d)) lead to a higher intention to adopt SaaS, a multiple regression analysis was performed with these four benefits on the intention to adopt SaaS (R2 = 0,087, df = 33 and F = 0,689). The results showed no significant influence, as shown in table 7. Therefore, we conclude that the four perceived benefits do not lead to a higher intention to adopt SaaS.

To analyse whether higher perceived risks (strategic risks (2a), performance risks (2b), economic risks (2c) and trust in provider (2d)), lead to a lower intention to adopt SaaS, a multiple regression analysis was performed with these four risks on the intention to adopt

SaaS (R2 = 0,098, df = 33 and F = 0,757). The results showed no significant influence, as shown in table 8. Therefore, we conclude that the four perceived risks do not lead to a lower intention to adopt SaaS.

Table 8: Regression Analysis Perceived Benefits and Risks (study 1)
DV: Intention to Adopt SaaS

Variable	*Beta(SE)**	*Sig.*
Strategic Flexibility	-0.139(0.153)	0.136
Quality Improvements	0,170(0.262)	0,888
Focus on Core Competences	0,129(0.267)	0,344
Cost Advantages	0,178(0.296)	0,288
Strategic Risks	-0,288(0.217)	0.278
Quality Improvements	0,233(0,182)	0,211
Focus on Core Competences	-0,190(0.198	0,126
Cost Advantages	0,014(0.040)	0,472

* = 0,10 ** = 0,05, *** = 0,01

The last question the participants answered in the survey related to other benefits or risks which had not been specified. Most answers were related to security and privacy risks, such as sensitive data in the cloud and the new Dutch AVG. Followed by, another risk that was mentioned considered the size and hosting location of the provider, where stated was: “We would not choose for a small provider.” Finally, the use of applications as a SaaS-solution was also determined by the specific applications a company used, declared was: “Some applications were not performing well enough in the cloud.”

Since the perceived benefits and risk do not show significant results, the perceived benefits and perceived risks general (which were questioned in the survey to ensure a higher reliability of constructs) are tested on the intention to adopt SaaS to check whether these constructs do lead to a higher/lower intention to adopt SaaS. To test whether the general constructs perceived benefits (3a) and perceived risks (3b) lead to a higher/lower intention to adopt SaaS, a multiple regression analysis was performed of the constructs perceived benefits and perceived risks on the intention to adopt SaaS (R2 =0,130, df = 33 and F = 2,322). The results showed significant influence of the perceived benefits, but no significant results for the perceived risks, as shown in table 9. Therefore, we conclude that higher perceived benefits do lead to a higher intention to adopt SaaS, but higher perceived risks do not lead to a lower intention to adopt SaaS.

Table 9: Regression Perceived Benefits and Risks General (study 1)

DV: Intention to adopt SaaS

Variable	*βeta(SE)**	*Sig.*
Perceived Benefits General	0,557(0,179)**	0.044**
Perceived Risks General	0,184(0,225)	0,339
	* = 0,10 ** = 0,05, *** = 0,01	

4.3. Study two

For study two, a multiple regression analyse was performed of customer servitisation(4a), company size(4b), level of annual revenue(4c), tenure(4d), first purchase value(4e) on customer profit (R2 = 0,130, df = 33 and F = 7,410). The regression showed a significant result for customer servitisation, tenure and first purchase value. Therefore, we conclude that a higher customer servitisation lead to a higher customer profit, a longer tenure leads to a higher customer profit and a higher first purchase value leads to a higher customer profit. The results of study 2 are shown in table 2.

Table 10: Regression Analysis study 2

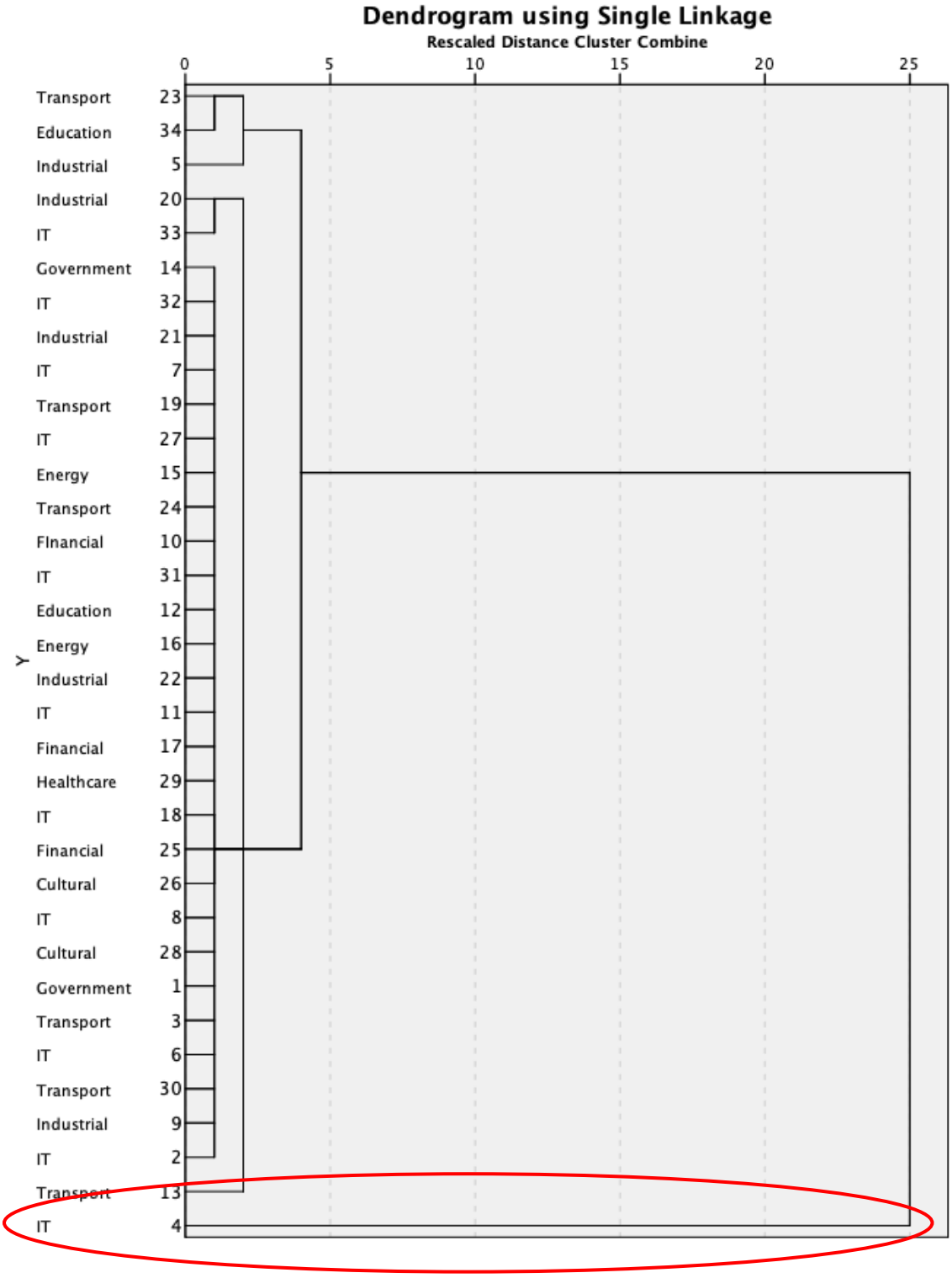
DV: Customer Profit

Variable	*Beta(SE)**	*Sig.*
Customer Servitisation	0,412(2207,34)**	0,013
Company Size	0,291(0,714)	0,490
Level of annual revenue	-0,167(0,211)	0,557
Tenure	0,344(0,457)**	0,034
First Purchase Variable	0,519(329,06)*	0,092
	* = 0,10 ** = 0,05, *** = 0,01	

4.4. Market segmentation

The variables customer servitisation and customer profit were used in the hierarchical clustering. The cases were labelled by industry. There was no predefined cluster membership, since the number of clusters is unknown beforehand. The distance method chosen is Squared Euclidean distance, as explained in the method section. At first, nearest neighbour linkage, which implies single linkage: distance between clusters is the distance between two data points is used. Nearest neighbour linkage is used to identify outliers. Using a dendrogram was a suitable way to identify outliers. Outliers could heavily disturb the analysis, as there are a limited number of observations. As clearly shown in the dendrogram in figure 2 on the next page observation number 4 is a clear outlier, which was removed from the dataset.

Figure 2: Dendrogram Single Linkage



After removing the outlier, three cluster methods are used. Firstly, Ward's linkage, which uses the F-value to maximize the significance of differences between clusters (Hair et al., 2013). Secondly, between-group linkage, where the distance between clusters is the average

distance of all data points within these clusters (ibid.). Thirdly, centroid linkage, where the distance between two clusters is the distance between the cluster centroids and means (ibid.). All dendrograms are shown in appendix 5. For all three cluster methods standardising of the values was used, because customer profit and customer servitisation were scattered differently (ibid.). After combining all three methods there are no clear number of clusters shown. As Ward's linkage showed four clusters at a minimal (<5 distance), four clusters were chosen. Therefore, all three methods were forced to create four clusters. The observations were set in the cluster which they appeared to in minimal two out of three methods. The characteristics of the four clusters are presented in table 12.

Table 12: Clusters Created

	Cluster 1	*Cluster 2*	*Cluster 3*	*Cluster 4*
Number observations	14	9	3	7
Industry	IT (35,7%), Transport (21,4%), Financial and Cultural (14,2%), Education & Government (7,2%).	Industrial (44,4%). IT (33,3%), Energy, Government (11,1%)	Transport (66,6%), Education (33,3%)	IT (28,6 %), Industrial, financial, energy, transport & healthcare (14,2 %)
Company size	Enterprise (50%), Medium (42,8 %) Small (7,2%)	Small (33,3%), Medium (33,3%), Enterprise (33,3%)	Medium (66,6%), Enterprise (33,3%)	Medium (42,9%), Enterprise(28,6%)Small and large (14,2 %)
Largest category annual revenue	10 – 50 million	50 + million	10-50 million	5-10 million
Average Customer Servitisation	4,75	4,73	4,71	4,64
Average Customer profit	11974	12207	12585	15594

To definite the number of clusters, a cluster analysis alone is not sufficient, each cluster should have external validation (Hair et al., 2013). This could be done by created a value proposition of each cluster. However, when there is closely looked at the four clusters, no actual descriptive stands out for one of the clusters created. There was no clear division between industry, company size or revenue. Therefore, no value proposition can be created. The average customer servitisation is approximately the same in every cluster, whereas the average customer profit differs. In addition, the combination of the average servitisation and the average customer profit is surprising. Cluster four includes the highest average customer profit, while including the lowest average customer servitisation. The results of the regression analyses show contrasting results. Overall, the cluster analysis showed no specific clusters and therefore the market cannot be segmented based on customer servitisation and customer profit.

5. Conclusion

The main research question presented in the first chapter is as follows;
"How can the market for a Software-as-a-Service (SaaS) be segmented based on the customer servitisation and customer value? This research question has been investigated by conducting two studies.

Using results from study 1, for the first sub question (RQ1): What is in existing literature known about benefits and risks of SaaS and what benefits and risks are frequently perceived by customers? Can be concluded that research on perceived benefits and risks of Software-as-a-Service is not really extensive. An often-used framework to identify benefits and risks that have an influence on the intention to adopt Software-as-a-Service is the so-called TOE framework. Technological, organisational and environmental factors play an important role in this framework. A list of benefits and risks was compelled out of literature and tested in interviews. The benefits that were perceived the most are: (1): Strategic flexibility, (2): Quality improvements, (3): Focus on core competences and (4): Cost advantages. The risks that were perceived the most are: (1): Strategic risks, (2): Performance risk, (3): Economic risk and (4): Trust in provider. Unfortunately, these benefits and risks did not have a significant impact on the intention to adopt SaaS in the survey.

Using results from study 2, for the second sub-question(RQ2): What is the relationship between customer servitisation and customer profit? Can be answered as follows: The relationship between customer servitisation and customer profit was empirically using survey and CRM data. The regression analysis showed a significant result for customer servitisation, tenure(control) and first purchase value(control). Therefore, more customer servitisation leads to a higher customer profit. Consequently, customer using additional services lead to higher profitability.

Furthermore, using the results from study 2 for the third sub-question(RQ3): Which segments exist based on customer servitisation and customer profit? Can be concluded that: Based on three different cluster analysis methods, four clusters were formed. Despite using different cluster analysis, there were no clear cluster characteristics discovered. No specific industry, company size or level of annual profit were present in one of the four clusters, tall of mixed composition. Therefore, we could state that based on customer servitisation and customer profit no clear clusters can be formed.

The general conclusion of the two studies the market for SaaS cannot be segmented based on customer servitisation and customer profit. To identify new customers for the

platform, no focussed targeting is necessary. However, the influence of the customer servitisation on customer profit is found to be significant. Therefore, stated can be that a business customer with higher customer servitisation, provides a higher value for the company. An addition to this conclusion is that general perceived benefits do have a significant impact on the intention to adopt SaaS, while general perceived risks do not. While creating a marketing strategy for SaaS, emphasis is needed on benefits.

6. Limitations and contribution

6.1. Limitations

The first limitation is the sample size, since the sample consisted of 34 companies only. Although the central limit theorem states that a sample size above 30 is sufficient and approximates a normal distribution, the sample could possibly lack sufficient datapoints to receive significant results. Nevertheless, the response rate was 28,8%, which is normal when the data is collected in organisational context (Baruch & Holtom, 2008). The cluster analyses which were performed did not point out any specific value propositions for each cluster. Likewise, this can be related to the small sample size.

The second limitation is about the perceived benefits and risks. The survey sample consisted of companies who already use SaaS-applications or those who only use applications on-premise or host the applications themselves. For the second group, it might be hard to interpret perceived benefits and risks as they have never perceived them actually. Future research could point out if there is a difference in perceived benefits and risks between "in use" SaaS customers and "willing to use" SaaS customers.

The third limitation is about the measure for customer servitisation, which is based on the research of Calabrese and Colleagues (2019). The two items that measured servitisation were placed in a buyer-perspective instead of a supplier-perspective, and therefore the reliability of the measurement is changed. An interesting future research direction for this measurement could be longitudinal research about the shift in customer servitisation of a company within a period of years, as a lot of companies in the sample expect a higher need for servitisation in the future.

The fourth limitation is about the generalisability of the research conducted. The research is a case study and therefore has a smaller generalisability since the customers of the software company are sampled. If the research could be replicated within another company in the IT sector, the generalisability would be more sufficient.

6.2. Practical contribution

The practical contribution consists of three parts. Firstly, there are four benefits and risks of SaaS that were mostly perceived by customers. These benefits and risks did not have a significant impact in the regression analysis, nevertheless they can still be used while attracting new customers, to have an argument for each risk and to specify each benefit in the negotiation phase with a potential attracted customer.

Secondly, the relationship between the intention to adopt SaaS and servitisation is found to be significant and positive. Accordingly, when business customers show interest in adopting SaaS, they automatically are supposed to have a higher need for servitisation. Business customers which show an interest in SaaS adoption, could be offered a comprehensive package of SaaS licenses, including support, consultancy and updates. This could lead to higher profit margins for those customers.

Thirdly, the influence of customer servitisation on customer profit is found to be significant and positive. In practice, this means that the most valuable customers are those who have a high degree of servitisation. For a specific platform as in the case-study, the most valuable customers are those who have interest in additional services as consultancy, support, a high up-time. When creating a marketing strategy or while in the process of attracting new potential customers, focus has to be expanding the services offered. The more additional services added to the total purchases, the more profit a customer provides.

6.3. Academic contribution

The academic contribution of this research can be found in repetition of the already validated relationship between perceived benefits and risks and the intention to adopt SaaS. Unfortunately, the research only showed a significant result for general perceived benefits and the intention to adopt SaaS. Although the sample is limited, the findings of Benlian & Hess (2011), could not be replicated.

Next, the relationship between intention to adopt SaaS and Servitisation is found significant and positive. Concludingly, when business customers have a higher intention to adopt SaaS, automatically their need to be servitised is higher. Although previous studies already acknowledged different forms of servitisation and the relationship with SaaS adoption, the influence of the two constructs were not tested before in this context.

The result found in the research that is very promising is the significant relationship between servitisation and customer profit. This is very interesting to continue on the stream of servitisation research, while it impacts the financial effects of servitisation. Future studies can test this relationship, to validate the existence of this relationship.

7. Appendices

7.1. Literature search queries

Topic	*Key words*	*Filter / sort on*	*Results*
Software-as-a-Service	(Software-as-a-Service OR SaaS OR Cloud computing) AND intention to adopt	Business, management and accounting	103
	Intention to adopt SaaS AND benefits AND risks	Business, management and accounting	51
	Cloud adoption AND SaaS AND benefits AND risks	Business, management and accounting	158
Customer Servitisation	Servitisation OR Degree of Servitisation OR Servitisation level AND (Software as a service OR SaaS or Cloud Computing)		27
	Degree of servitisation AND measurement	Business, management and accounting	52
	Servitisation OR Degree of Servitisation AND Financial performance		30
Customer Profit	Customer Profit AND Customer Valuation AND Customer profitability	Business management and accounting AND Year: 2015-2019	243
	Customer Profit AND market segmentation		22
Market Segmentation	B2B OR business-to-business OR business to business AND customer segmentation	Business, management and accounting	14

7.2. Interview questions

1. General information

- *What is your function within the company?*
- *How many employees does the company have?*
- *How many are working for the IT department?*

2. **Servitisation/ SaaS**

- *Are you familiar with the term servitisation? (If not, explain servitisation)*
- *What is the servitisation intensity of your firm on a scale from 1-7?*
- *Are you familiar with the term SaaS? If so, can you give your opinion about it from your company's perspective?*

3. SaaS benefits and risks

Considerate or perceived benefits or risks (Depending on if the company already uses SaaS or is thinking about implementing it)

- *Can you name possible benefits of implementing SaaS at your company?*
- *Can you name possible risks of implementing SaaS at your company?*

How do you perceive…

1. *Quality improvements? (higher quality)*
2. *Cost advantages? (lower costs)*
3. *ICT employee's reduction?*
4. *Focus on core capabilities/ less ICT focus?*
5. *Strategic flexibility?*
6. *Increased mobility?*
7. *Access to specialized resources?*

How do you perceive…

1. *Performance risks? (speed reliability)*
2. *Less application availability?*
3. *Security risks?*
4. *Privacy risks?*
5. *Economic risks? (hidden costs)*
6. *Loss of data?*
7. *Dependence on the provider?*

Last question: Are there any other possible benefits or risks which have not been mentioned?

7.3. Reliability Analysis

Construct	*Cronbach's Alpha*	*Factor Loadings*
Intention to adopt SaaS (General)	*0,945*	*G1: 0,937* *G2: 0,953* *G3: 0,967*
Perceived risks general	*0,852*	*G4: 0,881* *G5: 0,817* *G6: 0,941*
Perceived benefits general	*0,855*	*G7: 0,890* *G8: 0,895* *G9: 0,866*
Customer Servitisation	*0,736*	*S1: 0,890* *S2: 0,890*
Strategic flexibility	*0,630* *After excluding B1: 0,873*	***B1: 0,338*** *B2: 0,923* *B3: 0,929*
Quality improvements	*0,915*	*B4: 0,882* *B5: 0,887* *B6: 0,887* *B7: 0,922*
Focus on core competences	*0,930*	*B8: 0,944* *B9: 0,912* *B10: 0,960*
Cost advantages	*0,887*	*B11: 0,804* *B12: 0,941* *B13: 0,868* *B14: 0,859*
Strategic risk	*0,602* *After excluding R2:* *0,655*	*R1: 0,607* ***R2: 0,377*** *R3: 0,723*
Performance risk	*0,898*	*R4: 0,906* *R5: 0,942* *R6: 0,889*
Economic Risk	0,917	R7: 0,946 R8: 0,952 R9: 0,878
Trust in provide	0,911	R10: 0,858 R11: 0,970 R12: 0,941

7.4. Survey designed in Qualtrics

Start of Block: Introduction: doel en informed consent

Beste meneer/mevrouw,
Fijn dat u de tijd wil nemen om deze survey in te vullen. Het doel van dit onderzoek is te zorgen voor een verbeterde dienstverlening van …. aan klanten en is in het belang van mijn afstudeeronderzoek aan de Universiteit Twente. In dit onderzoek vragen we u naar voor- en nadelen van Software-as-a-Service zoals u die waarneemt. Het invullen duurt ongeveer 8 minuten. Door het invullen van deze survey geeft u toestemming voor het verwerken van uw gegevens voor wetenschappelijke doeleinden,.

Dit onderzoek gaat over de voor- en nadelen van Software-as-a-Service (SaaS). Binnen dit onderzoek wordt er gevraagd naar afwegingen die u maakt bij het wel of niet kiezen van een SaaS-oplossing. Natuurlijk zijn dit niet altijd afwegingen die u bewust gemaakt heeft. Probeer bij het beantwoorden van de vragen te denken vanuit het volgende hypothetische scenario:

Uw organisatie gaat gebruik maken van verschillende nieuwe applicaties die u zowel on-premise (self-hosted) als in de cloud kunt afnemen. Er zijn oriënterende gesprekken geweest en er zijn twee opties overgebleven
1. Uw organisatie neemt de applicaties zelf in beheer.
2. Uw organisatie besteedt het beheer uit aan een zogenoemde SaaS-provider.

Start of Block: General information

Wat is uw functie?

_____

Bij welke organisatie bent u werkzaam?

_____

Hoeveel medewerkers zijn er werkzaam binnen uw organisatie?

- ○ 0-49
- ○ 50-249
- ○ 250-999
- ○ 1000 of meer

Start of Block: General stellingen

De volgende stellingen gaan over het algemene gebruik van SaaS-applicaties binnen uw organisatie.

	Helemaal mee oneens	Mee oneens	Enigszins mee oneens	Neutraal	Enigszins mee eens	Mee eens	Helemaal mee eens
1 Als er een beter aanbod is, zou een SaaS-oplossing ingezet moeten worden binnen het domein waar ik verantwoordelijk voor ben.	○	○	○	○	○	○	○
2 De organisatie waar ik voor werk zou het huidige niveau van afname van SaaS-applicaties moeten verhogen.	○	○	○	○	○	○	○
3 Ik ben voorstander van de verdere adoptie van SaaS-applicaties	○	○	○	○	○	○	○

Beantwoord de volgende stellingen:

	Helemaal mee oneens	Mee oneens	Enigszins mee oneens	Neutraal	Enigszins mee eens	Mee eens	Helemaal mee eens
4 Het adopteren van SaaS-applicaties brengt een hoog risico met zich mee.	○	○	○	○	○	○	○
5 Er is een hoog risico dat de verwachte voordelen van de adoptie van SaaS-applicaties niet waargemaakt worden.	○	○	○	○	○	○	○
6 Over het geheel gezien, denk ik dat de adoptie van SaaS-applicaties risicovol is.	○	○	○	○	○	○	○

Beantwoord de volgende stellingen:

	Helemaal mee oneens	Mee oneens	Enigszins mee oneens	Neutraal	Enigszins mee eens	Mee eens	Helemaal mee eens
7 Het adopteren van een SaaS-applicaties heeft veel voordelen.	○	○	○	○	○	○	○
8 Het adopteren van SaaS-applicaties is een nuttig instrument om operational excellence te vergroten.	○	○	○	○	○	○	○
9 Over het algemeen vind ik het adopteren van SaaS een nuttige strategische optie.	○	○	○	○	○	○	○

End of Block: General stellingen

Tegenwoordig bieden steeds meer bedrijven aanvullende diensten om hun product of dienst heen aan. Een voorbeeld is het afnemen van een ERP (Enterprise Resource Planning) systeem met daaromheen meerjarige afname van support, onderhoud en consultancy.

	Heel klein	Klein	Enigszins klein	Neutraal	Enigszins groot	Groot	Heel groot
1 In welke mate heeft het afnemen van aanvullende diensten een invloed op de algehele omzet van uw organisatie?	○	○	○	○	○	○	○
2 In welke mate gaat uw organisatie door met het afnemen van aanvullende diensten in de nabije toekomst?	○	○	○	○	○	○	○

Beantwoord de volgende stellingen:

	Helemaal mee oneens	Mee oneens	Enigszins mee oneens	Neutraal	Enigszins mee eens	Mee eens	Helemaal mee eens
1 Het adopteren van SaaS-applicaties zorgt ervoor dat applicaties sneller geïmplementeerd kunnen worden en het zorgt sneller voor waarde voor onze organisatie.	○	○	○	○	○	○	○
2 Door SaaS-applicaties te adopteren, kan ons bedrijf beter wisselen tussen IT-leveranciers	○	○	○	○	○	○	○
3 Door SaaS-applicaties te adopteren kan onze organisatie vendor lock-in (afhankelijkheid van leveranciers) verminderen door lagere verzonken kosten (kosten die niet meer ongedaan kunnen worden).	○	○	○	○	○	○	○

Hoe schat u het risico in dat:

	Heel klein	Klein	Enigszins klein	Neutraal	Enigszins groot	Groot	Heel groot
1 Door het adopteren van op SaaS gebaseerde applicaties verliest onze organisatie het vermogen om flexibel te reageren op veranderingen in de markt?	○	○	○	○	○	○	○
2 Door het adopteren van op SaaS gebaseerde applicaties, is onze organisatie erg afhankelijk van de duurzaamheid (inclusief faillissement) van het businessmodel van de SaaS-provider?	○	○	○	○	○	○	○
3 Door het adopteren van op SaaS gebaseerde applicaties zal onze organisatie kennis verliezen die benodigd is om competitief te blijven in toekomstige markten?	○	○	○	○	○	○	○

Beantwoord de volgende stellingen:

	Helemaal mee oneens	Mee oneens	Enigszins mee oneens	Neutraal	Enigszins mee eens	Mee eens	Helemaal mee eens
1 Een SaaS-provider heeft het potentieel om applicatie-dienstverlening te leveren van hogere kwaliteit dan dat onze organisatie kan.	○	○	○	○	○	○	○
2 Een SaaS-provider kan de applicatie-dienstverlening leveren in kortere release cycles (oplevertijd) en/of met een hogere nauwkeurigheid dan dat onze organisatie kan.	○	○	○	○	○	○	○
3 Door gebruik te maken van korte-termijn en op een abonnement gebaseerde contracten, worden SaaS-providers gedwongen om frequenter te reageren op de behoeften van een klant.	○	○	○	○	○	○	○
4 Over het algemeen zal door het adopteren van SaaS-applicaties de kwaliteit van de geboden applicatie-dienstverlening worden verbeterd.	○	○	○	○	○	○	○

Hoe belangrijk zijn de volgende punten:

	Zeer onbelangrijk	Onbelangrijk	Enigszins onbelangrijk	Neutraal	Enigszins belangrijk	Belangrijk	Zeer belangrijk
1 De SaaS-provider en onze organisatie hebben veel wederzijds vertrouwen.	○	○	○	○	○	○	○
2 De SaaS-provider staat bekend om eerlijk zaken doen.	○	○	○	○	○	○	○
3 De SaaS-provider houdt zich aan zijn woord.	○	○	○	○	○	○	○

Beantwoord de volgende stellingen:

	Helemaal mee oneens	Mee oneens	Enigszins mee oneens	Neutraal	Enigszins mee eens	Mee eens	Helemaal mee eens
1 Door SaaS-applicaties te adopteren kan onze organisatie beter gebruiken maken van onze eigen kerncompetenties die ons onderscheiden van concurrenten.	○	○	○	○	○	○	○
2 Door SaaS-applicaties te adopteren kan onze organisatie zich beter concentreren op het uitvoeren van onze strategie.	○	○	○	○	○	○	○
3 Over het algemeen is het gebruik van SaaS-applicaties een goede manier om je als organisatie te kunnen bevorderen op eigen kerncompetenties	○	○	○	○	○	○	○

Hoe schat u het risico in dat:

	Zeer klein	Klein	Enigszins klein	Neutraal	Enigszins groot	Groot	Zeer groot
1 De SaaS provider niet de beloofde service levert?	○	○	○	○	○	○	○
2 De SaaS provider het proces niet volgens de gewenste kwaliteit (snelheid en betrouwbaarheid van het netwerk) en omvang uitvoert?	○	○	○	○	○	○	○
3 De SaaS provider er niet voor kan zorgen voor interoperabiliteit met onze eigen, zelf-ontwikkelde applicaties?	○	○	○	○	○	○	○

Beantwoord de volgende stellingen:

	Helemaal mee oneens	Mee oneens	Enigszins mee oneens	Neutraal	Enigszins mee eens	Mee eens	Helemaal mee eens
1 Een SaaS-provider kan applicaties leveren tegen lagere kosten dan dat onze organisatie kan.	○	○	○	○	○	○	○
2 Onze interne productiekosten zijn hoger dan de prijs die een SaaS-provider in rekening brengt voor zijn dienstverlening.	○	○	○	○	○	○	○
3 Het afnemen van applicaties via een SaaS-provider verlaagt de kosten die ontstaan door het leveren van applicatie-dienstverlening.	○	○	○	○	○	○	○
4 Over het algemeen geloof ik dat het adopteren van SaaS een geschikt middel is om de kosten van applicatie-dienstverlening te verlagen.	○	○	○	○	○	○	○

Hoe schat u het risico in dat:

	Zeer klein	Klein	Enigszins klein	Neutraal	Enigszins groot	Groot	Zeer groot
1 De origineel berekende kosten van de business case niet alle werkelijke kosten zijn?	○	○	○	○	○	○	○
2 Er zich onverwachte kosten voordoen die de berekende kostenbesparingen verminderen?	○	○	○	○	○	○	○
3 Dat vooraf verwachte kostenbesparingen niet worden gerealiseerd?	○	○	○	○	○	○	○

Spelen er afwegingen over het wel of niet kiezen voor een SaaS-applicatie die niet benoemd zijn maar waar u tijdens het invullen van de vragenlijst wel aan hebt gedacht? Zo ja, vul deze afwegingen dan hieronder in:

_____

Wat is ongeveer de jaarlijkse omzet van uw organisatie?

○ 0 tot €2 miljoen

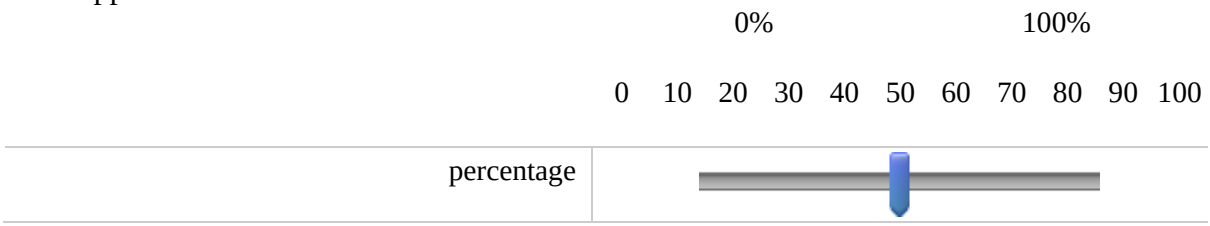
○ meer dan €2 miljoen tot en met €5 miljoen

○ meer dan €5 miljoen tot en met €10 miljoen

○ meer dan €10 miljoen tot en met €50 miljoen

○ meer dan €50 miljoen

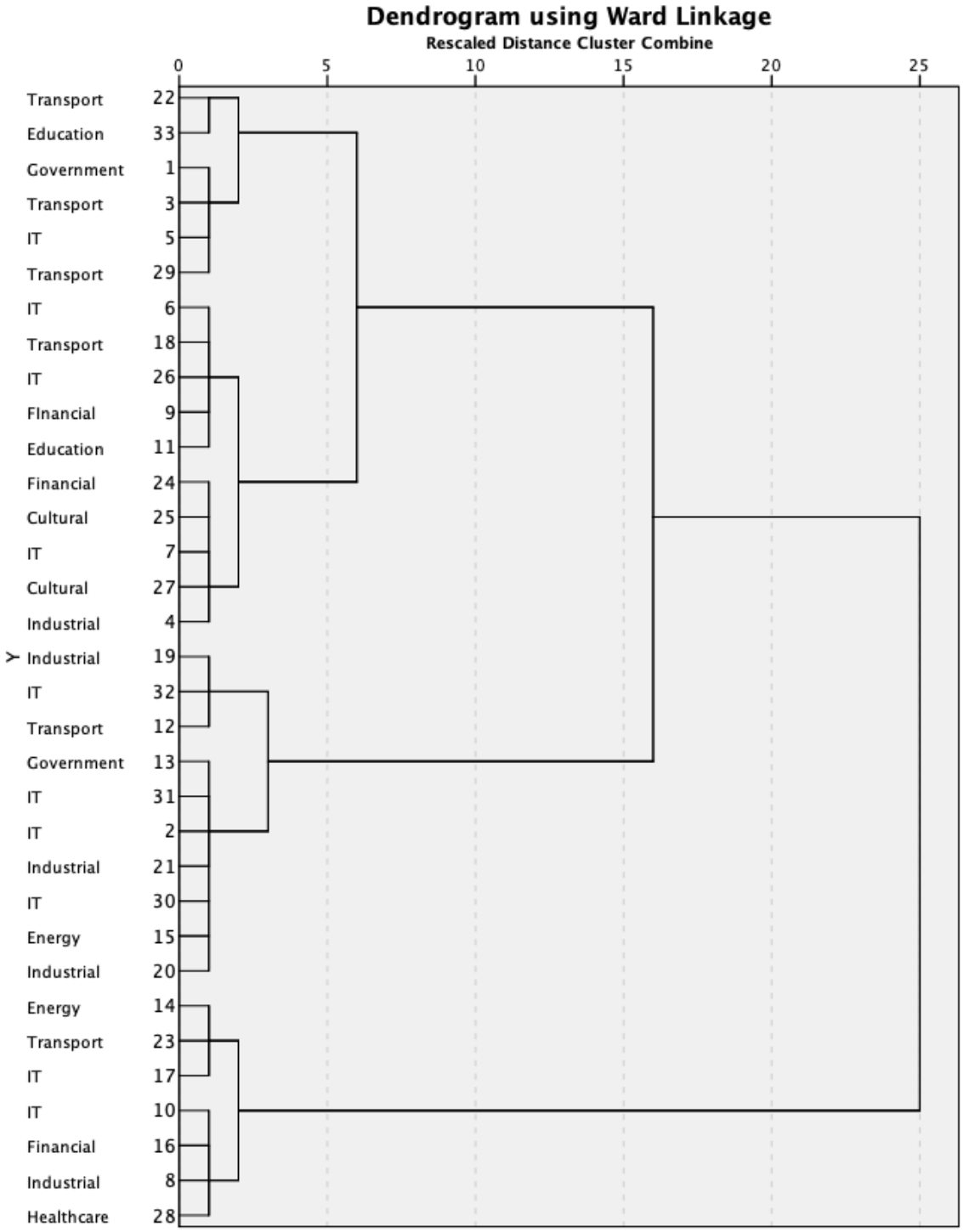
Welk percentage van de omzet wordt op dit moment als budget ingezet voor het afnemen van SaaS-applicaties?

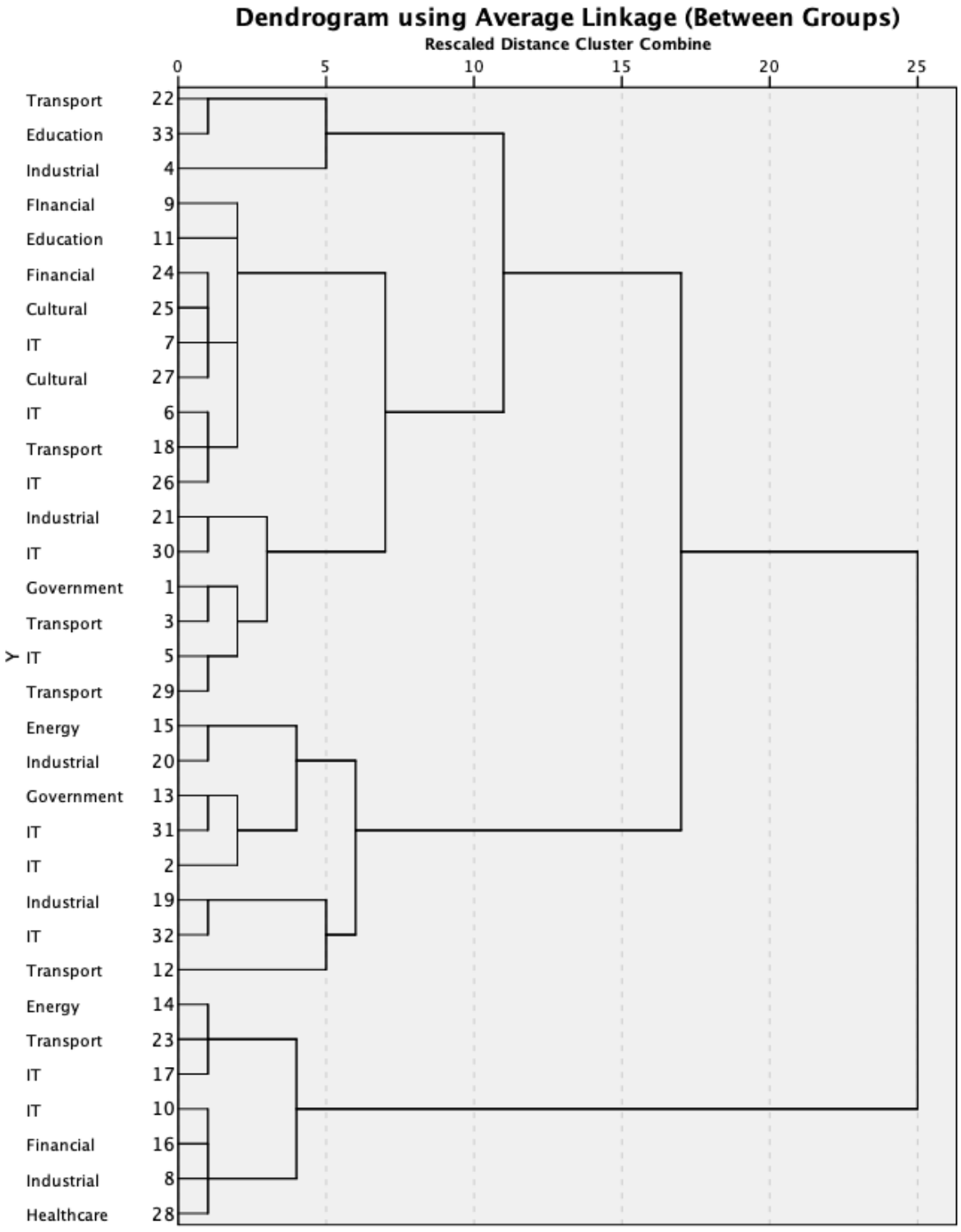


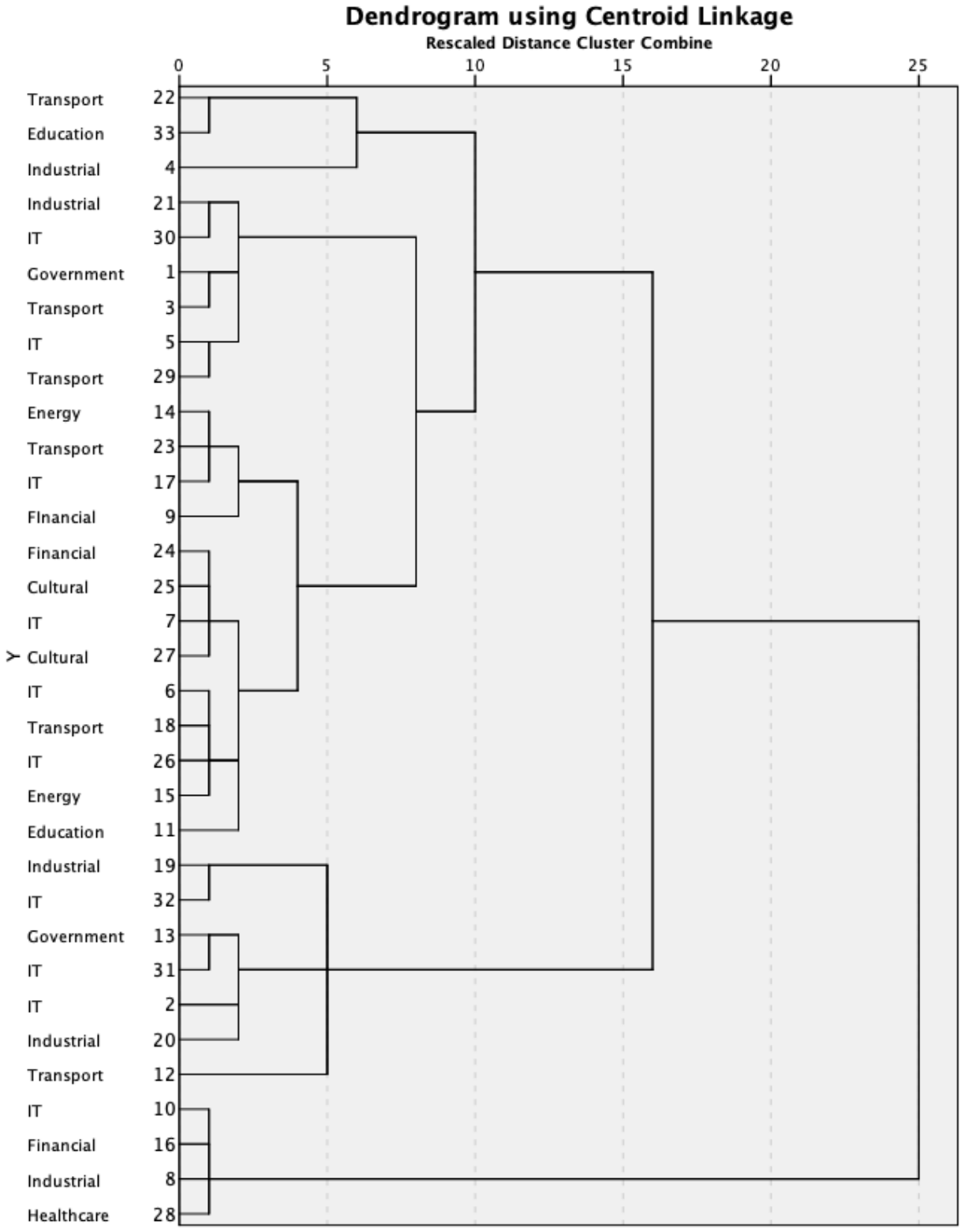
Heel erg bedankt voor het invullen van de vragenlijst. Mocht u aan de hand van de vragen nog op- of aanmerkingen hebben, neem dan contact met me op via mijn e-mail: e.w.beer@student.utwente.nl
Mocht u interesse hebben in de uitkomst van dit onderzoek, dan kunt u hieronder uw e-mailadres achterlaten, dan stuur ik u de samenvatting op!

_____

7.5. Dendrograms Cluster analysis




Dendrogram using Average Linkage (Between Groups)
Rescaled Distance Cluster Combine
0
5
10
15
20
25
Transport 22
Education 33
Industrial 4
FInancial 9
Education 11
Financial 24
Cultural 25
IT 7
Cultural 27
IT 6
Transport 18
IT 26
Industrial 21
IT 30
Government 1
Transport 3
IT 5
Transport 29
Energy 15
Industrial 20
Government 13
IT 31
IT 2
Industrial 19
IT 32
Transport 12
Energy 14
Transport 23
IT 17
IT 10
Financial 16
Industrial 8
Healthcare 28
Y


Dendrogram using Centroid Linkage
Rescaled Distance Cluster Combine
0
5
10
15
20
25
Y
Transport 22
Education 33
Industrial 4
Industrial 21
IT 30
Government 1
Transport 3
IT 5
Transport 29
Energy 14
Transport 23
IT 17
FInancial 9
Financial 24
Cultural 25
IT 7
Cultural 27
IT 6
Transport 18
IT 26
Energy 15
Education 11
Industrial 19
IT 32
Government 13
IT 31
IT 2
Industrial 20
Transport 12
IT 10
Financial 16
Industrial 8
Healthcare 28

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