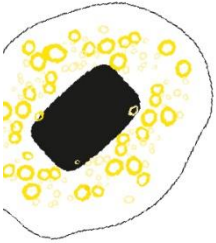**UNIVERSITY OF TWENTE.**

WHAT IS THE IMPACT OF SELF-SERVICED SUPPORTCHANNELS IN SAAS BUSINESSES?

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MASTER THESIS

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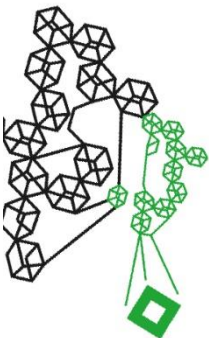
NOVEMBER 27, 2023

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Abstract

The rise to new technologies, particularly AI, will make it easier for businesses to implement self-service technologies (SSTs). This shift holds the potential to reshape the dynamics between businesses and their customers.. This research investigates how SaaS-customers react towards an increase of SSTs compared to human-assisted channels (HACs), by answering the main research question *"What is the impact of self-service in a SaaS-application on customer satisfaction of customers using the SaaS application?"* To gather comprehensive insights, 12 semi-structured interviews were conducted across diverse customer segments within a SaaS's vendor customers base.

The results of those interviews shows that SSTs are in general used for simple question. However, more experienced customers mentioned that SSTs are not able to answer their kind of questions. They do think SSTs would be useful for non-experienced colleagues. SSTs do not directly increase customer satisfaction, but even sometimes decrease it. On the other hand, an increase of SSTs do not directly causes switching intentions, but they do prefer a company with HACs above on without. All interviewees chose a HAC as their preferred channel. Furthermore, advantages and disadvantages of channels questioned are identified.

Key contributions are that a lack of desired support channels is not a direct reason for cancelling a SaaS subscription, but only if the product fails and no HAC is available and that customers preference for one channel influences the reason to use other channels. Furthermore, a contradiction to other researchers is that results show that not the interaction with service agents, but the seeing of features in the application provided as idea by the customer causes more bonding with the application and higher the barrier to switch.

The by customers expected level of service depends on the involvement of the product in customers` company. Therefore, managers of SaaS products should determine the involvement of their products by implementing SSTs.

Introduction

Software-as-a-Service (abbreviated as SaaS) end-user spending is forecasted at $195.2 million in 2023, which is a 16.8% growth since 2022 (Gartner, 2022). The global SaaS market will expect a compound annual growth of 11% until 2028 (Grand View Research, n.d.).

The term SaaS entered the computing vocabulary a few years after the millennium (Mäkilä et al., 2010) and is facing an increasing number of research that has been conducted. Researchers investigated among others, how to support configurability in SaaS software (Nitu, 2009) and reasons for customers to discontinue a SaaS subscription (Pring, 2009). Razumnikov (2022) found that SaaS-customers are more advanced in internet technologies and therefore have a higher preference for self-service support channels, such as a knowledge base of customer support community. Self-service support channels are part of the umbrella term self-service technologies (SSTs) which offers the possibility for customers to serve themselves, without interruption of service providers (Meuter et al., 2005).

Researchers also investigated the link between self-service technologies and customer loyalty. Gwinner et al. (1998) and Hennig-Thurau et al. (2002) found that relational benefits play an important role in the influence on consumer' loyalty intentions, level of commitment to the organizations, word-of-mouth behavior and level of satisfaction with the service provider in the service industry. Yen & Gwinner (2003) developed a conceptual framework that uses the construct of relational benefits to explain the relationship between internet-based self-service technology attributes and customer loyalty and satisfaction. They added evidence to previous research, that relational benefits are mediating, through which selected technology

attribute operate to their impact on constructs customer loyalty and satisfaction. Yen & Gwinner (2003) also found that relational-benefit constructs remain relevant in an online environment. Shahid Iqbal et al. (2018) found via structural equation modeling that there is a positive and significant relationship between SSTs service quality and customer loyalty, which is in accordance Yen & Gwinner (2003). However, those type of SSTs (e.g online airline check-ins) and type of users (B2C) differ from those in a SaaS application (e.g. chatbots, forums and knowledge base & in this research B2B users), which makes it relevant to gain insight into.

We contribute to the above mentioned discussion by investigating the effect of increasing the level of self-service within a SaaS application on the relationship between the users and customers using a SaaS application and the SaaS vendor. Which is interesting since the world is facing enormous interest in new technologies that potentially influence this relationship enormously. Due to Artificial Intelligence (AI) it will become easier to implement SSTs, which can be a solution for staffing shortages. However, it is yet unknown how SaaS-customers react towards an increase of SSTs compared to human-assisted channels (HAC).

Among others, Payne & Frow (2004) have investigated the field of customer relationship management (CRM) and defined multiple channels in which businesses and customers interact with each other. Self-service technologies should be seen as one of those channels. 12% of the respondents in a research of Statista choose 'Online self-service' as the preferred channel for customer service (*Customer Service: Contact by Communication Channel 2018 | Statista*, n.d.), while in another research, 58% found that 'web self-service' is easy to use (*Communication Channels Easy to Use with Customer Service U.S. 2020 | Statista*, n.d.).

This thesis aims to find out what positive and negative effects users and customers experience by using self-service channels in a SaaS application and whether they experience a

lower barrier to cancel their subscription while not interacting with the SaaS vendor's human being.

Hence, the research question to address the above-mentioned research gap is: *"What is the impact of self-service in a SaaS-application on customer satisfaction of customers using the SaaS application?"*

To answer this question the following sub-questions are defined:

- RQ1. How does the level of client's ' knowledge of the software affect the opinion on SSTs?

- RQ2. How does the customer expectations between SSTs and human-assisted support differ between phases in customer lifetime (CLT)?

- RQ3. How does the customer expectations between SSTs and human-assisted support differ between customer size?

- RQ4. What is the SaaS user's opinion on different support channels?

    o RQ4.1 What advantages and disadvantages do they recognize?

    o RQ4.2 Do customers have lower switching intentions if they do not interact with service agents?

- RQ5. For what type of questions will SaaS users use which SSTs?

    o RQ5.1 Why do they use SSTs for those questions?

Figure 1 Conceptual model
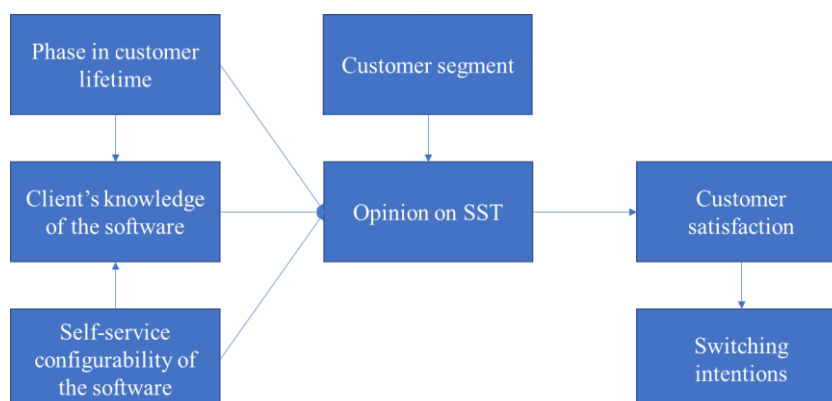
The research is conducted within a Dutch SME, focusing on the development of fleet management software with applications such as track & trace, trip registration, driving behavior analysis and fuel analysis using an IoT sensor in vehicles. The revenue model is fully based on subscriptions and the product is delivered in a Software-as-a-Service (SaaS) manner. The company expects to be able to fully onboard customers without human intervention and without any time delay within a year, due to new technologies that eliminate the need for a hardware component (Internet-of-Things sensor) with the associated initial investment costs and thus delivery time and often human intervention in the form of an onboarding process.

While the causes of customer loyalty have been investigated before, there is a lack of research regarding customer loyalty in SaaS businesses and specific choices in product development and operations. Hence, the academic relevance of this research is to find out how the construct customer loyalty is being influenced by specific choices in a SaaS-application.

In the current labor market, it is challenging to find new employees for certain positions, while wages are increasing too. This also applies for customer service employees. While on the other hand, a transition towards a more self-serviced support process can be impactful and incur significant time and cost. The results of this research can be used in practice to substantiate choices in digital product development and guide discussions in the field of marketing.

Theory

In the following section, the literature on the key constructs of this thesis will be discussed and analyzed to give a better understanding of the addressed subjects.

Software-as-a-Service (SaaS)

Software-as-a-Service (SaaS) is one of the three services of cloud computing. Armbrust et al. (2010) defined cloud computing as "Cloud computing refers to both the applications delivered as services over the Internet and the hardware and systems software in the data centers that provide those services". Next to SaaS, other services are Platform-as-a-Service (PaaS) and Infrastructure-as-a-Service (IaaS). PaaS concerns the online availability of software development kits, tools and platforms like operating systems and databases, whereas IaaS concerns the online accessibility of physical devices like servers for example (P. Gupta et al., 2013) (Prajapati et al., 2018).

In research the comparison and differences between SaaS and Application Service Provider (ASP) are often explored. The main difference is the multi-tenant architecture of SaaS, in contrary to the single-tenant architecture of ASP. With a multi-tenant architecture, only one code and data definition exist on the vendor's server. In other words, all customers are using the same `system`, only with other accounts. Configurations per customer can be made on top of this code, using a provided user interface (Armbrust et al., 2010; Xin & Levina, 2008).

Various definitions of SaaS can be found in the literature. Based on these definitions Mäkilä et al. (2010) distinguish the following five characteristics of SaaS.

1. The product is used through a web browser.

2. The product is not tailor-made for each customer.

3. The product does not include software that needs to be installed at the customer's location.

4. The product does not require special integration and installation work.

5. The pricing of the product is based on actual usage of the software (Mäkilä et al., 2010).

Following on the characteristics that the product is not tailor-made for each customer (Mäkilä et al., 2010), Nitu (2009) defined configurability as a key characteristic of SaaS by which a customer can adjust the software to fit their individual requirements, enabling multi-tenancy which means that the underlying code of the application is still the same among all customers (Nitu, 2009).

These characteristics have numerous benefits for software users as well. Including lower IT costs, higher availability of computing services and easier to scale (Armbrust et al., 2010). Customers of SaaS do not own or maintain the infrastructure to run the software and they use often very flexible payment models (e.g., subscription or pay-as-you-go models). Because of that, customers can easily switch to another SaaS vendor, which leads to relatively higher bargaining power (Choudhary, 2014; Mulholland et al., 2010) and creates unique challenges for SaaS vendors to satisfy their customers' requirements for service to keep churn rate low (Benlian et al., 2011). Benlian et al. (2011) developed a service quality measure for SaaS clients to assess this. Reason for customers to discontinue a SaaS subscription are unfulfilled technical requirements, security issues and low-quality customer support (Pring & Lo, 2009).

Self-service technology (SST)

Self-service technology (SST) means the possibility for consumers to serve themselves, without the need and involvement of service providers (Meuter et al., 2005). SST is a broad concept and involves online self-check-out procedure at a hotel room (J. Lee & Allaway, 2002), but also more complicated services such as problem-solving decisions process for computer issues (Meuter et al., 2005). In this section only SaaS related SST concepts will be investigated.

SST should be seen as an umbrella term, which involves different types of 'self-serviced' support channels. Besides those channels, Razumnikov (2022) suggested other popular support channels for SaaS vendors namely, `e-mail, online chat, FAQ and Knowledge Base, forum, social networks, customer community`. Razumnikov (2022) mentioned that the customers of SaaS products are more advanced in internet technologies and thus have a higher preference for self-service channels (FAQ, knowledge base, customer support community) compared to classic support channels.

SSTs are found to be interesting for both practitioners and scholars. The subject of SSTs is investigated by different approaches, such as the value of the technology e.g., (Bitner et al., 2000; Dabholkar, 1996), but also the benefits of using customers as "partial employees" from a cost cutting and efficiency perspective (e.g., Fitzsimmons, 1985; Lovelock & Young, 1979; Mills, 1983). SSTs provide numerous advantages for service providers, but research also highlighted the advantages for customers, for example higher convenience (improved accessibility and availability) and higher control during the service process (e.g., Collier & Kimes, 2013; Schumann et al., 2012; Zhu et al., 2007) . Researchers have also investigated customers' motivation to adopt and continuously use SSTs, which resulted in the identification of important customer characteristics (e.g., Hitt & Frei, 2002; Xue et al., 2007), technology (or service channel) characteristics (e.g., Collier & Kimes, 2013; Meuter et al., 2005), as well as situational components (e.g., Simon & Usunier, 2007) necessary for customers' self-service process.

Often, research considers the advantages of SSTs and therefore disregards the advantages of personal service channels in terms of trust, customization or close customer – firm relationships (e.g., Barnes, 1997; Ennew & Binks, 1999; Mittal & Lassar, 1996). A. Kumar & Telang (2012) also indicate that the value customers experience from self-service technologies differs from personal service in such a way that it cannot be replaced with, due to

three reasons. Firstly, because it is essential to understand how customers choose available channels for setting up and managing multichannel service setup. Secondly, researchers have indicated that this can lead to increased customer satisfaction, retention and loyalty (Danaher et al., 2003; Wallace et al., 2004). Thirdly, SSTs do not always resolve the problem completely. Therefore, customers should have the possibility to escalate to other 'assisted channels' (personal service channel) like e-mail, chat, calls etc. (A. Kumar & Telang, 2012).

However, researchers found that service providers actively push SSTs towards their customers (Langer et al., 2012; White et al., 2012) and that customers using SSTs are stuck with it, instead of satisfied with it (Buell et al., 2010). When personal service channels are fully replaced with self-service technologies, customer loyalty could decrease (Selnes & Hansen, 2001) and customers decline the service relationship often when using a single channel for service delivery, regardless of whether it is a personal service channel or a self-service technology (Scherer, 2015).

Configurability

Configurability can be seen as one of the key characteristics of a SaaS product, according to Nitu (2009). It fulfills the unique needs of customers of a SaaS product and should be easy and intuitive for the designer (privileged user(s) of a customer) to satisfy the needs of the users that are not able to configure settings etc. In the software the designer and the user both have different interfaces, in which the designer interface enables configure the SaaS application and the user interface to make use of configured SaaS application (Nitu, 2009).

Nitu (2009) defined the following configurable aspects of SaaS software.

- User Interface (UI)
    - Change the look and feel of the UI available to the players. E.g., icons, colors, fonts, title etc. for both controls as forms in the UI.

- Workflow

  - Configuring the behavior of the application. Workflows consists of activities, roles and rules and allow automation of processes involving both human and machine-based activities.

- Data

  - Providing a template for storing data, with the possibility to add specific data requirements (adding additional fields to a table or adding additional table or constraints)

- Access control

  - The designer is able to create, edit or delete users and user-roles specific to his/her organization.

- Other configurability concerns

  - E.g., domain-specific extension

Zainuddin & González presented in (2011) a refined version of the SaaS maturity model of Hudli et al. (2009) by adding a fifth level of "transformation from providing vendor-supported to client-enabled configurability options". The SaaS Maturity model contains the following levels (Zainuddin & González, 2011).

- Level 1: "The software application is customized for individual clients and does not offer any configuration option. At this point, the software application does not support multi-tenancy."

- Level 2: "The software application offers minimal configurability options. These configurability options are mostly vendor-supported. There are limited instances of software applications available and vendors provide extensive configuration services to clients. Thus, the software application does not support multi-tenancy, and is not self-serviced."

- Level 3: "The software application offers extended configurability options for clients. The configurability options are a combination of vendor-supported and client enabled. The software fully supports multi-tenancy, and only a single instance of the software application is available to all clients. However, vendors provide some configuration services to clients. The software application is not fully self-serviced."

- Level 4: "The software application offers extended, client-enabled configurability options for clients. Thus, the software application supports multitenancy and full self-service."

- Level 5: "Apart from supporting extended client-enabled configurations, the software application is hosted in a multi-tier architecture. The software is highly configurable, self-serviced, and scalable."

Zainuddin & González (2011) found that client-enabled configurability increases the sense of ownership of users, which is one the main criticisms in SaaS. Also, they found that SaaS vendors only need to offer common option for client-based configurability, because otherwise this increases the complexity of the application. From a managerial perspective, they found that the increase of self-service configurations has a negative effects on the frequency of communications between clients and Saas-vendors. Also, they suggest to not dismiss the feedback of long-standing clients and that clients needs to know the software well, before starting with self-service configurable options, thus SaaS-vendors should provide support in the beginning to move clients to self-service.

The self-service model and the complexity of software applications can lead to adoption and implementation challenges for SMEs (P. Gupta et al., 2013). SaaS intermediaries can address these challenges by playing a basic role based on technology orientation and operational alignment in the implementation process and by supporting SMEs in creating

business value with SaaS applications based on customer orientation and strategic alignment (P. Gupta et al., 2013).

Client's knowledge of software

Client's knowledge of the software influences the frequency and preciseness of their support requests (Zainuddin & González, 2011). Dahlbom & Mathiassen (1993) explains knowledge from two perspectives, namely the positivistic and the hermeneutic perspective. The positivistic perspective sees knowledge as information that can collected and processes. Knowledge that includes facts is an objective commodity that can be measured, bought and classified. Knowledge can be stores, for example in books, memory or in people.

From the hermeneutic perspective, knowledge cannot be seen as a commodity (able to receive under controlled conditions and bought/sold). This perspective sees it as an individual property and is difficult to, but possible to share knowledge (Dahlbom & Mathiassen, 1993).

Nonaka (1994) came up with a perspective in which knowledge is embedded in and constructed from social relationships. Following Nonaka, knowledge cannot be processed in the way information can. The reason for that is that knowledge is constantly recreated and reconstituted, due to dynamic and interactive social networking activities.

Knowledge is a two-sided concept, it can be split up between explicit, codifiable knowledge, which can be transferred through formal, systematic language. And tacit knowledge, which is embedded in action and more difficult to formalize and communicate with others (Polanyi, 1966).

Customer satisfaction

Customer satisfaction can be seen as the result of a customer's perception of value that is received in a relationship or transaction, in which value is the perceived service quality in relation to the price and costs to acquire customers (Galloway, 1994; Heskett et al., 1990) and

relative to the value that is expected from those transaction or relationships with competitors (V. Zeithaml et al., 1990).

Shankar et al. (2003) investigated differences in customer satisfaction and customer loyalty between online and offline environments. They showed that customer loyalty is higher when the relationship started online compared to offline, but that the level of customer satisfaction is equal between online and offline. Besides that, they also found that loyalty and satisfaction strengthen each other and that this relationship is even stronger in an online environment (Shankar et al., 2003).

In relation to research setting of this thesis, Guimaraes & Paranjape (2014) showed that the application risks, knowledge about service provider and system/data quality management are success factors that increase customer satisfaction in cloud computing SaaS applications and will lead to higher customer loyalty.

Scholarly briefly showed that customer satisfaction leads to customer loyalty (Biong, 1993; Fornell et al., 1996a; Walsh et al., 2005) and that customer satisfaction also influences the switching intentions of customers (Walsh et al., 2005).

Customer engagement

Bijmolt et al. (2010) discussed a model for customer engagement and distinguished 3 phases namely, customer acquisition, customer development and customer retention. The goal of the first phase customer acquisition is focused on finding prospects on thus not relevant for this research, since it is focused on current customer relations.

In the second customer development stage the customer lifetime value (CLV) can be stimulated due to marketing activities, which results in sales at existing customers, cross-buying and upgrading (Verhoef et al., 2007). A core issue for customer development is the estimation of the customer lifetime value, often this is done on customer transactions (e.g. S.

Gupta et al., 2006). However, some use econometric models, such as regression models (Venkatesan & Kumar, 2004) and systems of equations (Bowman & Narayandas, 2004). For cross-selling, Li et al. (2005) built a model by using multivariate probit model on the concept that customer have predictable life cycles and buy product before they buy other products. Following on this Knott et al. (2002) build a model that can predict the next product to buy.

In the third phase of Bijmolt et al. (2010) customer retention is discussed. Customer retention is about preventing customer attrition or churn. The assessment of churn risk is seen as needed for customer valuation (Bijmolt et al., 2010). Multiple studies identified drivers of churn and retention drivers of customers. Verhoef (2003) showed that affective commitments and a loyalty program can decrease the chance of churn. R. T. Rust & Zahorik (1993) showed a link between the concepts satisfaction and retention, but this relation might vary between customer segments (V. Mittal & Kamakura, 2001).

Customer loyalty

Dick & Basu (1994) defined customer loyalty as "the strength of the relationship between an individual's relative attitude and repeat patronage." However, a more understandable definition is given by Oliver (1999) who explains it by "a deeply held commitment to rebuy or repatronize a preferred product/service consistently in the future, thereby causing repetitive same-brand or same brand-set purchasing, despite situational influences and marketing efforts having the potential to cause switching behavior."

Dick & Basu (1994) conceptualized loyalty as "the relationship between the relative attitude toward an entity (brand/service/store/vendor) and patronage behavior", which is the key to their framework of customer loyalty. Relative attitude has two underlying dimensions, namely the degree of attitudinal strength and the degree of attitudinal differentiation (Dick & Basu, 1994). The antecedents of relative attitude consist of three categories, namely cognitive

(associated with informational determinants (e.g., brand beliefs), affective (associated with feelings states involving the brand) and conative (related to behavioral dispositions toward the brand) (Dick & Basu, 1994).

Figure 2 A Framework for Customer Loyalty (Dick & Basu, 1994)

FIGURE 1
A Framework for Customer Loyalty
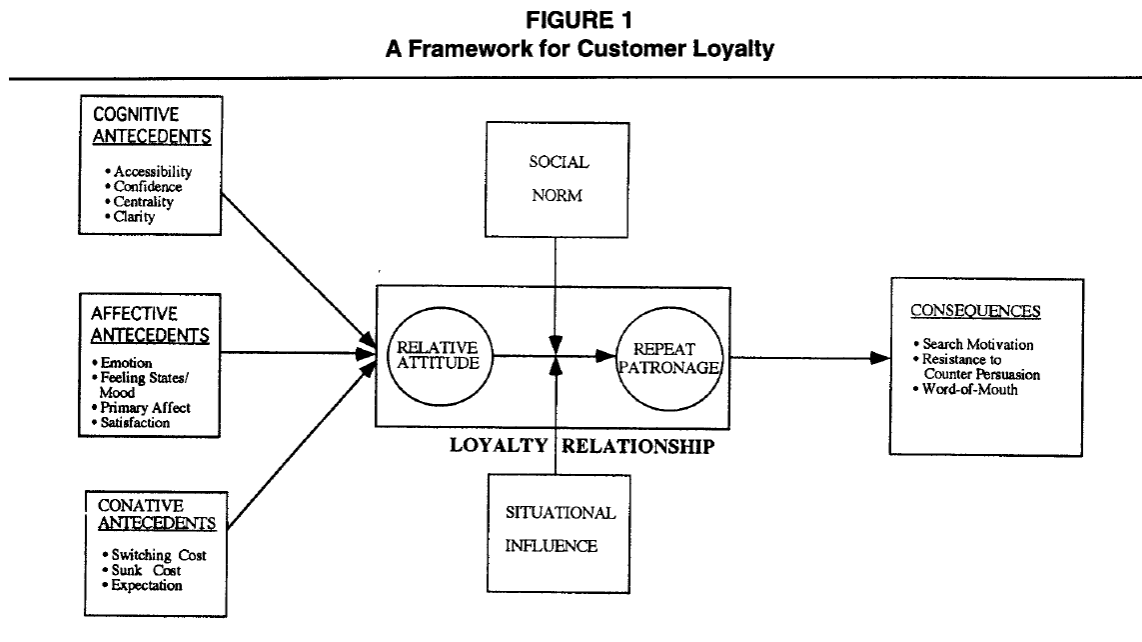
Customer loyalty highly influences the performance of a firm and is an important source of competitive advantage for many companies (Heskett et al., 1997; R. Rust et al., 2000; Woodruff, 1997). A higher customer loyalty results in higher revenue, lower customer acquisition cost and lower costs of serving repeat purchaser, resulting in higher profitability (Heskett et al., 1997; Reichheld, 1993; Shankar et al., 2003). Also, in online environments (e.g., SaaS) customer loyalty is important, which has been shown by Shankar et al. (2003).

In organizational buyer-seller relationship, two types of buyers can be distinguished, on one hand a loyal buyer who focuses on long-term benefits and aims for cooperative actions that are beneficial for both partners in the relation. On the other hand, we have disloyal buyers, who aim for competitiveness of both partners and cuts transaction costs (Doney & Cannon, 1997; Ganesan, 1994; Morgan, 1994).

Furthermore, customer loyalty has a positive effect on customer satisfaction and switching costs (Lam et al., 2004). While, Hallowell (1996) illustrated that customer satisfaction, customer loyalty and profitability are in relationship with each other and Reinartz & Kumar (2000) more specifically the relationship between customer loyalty and profitability.

Customer Valuation Theory

Kumar (2018) proposed a Customer Valuation Theory (CVT). Kumar (2018) provides the following propositions to test CVT.

- Transaction behavior: This includes all previous and current transaction variables that affect and influence the relationship between customer and firm.

- Marketing cost: Includes previous, current and future promotional costs (e.g., for acquiring customers, retention and winning back customers), technology upgrades, improvement of service, management of employees and controlling the quality.

- Demographic/firmographic variables: Referring to the distinguishing characteristics of customers (both end user and business customer). For business customers the variables consist of type of industry, age of firm, size of firm, annual revenue and location of the business. For end users this consists of demographic variables such as age, gender, income and the physical location of the customer.

- Economic and environmental factors: Economic factors are for example gross domestic product (GDP) per capita that help to determine the consumption pattern of a country. Consumers' response to macroeconomic factors can be seen as a function of not just only their ability to buy (measured by current and expected future income), but also their willingness to buy (Katona 1975).

Furthermore, Kumar (2018) comes up with a mechanism to measure the future of each customer, namely the Customer Valuation Theory (CVT). This is measured on the following key components:

- Direct economic value contribution: The economic value of the customer relationship to the firm.

- Depth of direct economic value contribution: The intensity and inclusiveness of customers' direct value contribution to the firm on behave of their own purchases that generated significant financial results for the implementing firms.

- Breadth of the indirect economic value contribution: Customers' indirect value contributing to the firm through referral behavior, online influence on prospects' and other customers' purchases and their feedback on offers of the firm.

Research design

In the next section, the research method is described and an explanation of how the constructs are measured is provided. The goal of this study is to extend our knowledge on the effects of self-service in a SaaS application on the customer loyalty towards the SaaS vendor. I conducted this research at a SaaS vendor in the Netherlands, enabling the use of primary data to investigate the relationship. During this exploratory research, empirical evidence is found for answering the research question by capturing the participants` meanings using a mono method qualitative approach (Saunders et al., 2019). Semi-structured interviews are used to understand the participants opinion and underlying reason for their opinions (Saunders et al., 2019).

Selection

For conducting this research, I had the opportunity to collect data from the customers of the SaaS vendor. The vendor has a broad group of customers, since the product they offer is

quite generally applicable. The common denominator is that all customers have vehicles in some way. By using the non-probability sampling method, quota sampling, interviewees were selected among all customer groups. By using minimum quotas, key groups are represented, but there is flexibility in composing the final sample (Robinson, 2014). The following quotas were defined:

- At least 1 interviewee is a top-3 customer;

- At least 1 interviewee is a large customer;

- At least 2 interviewees are medium customers;

- At least 2 interviewees are small customers;

- At least 2 interviewees are a one-license customer;

- At least 2 interviewees are decision-making units at the customer's company;

- At least 2 interviewees are key users of the software, but not a decision-making unit at the customer's company.

The customers of this SaaS vendor are considered as our Unit of Analysis, however the contact persons and often the main users of the offered software are our Unit of Observation.

Characteristics

Size

The SaaS vendor has a broad variety of customers based on size. Approximately 76% of the customer-base are customers with 1 license, such as self-employed persons or companies with one vehicle. A small customer has more than 1, but less than 11 licenses. A medium-sized customer has more than 10, but less than 20 licenses. At the SaaS vendor, a large customer is defined as 20 or more licenses. Furthermore, there is a clear top-3 segment. This makes the following segmentation bases on size:

Table 1 Customer segments

Segment	Size as number of licenses
Top-3	
Large customers	>20
Medium customers	11-20
Small customers	2-10
One-license customers	1

The SaaS vendor sees a relation between the size of the company and the size of the company as customer, however that is not always the case. For example, a big company could be a small customer of the SaaS vendor.

Industry

In general, organizations of all industries can potentially become a customer of the SaaS vendor and this is something they notice in practice as well. However, they recognize a few customer groups, namely employment agencies, taxi companies, driving schools, construction and infrastructure companies and delivery companies.

Location

The customers of the SaaS vendor are primarily located in the Netherlands and to a lesser extent in Belgium. Within those countries, the customers are distributed well across the country. Some of the customers are internationally focused and therefore have international characteristics in terms of users and vehicles driving across Europe.

Measurement

In table 2, the operationalization of the concepts in this research is given.

Table 2 Operationalization table

Concept	Variables	Indicator	Measurement	Reference
Self-service configurability of the software	Maturity level of application	Degree of software supporting client-enabled self-service configurability	Observation by researcher of the SaaS product, based on the maturity levels (1 (no configuration) till 5 (full self-service), as mentioned in theory and mesurement section)	Zainuddin & González (2011)
Client's knowledge of the software	Support requests	Frequency	Asked during the interview, measured as the perceived amount of support requests in the last 6 months	Zainuddin & González (2011)
Client's knowledge of the software	Support requests	Preciseness	Asked during the interview about what type of questions are asked in the past. Answers will be categorized with a product specialist (less precise, normal, very precise) e.g. less precise= `X is/will happen, what should I do?` | normal= `I want to do Y, how can I do that?` | very precise= `I tried to do Y, but this doesn't work because of Z.`	Zainuddin & González (2011)
Customer segment	Size of customer	Number of licenses at software vendor		
Communication channel	Channel type	Assisted (personal service) or non-assisted (technological self-service channels)	Observation by researcher of the channel	
Communication channel	Channel characteristic: interaction	Interaction between user and technology	Observation by researcher of the channel, based on 5-point Likert scale (1. no interaction - 5. full interaction)	(Scherer, 2015)
Communication channel	Channel characteristic: human involvement	Presence of service provider agents	Observation by researcher of the channel, based on 5-point Likert scale (1. no presence (no agent needed) - 5. constant presence (agent is constantly answering)	(Scherer, 2015)

Concept	Variables	Indicator	Measurement	Reference
Communication channel	Channel characteristic: communication	Communication between user and service provider agent during the usage of a certain channel	Observation by researcher of the channel, based on 5-point Likert scale (1. no communication - 5. constant communication interaction (1-to-1 direct conversation with agent)	(Schultze, 2003)
Communication channel	Channel characteristic: personalization	Personalized or standardized answers	Observation by researcher of the channel, based on 5-point likert scale (1. not personalized (answer is generally applicable)- 5.personalized (answers are specific for customer))	(Ba et al., 2010; Campbell et al., 2011; Cyr et al., 2007).
Opinion on SST	Customer expectations	"Overall expectation of quality of a certain channel (prepurchase)"	Asked during the interview as open question	(Fornell et al., 1996)
Opinion on SST	Customer expectations	"How well the product fits the customer's personal requirements (prepurchase)"	Asked during the interview as open question	(Fornell et al., 1996)
Opinion on SST	Customer expectations	"Expectations regarding reliability, or how often thing would go wrong (prepurchase)"	Asked during the interview as open question	(Fornell et al., 1996)
Customer satisfaction	Satisfaction with services offered	"In general, my company is very satisfied with the services offered"	Asked during the interview as open question	(Lam et al., 2004)
Customer satisfaction	Satisfaction with relationship	"Overall, my company is very satisfied with its relationship"	Asked during the interview as open question	(Lam et al., 2004)
Customer satisfaction	Opinion on company to do business with	"Overall, it is a good company to do business with."	Asked during the interview as open question	(Lam et al., 2004)
Customer satisfaction	Opinion on fairness	"Overall, it treats my company very fairly."	Asked during the interview as closed question	(Lam et al., 2004)

Concept	Variables	Indicator	Measurement	Reference
Customer satisfaction	Services offered meets expectations	"Overall, the service comes up to my expectations."	Asked during the interview as closed question	(Lam et al., 2004)
Switching intentions	Intention to switch to other software vendor	"I will switch to another SP if I experience problems with XYZ SP's service"	Asked during the interview as closed question	(Quoquab et al., 2018)

Client's knowledge

To estimate the level of client's knowledge of the software, the framework of Zainuddin & González (2011) provides two variables to measure this. Namely, the frequency and preciseness of the communication from customer to the vendor. Thus, if the client's knowledge is high, the communication is rare and precise, while if the client's knowledge is low, the communication is more often and less precise.

Self-service technologies

Self-service technologies contain more interaction between the user and the technology that is used, while the service provider agent is not directly involved in the process (A. Kumar & Telang, 2012; Scherer, 2015). Technological self-service channels do not support direct communication between the user and the service provider agent (Schultze, 2003). Also, technological self-service channels require customers to involve themselves in the service process (Campbell et al., 2011) and have more interaction with the self-service technology (Scherer, 2015). According to A. Kumar & Telang (2012) examples of self-service technologies are web-based self-service portals or interactive voice-response units. In a more practical and SaaS related way, examples are knowledge bases (with help articles), FAQ (Frequently Asked Questions), help centers, in-app guidance (product tours and interactive

walkthroughs), notifications (new features), community forums, instruction videos and troubleshooting tools such as chatbots and video tutorials.

Personal service channels (or assisted channels) need the presence of a service provider agent and involves direct interaction between the customer and service agent (Scherer, 2015). However, the customer and service agent does not need to be necessarily in the same physical location, they can also interact via technologies such as telephones (Scherer, 2015), mails or chats.

Self-service channels are characterized by lower personalization. They require interaction of the user and are more standardized, thus have lower personalization and customization in comparison to personal service channels (Ba et al., 2010; Campbell et al., 2011; Cyr et al., 2007).

Customer satisfaction

Fornell et al., (1996) defined in the American Customer Satisfaction Index (ASCI) which is a concept to measure overall customer satisfaction, the measurement variables used in the ACSI. They predicted and examined successfully that the model is generally applicable in different sectors. Therefore, the prepurchase measurement variables that are in relation to the variable customer satisfaction of this model is adopted to measure customer satisfaction in this research as well.

Table 3 Measurement Variables Used in the ACSI Model (Fornell et al., 1996a)

Measurement Variable	Latent Variable
Overall expectation of quality (prepurchase)	Customer expectations
Expectation regarding customization, or how well the product fits the customer's personal requirements (prepurchase)	Customer expectations
Expectation regarding reliability, or how often thing would go wrong (prepurchase)	Customer expectations
Overall evaluation of quality experience (postpurchase)	Perceived quality
Evaluation of customization experience, or how well the product fits the customer's personal requirements (postpurchase)	Perceived quality
Evaluation of reliability experience, or how often thing have gone wrong (postpurchase)	Perceived quality
Rating of quality given price	Perceived value
Raing of price giving quality	Perceived value
Overall satisfaction	ACSI
Expectancy disconfirmation (performance that falls short of or exceeds expectations)	ACSI
Performance versus the customer's ideal product or service in the category	ACSI

Customer loyalty

As explained in the theory section, scholarly briefly explained that higher customer satisfaction increases customer loyalty (Biong, 1993; Fornell et al., 1996a; Walsh et al., 2005). Therefore, customer loyalty is not directly measured in this research, but customer satisfaction is directly measured to explain customer loyalty in which those are followed.

Data collection

To collect data to measure the construct, in-depth semi-structured interviews with the selected participants are conducted via video conferencing. To find saturation, a total of 12 interviews were conducted (Guest et al., 1995). This research method provides the freedom to the interviewer to ask follow-up questions.

Semi-structured interviews are the most common of all qualitative research methods (Alvesson and Deetz, 2000, p. 194). A semi-structured interview consists of prepared questions guided by themes and is popular due to flexibility, accessibility, intelligibility and can disclose important facets of humans (Qu & Dumay, 2011). Kvale & Brinkmann (2009) described it as the most effective and convenient way of collecting data.

The interview guide and operationalization table can be found in the appendix. The sample distribution is given in table 4.

Table 4 Sample description of interviewees

Interviewee	Segment	Customer lifetime (CLT) in years	Position	DMU
1	Large	1,5	Staff member	No
2	Top-3	6,5	Staff member	No
3	Top-3	7	Manager	No
4	One-license	2	Self-employed	Yes
5	One-license	<1	Company owner	Yes
6	Small	1,5	Chairman	Yes
7	Small	<1	Project manager	No
8	Small	<1	Staff member	No
9	Medium	6,5	Management team	No
10	Medium	1,5	Staff member	No
11	One-license	<0,5	Staff member	No
12	Small	7	Management team/owner	Yes

Data analyses

Qualitative research often received criticism because of a lack of scholarly rigor. To bring this rigor, Gioia et al. (2013) summarized a systematic approach to conduct and present inductive research, named the Gioia method. To analyze the collected data, the Gioia method is used. By using the Gioia method, a data structure is developed by going from 1st order concepts, to 2nd order themes and finally aggregate dimensions. The developed data structure can be found in the appendix.

Results

This thesis aims to answer the following main research question: *"What is the impact of self-service in a SaaS-application on customer satisfaction of customers using the SaaS application?"* To answer this question, the results are addressed per sub-questions.

Furthermore, the maturity of the software products of which the interviewees are customers is assessed with a maturity level of 3, regarding the maturity framework of Zainuddin & González (2011). The assessment of the channel types can be found in the appendix.

RQ1. How does the level of client's knowledge of the software affect the opinion on SSTs?

Clients with more experience in the application noted that their support requests are not standard questions about how certain functions work in the application, but often about bugs in the application or suggestion for feature requests. Thus, they are not willing to use SSTs since they believe SSTs can't handle this kind of support requests.

"Actually, focused on <name software vendor> I could not really come up with a quick question to ask there. Usually, my questions are about how can this ride not connect or if this <name of hardware> no longer works, what can be the reason for that, can it be updated? All questions that can't be asked on a forum and I have to ask purely with you guys." (Interviewee 2)

On the other hand, more experienced users believe SSTs would be useful for their colleagues who don't use the application as often as they do.

"I know exactly what I'm doing, but the colleague next to me who has to take over for me might be in doubt about how the application works, so that would be very easy. " (Interviewee 2)

"But indeed, for my colleagues it would be helpful find how do I fill something in, how do I create something, how do I import a file. That kind of questions, if then they don't know there is a knowledge base there then a reference comes after that. But really questions that relates to the software of a ride or import, I think it's hard to be answered by a chatbot. " *(Interviewee 2)*

RQ2. How does the customer expectations between SSTs and human-assisted support differ between phases in customer lifetime (CLT)?

In the onboarding phase of a customer lifetime cycle, some interviewees were of the opinion that it could be done without any support assistance since the application was easy to use. If for some reason, the interviewee still had questions in that phase, they mentioned the knowledge base as a suitable channel to use. For later phases, they haven't different expectations regarding the support channels.

"Yes, I do think that when you're just starting out and you haven't quite figured it out yet, well, you don't call someone and say, 'Hey, explain it to me. I think you just start looking for yourself first. Then you just search, mainly I think, in the knowledge base, you try out some things here and there and then it might be nice to have less human contact. Then you can also go there with very stupid questions, so to speak. A bit easier than if you would really ask someone all at once, for example on the phone or by e-mail, so to speak. Yes, then again, I think the threshold is indeed lower. If you come up with really stupid questions, which of course is perhaps quite logical, because you don't know it all yet, then it is easier to do that in an impersonal way, just to say it." (Interviewee 8)

RQ3. How does the customer expectations between SSTs and human-assisted support differ between customer size?

Interviewees of the top 3 and large customer segment said they frequently use the application; they know well what and how to do.

"So I'm not new to the software. I can understand that if you're new, you do have more questions about how do I adjust this in a vehicle, where does that get redirected to the fuel analysis, things like that. If you're new I can understand that you can have those kinds of questions, but obviously that's not the case because I've grown with it." (interviewee 2)

The support requests they have are more complicated and not common, therefore they expect the possibility of having direct contact with their contact person or otherwise a support agent.

"... we all have complex lines and clients who have demands. If you're a sole proprietor, you don't suffer from that as much. Then the bonding and contact is also a lot less." (interviewee 1)

Interviewees in the small and one-license customer segment also indicated that they want to have the possibility to have direct contact, due to the reasons given above.

In general, often interviewees mentioned by themselves that they understand the advantages for the software vendor of using SSTs such as a chatbot. The main advantage they named is the potential saving in working hours for support agents. However, they do not see or barely see added value for them as customers.

"I don't think that's customer friendly, but I can understand it from a business perspective. But as a customer I say: it's just raising a threshold towards your customer to prevent them from calling. A chatbot does not necessarily have to be wrong, but if someone asks: give me the number of the helpdesk, it has to come out, even if you want to discourage that. Eventually people are going to do that anyway if that's what they're looking for." (Interviewee 4)

All customer segments are somehow skeptical about a software product that only offers support via SSTs. The larger sized customer segments show a direct decrease in customer satisfaction if the software vendor makes this decision. "Question: Suppose we would choose to use the knowledge base as the only channel. What would be your opinion on that? What would that do to your satisfaction with the product?

"*I think I would be less satisfied with that. The moment I call you, how about this and how does that work. Then I also have immediate feedback. Calling is also shorter, it takes less time. Otherwise, I have to look it up all by myself. That makes it less fun. I like to have personal contact.*" (Interviewee 1)

While customer satisfaction for smaller sized customer segments shows a smaller decrease if the product they use remains the same, so no bugs in the software or other errors and failures.

"*Well initially not necessarily, look, as I said, if it basically just works it's good … Especially if you really start running into problems and you would like to have quick contact, then that dissatisfaction would only increase. But beforehand, I would be a little less satisfied.*" (Interviewee 8)

RQ4. What is the SaaS user's opinion on different support channels?

In general, and among all interviewees, direct contact is seen as valuable on the one hand with a contact person or otherwise with a general support agent. The reasons given are speed of solving, quality of solving and they find it more convenient to have a discussion to hear what the possibilities are and better express emotions.

"*Yes that's different, then you talk about specific problems. They look into it. Then they often solve it on the spot, that just works a lot better.*" (Interviewee 1)

"I usually value that you just end up being able to talk to someone or that it's a little more personal, that you can be helped a little better anyway." (Interviewee 8)

"And if I'm really bummed about something, I can also still express my emotion in that in that conversation. ... you can say to the chatbot that you just have a problem because your car hasn't been online for three weeks, four weeks. But yes, that chatbot couldn't care less, while on the other hand you can just tell a real human person say boy, I just really have a problem, you have to go and help me and I don't want to say I have to pull someone through the phone, but you can indicate of: yes, I just really have a problem if you can just help me for a moment, help you with it, because I have to move on." (Interviewee 7)

To check how valuable direct contact is for the interviewees, I asked them whether they are willing to pay more for human-assisted support or have a discount on only using SSTs. I did not find a straightforward answer. In all segments some interviewees would pay more for direct contact, while others are not willing to do that. There is also no clear relationship between the willingness to use SSTs or preference for direct contact on the willingness to pay more for human-assisted support.

"If I were a company like you, I would never differentiate between them. There I would just say this is it and if you need support, you get support. If you want to call you can call, if you want to go through once a quarter, we'll do that. ... I would choose that myself, that's my preference and as a customer I'd rather pay a bit more than think: well, I'll just not call anyway, because then I know we'll have another bill at the end of the month for 200 euros." (Interviewee 12)

"Yes, I'll go for the cheaper variant, because for me it's just trip registration. And then what is the added value of a high support subscription? For me, that's pretty much nothing if the thing does what it's supposed to do. Then I'm satisfied and if things don't work then I'm not

going to take out a subscription for it. In fact, I find it very bad or at least what is inconvenient about it. Because for big customers I would definitely consider that I think, that you say of you get kind of primary, better Support or faster Support. Then of course you start working with SLAs, on the other hand you then say to your small customers, you guys are just a sideshow because that's what you are of course indirectly then saying to those smaller customers of yes, you are actually less than our big customers. And I find that a bit ugly." (Interviewee 4)

"Yes, that also depends on what, look with you I never have contact, so yes, that's not worth paying more either. With that payroll, for example. Yes, look, if I am just sure that I am always helped right away and I have the man on the line three times a week, that is worth 150 euros a month, so to speak. Instead of having annoyance every time and more headaches than it's worth in the end. Really differs per thing." (Interviewee 5)

Preferred channels.

During the interviews, the preferred channels were asked and became clear. All interviewees found a non-SST the preferred channel. However, mostly they do not prefer one single channel, but like to have different options depending on the priority and complexity of the question. For questions with a higher priority or questions that are difficult to explain the interviewees preferred a phone call. For easier questions they like to use chat. Mail is used to collect evidence to check what someone said and if the support request somehow escalates later and preferred due to the freer formatting (inserting screenshot, highlighting content etc.).

"...If I think: yes, how am I going to word my problem properly, and have not I forgotten something there or something. So then I do find by phone pleasant. " (Interviewee 8)

"Look, the chat is also kind of easy at the moment you need something quick." (Interviewee 1)

"it's registered, so should it be necessary. Well, fortunately that's not necessary, but it can be if you're really in a dispute with a supplier, then you can say, look, I sent it then and there, and you can file that more like a record if it's really a bad supplier. Fortunately, that's not too bad, but I like that. Those are already reasons for me to use mail." (Interviewee 4)

"Yes, because then I know I can just give enough information, send pictures along. A picture often says more than 1000 words." (Interviewee 4)

Furthermore, a contradiction was found in the use of certain channels. Some interviewees declared that they use, for example, phone to easily explain complex questions and mail for more simple questions. While others indicated that they use mail for more complex questions, so they can take the time to explain it well and use for example screenshots in it and they use phone or chat for more easily answerable questions.

"Really the technical questions, where examples have to be grabbed. That's where e-mail is more solid and for the small direct things, a chat is fine." (Interviewee 10)

"...If I think: yes, how am I going to word my problem properly, and have not I forgotten something there or something. So then I do find by phone pleasant." (Interviewee 8)

RQ4.1 What advantages and disadvantages do they recognize?

Quality.

An often-mentioned variable about different channels is quality. Interviewees indicated that they see expert knowledge via direct channels such as phone, mail or chat as an advantage and valuable. By asking questions via those channels, they presume that they will receive the best answer. On the other hand, this was a mentioned disadvantage by using a SST like community in which they expect noise and wrong answers in the threads. Also, expectations of the quality of chatbots (SST) are low. Expected possibilities of chatbots are triage to support

agents, referring to right knowledge base articles or returning details (e.g. financial information). While some do not expect to find their answers in a knowledge base.

"I assume you guys have all the expertise of the program you provide. And when I ask my question to you guys I am sure I will get the right answer. If I look for an answer myself, I still think that for me it might not be 100% sure that I have found the right one." (Interviewee 2)

"So you just have to search among the nonsense. I do think that's a big disadvantage." (Interviewee 1)

"And when I go to a knowledge base in general, I find that my questions are not there anyway. I find that very often there are these pre-engineered questions. Then it says, 'these are frequently asked questions' then I think those are not frequently asked questions at all, these are just some standard things I may come across." (Interviewee 7)

Time.

Different perspectives on the time consumed by using certain channels and as an underlying reason for preferences between those channels were given. One interviewee mentioned that he drives a lot during the day which forces him to use a phone, because it is not allowed to text while driving. While other interviewees prefer mail and chat over phone, because they can send their answer and response to the answer when it fits their agenda.

"... but still because I'm on the road a lot and my preference then again is calling, because you're just in the car hehe." (Interviewee 6)

"Yes, I find it easier, just a quick email, then on again and I'll see it pop up the next time I'm there." (Interviewee 8)

"Well, it's not that it's faster, but you get helped when you get helped and then you just respond. It's not like you're on the phone, you're on hold for 15 minutes and then you still have to.... Then you're constantly focused on your phone." (Interviewee 5)

Above all, SSTs were considered as more time consuming compared to human-assisted channels, for example, because it takes time to dive into a knowledge base, must answer triage questions of a chatbot and uncertainty of receiving an answer on a community thread.

"Yes, I can't cite an example of it, but if you do go and figure something out on your own, you often spend a long time, while someone else might just have the answer ready to go, so that can save a lot of time and energy." (Interviewee 3)

Possibilities.

Per channel different possibilities and lack of possibilities were given by the interviewees. As given above, multiple interviewees said that they found that a chatbot was capable of forwarding the support request to the right support agent, but dislike letting the support request resolved by the chatbot due to the expectations that it is not able to answer correctly. Customers with more employees working in the application see the knowledge base as an opportunity for less experienced users to find their answers and relieve workload (answering standard questions) for key-users. Also, a mentioned advantage of the knowledge base is understanding certain lesser used functions in the application.

"Yeah, and some companies also have like, well, what's your customer number and what's your name? Okay, wait a minute and then eventually an employee will come. So, then it's kind of a preliminary step just like you have to go through a phone menu to the right department, you're just kind of guided there as well." (Interviewee 8)

"But when I'm helped by a virtual assistant that I have to talk to, I'm actually always kind of creeped out by that, I must also say." (Interviewee 7)

"And for accounting, there's also a question mark there where you get into a kind of knowledge base or handbook. That is very nice. If that were in the product, it would be very handy for colleagues. I know exactly what I am doing, but the colleague next to me who has to take over sometimes thinks, "How did that work again?" (Interviewee 2)

"Of course, in a program, you don't use all the facets every day. There are things of which you think, yes, how does that work again. Then you look it up in the knowledge base and it's easy. You don't have to bother someone every single time." (Interviewee 1)

Interviewees from both large and small customer segments mentioned that they addressed feature requests in the past. Larger customers have done this directly via contact persons of the software vendor while an interviewee from a smaller customer segment did it via a survey. One interviewee mentioned that he used a community at another software vendor as an online idea box which suits him well.

"No, I'm a typical doer so I click around and then sometimes you have that you think: hey, I'm missing something or something. At one point there was a customer satisfaction survey, and I think I also mentioned that I miss the fact that sometimes I have a business trip, but privately I have to make a detour to pick up my children, for example. But anyway, that's what I suggested then, that's just in there these days. So that's really nice." (Interviewee 4)

"I do see a forum really being something for big companies. Especially. And or if I look at SMEs, I would see a forum also, they do that at <name other software product> also at accounting package, for ideas, because obviously that's like.... `Can you add this or that `That's also kind of interesting." "Yes, and then of course if you really have a lot of customers and ideas are posted there and you respond to them, this idea we are going to put in the planning in six months, then you also have the feeling as a customer that it is taken into consideration. Or that it is seriously looked at by the company." (Interviewee 4)

"For example, <name of product>, that's the ultimate example. We raised that, we want this. Actually, that was custom built. That is a piece, yes that you indicate something yourself. If we do this now like this, that now like that. We are happy with it and you are happy with it." (Interviewee 1)

RQ4.2 Do customers have lower switching intentions if they do not interact with service agents?

In general, interviewees said they would not switch directly if they do not interact with service agents. However, some mentioned that they would prefer a company with direct support possibilities over one that does not but also that it depends on the type of product. On the other hand, if the product shows failures or does not function as expected and at that moment it is not possible to interact with a service agent, that would potentially be a reason to switch to another vendor.

"If I only have to email or contact via whatever, so to speak, yes, that in itself is not a reason for me to leave right away." (Interviewee 5)

"...the moment that there is no possibility for telephone contact, I do not subscribe." (Interviewee 6)

"Not immediately, but when there have been a few problems and are not resolved as they should be, there comes a time when I start looking further into alternatives." (Interviewee 2)

1 top-3 customer and 1 customer in the large segment said it feels somehow as a tailor-made application since their desired functions are in the application and a smaller customer felt more bonding with the application due to a submitted wish was fulfilled.

"For example, the <name of product>, that's the ultimate example. We raised that, we want this. Actually, that was custom built. That's a piece, yes that you indicate something yourself. If we do this now like this, that now like that. Are we happy with it, you are happy with it. ... Yes, then you also bond, then it is also a cooperation, it is as simple as that. And then I also think about the cancellation, the moment you have worked together for so long and choose to move on. Yes, in my opinion it can't be done with an e-mail. But that's my personal opinion." (Interviewee 1)

RQ5. For what type of questions will SaaS users use which SSTs?
RQ5.1 Why do they use SSTs for those questions?

In general, the interviewees would use SSTs for easy questions. For example, if they aim to use a certain feature that is not used often, they approach the knowledge base to find out what they need to do. Also, for employees that don't use the application often the knowledge base would be handy instead of letting key-users within the customer's company explain the application.

A few interviewees mentioned that they would use a chatbot for simple questions, for example requesting an invoice or other financial data. Or thought it would be valuable if a chatbot refers to the right knowledge base article instead of finding it themselves.

"Yes maybe that's something, that they can ask questions with a reference to the knowledge base. But indeed, for my colleagues it would be helpful to get to how do I fill something in, how do I create something, how do I import a file. Those kinds of questions, if they don't know then there is a knowledge base there then a reference comes after that." (Interviewee 2)

Additional insights

Multiple interviewees acknowledged that they choose certain channels based on habitats. This often results in using the phone or mail.

"But look for a lot of institutions and parties we have a portal running, that you just log in and then they see for example for the student transport I'm just giving an example. We drive, I don't know how many routes for that. A parent who just logs in on his phone, his smartphone in our app and you look at my son or daughter: `Is she boarded the car, and you see of well, I see him or her in three quarters of an hour at home`. You don't want to know how here the phone is still ringing off the hook between three and four and that's just habituation calling is faster. "(Interviewee 10)

Also, some interviewees indicated that they experienced more additional and unintentional insights with certain channels. E.g., support agents that suggested another way of working that is more beneficial or finding other interesting tips and tricks by finding answers in a knowledge base.

"Look, if I have a question, of course I try to explain it to those, and those who would then might say with an underlying thought of, hey, you're doing it all wrong. You really should have done that differently. A chatbot might just overlook that, it actually wants to answer that directly." (Interviewee 10)

"You're not going to learn things you don't ask for so to speak and with the knowledge base you do. With a forum I could imagine that it is the same, but I think that it is also more specific. In a knowledge base it is just often, I think, explained exactly how everything works, manuals whatever, that you might then also learn more, because ultimately your original intention was. So, you would have that my preference." (Interviewee 8)

An often-mentioned perspective of the interviewees is that they expect different support in terms of speed and channels based on the type of product and the frequency of support requests. Software products that are more embedded in key processes of the customers' company need quicker responses and have often regular contact persons. While this is not the

expectation with software products that are less important in those key processes, which was often the case for the software product of which the interviewees were customers of. However, some argued that due to the constantly needed data flow of the software product urgent responses are still necessary.

"Depends of course also just how often, if I need you guys once a year for something, yeah, then it's not so very exciting. Well, if you really want to know something monthly or think how about that, how do they do this and you have to scroll through a menu every time yes, then I would get cranky soon." (Interviewee 5)

"Yeah, but for you guys I think it's a little different. I think that's a side product, you understand, that's an additional product, which we like to see. No-yes, then you don't run out of one day here, even a few days, look, because you have weekly and monthly reports there anyway. Yes, with all due respect, you're trying to flesh that out as best you can and if we had it all so well put together, then you could steer by way of daily or every couple of days or maybe weekly just how everybody wraps it up on the numbers that you can provide from all the info. That doesn't happen now, I'm very honest about that too, so then that's not very relevant either." (Interviewee 9)

Underlying data of results

Two aggregations are made for summarizing the results. Firstly, the individual interviews are aggregated in the defined customer segments as given in the research design which are the columns in table 5 and table 6. Secondly, the codes are structured following the Goia method from 1st order concepts to 2nd order themes, to aggregated dimensions. This overall data structure can be found in appendix D. The cells in the tables represent how often a code that belongs to the aggregate dimension or 2nd order theme in the left column was selected, thus the more it is said during the interviews.

In table 5, the results per aggregated dimension of each customer segment are given. In table 6, the results per 2nd order theme per customer segment are shown, which gives more precise insights compared to table 5. In appendix E the data is shown per interview in which the customer segment of which the interviewee belongs is given in the header.

Primarily table 5 indicates with the predominantly greener cells, that in all customer segments there is a negative attitude against SSTs and a positive attitude against human-assisted channels (HAC). With table 6 and appendix E the results per channel and interviewee or customer segment can be evaluated.

For table 5, 'Gr' in the top row stands for the total number of quotations selected for this thesis for all interviewees in the segment and GS represents the number of interviewees in the segment. For table 6, in the left column GS stands for the number of codes per code group and in the top row 'Gr' represents the number of quotations for all interviewees in the segment and 'GS' is the number of interviewees per segment.

All interviews were of a comparable length, however it is noticeable that the medium segment has less quotations compared to others. The interviews in this segment were held later during this research which allowed more specific coding. The interviews in top 3 segment were held in the beginning of this research, which was a reason for less specific coding, as seen on the high number of quotations in 'Other'.

Table 5 Result per aggregate dimension and customer segment

Aggregate dimensions	1. Top 3 Gr=205; GS=2	2. Large Gr=76; GS=1	3. Medium Gr=50; GS=2	4. Small Gr=134; GS=4	5. One license Gr=170; GS=3	Totals
Positive opinion SST	12	3	2	12	9	38
Positive opinion HAC	50	25	14	43	47	179
Negative opinion SST	23	16	11	23	23	96
Negative opinion HAC	2	0	0	3	3	8
Drivers	27	6	10	21	33	97
Others	84	31	17	53	54	239
	198	81	54	155	169	657

Table 6 Results per customer segment

	1. Top 3 Gr=205; GS=2	2. Large Gr=76; GS=1	3. Medium Gr=50; GS=2	4. Small Gr=134; GS=4	5. One license Gr=170; GS=3	Totals
1.1 Positive about knowledge base GS=8	7	2	1	5	3	**18**
1.2 Negative about knowledge base GS=10	3	4	1	6	3	**17**
1.3 Neutral about/ opinions of knowledge base GS=12	13	3	3	6	7	**32**
2.1 Positive about community GS=7	5	1	1	1	4	**12**
2.2 Negative about community GS=11	8	7	1	2	3	**21**
2.3 Neutral about/opinions of community GS=8	7	3	2	6	5	**23**
3.1 Positive about chatbot GS=5	0	0	0	6	2	**8**
3.2 Negative about chatbot GS=20	8	4	3	9	12	**36**
3.3 Neutral about/opinions of chatbot GS=10	12	2	1	8	7	**30**
3/6 Neutral/positive about chatbat as/with triage GS=4	4	1	1	6	2	**14**
4.1 Positive about mail GS=15	11	0	3	8	10	**32**
4.2 Negative about mail GS=2	0	0	0	2	1	**3**
4.3 Neutral about/opinions of mail GS=16	13	5	3	4	3	**28**
5.1 Positive about phone GS=13	7	2	0	7	12	**28**
5.2 Negative about phone GS=3	1	0	0	1	1	**3**
5.3 Neutral about/ opinions of phone GS=10	4	2	2	5	2	**15**
6.1 Positive about chat GS=13	4	4	3	5	10	**26**
6.2 Negative about chat GS=2	1	0	0	0	1	**2**
6.3 Neutral about/opinions of chat GS=8	6	1	0	0	4	**11**
7.2 Negative about SST GS=6	3	1	4	1	3	**12**
7.2.1 SST decrease satisfaction GS=5	1	0	2	5	2	**10**
7.3 Neutral about/opinions of SST GS=6	2	0	0	3	3	**8**
8.1 Positive about direct contact/human assisted channels GS=35	28	19	8	23	15	**93**
8.3 Neutral about/opinions of direct contact GS=6	3	7	0	1	3	**14**
Additional channels GS=5	0	1	0	2	7	**10**
Channels among customer life-time phases GS=12	7	3	4	7	6	**27**
Clients knowledge of software GS=8	9	1	1	4	5	**20**
Costs for support GS=5	2	1	2	3	6	**14**
Product affect support GS=9	10	2	0	5	2	**19**
self-reliance GS=4	3	0	1	0	3	**7**
Service expectations GS=19	3	2	6	9	17	**37**
Support requests in the past GS=14	13	3	1	5	5	**27**
Total	**198**	**81**	**54**	**155**	**169**	**657**

	1. Top 3 Gr=205; GS=2	2. Large Gr=76; GS=1	3. Medium Gr=50; GS=2	4. Small Gr=134; GS=4	5. One license Gr=170; GS=3	Totals

Discussion

This research focuses on answering the question: "What is the impact of self-service in a SaaS-application on customer satisfaction of customers using the SaaS application?" Based on the results of the interviews, it is found that in general customers have a negative opinion on SSTs and often a strong preference for human-assisted channels. SSTs do not increase customer satisfaction but sometimes even decrease it, for example if a SaaS vendor only provides SSTs and no human-assisted channels. However, there are differences noticeable due to certain reasons which are elaborated on in this section.

During those interviews, it became clear that this negative opinion often arises from bad experiences with those SSTs, for example due to a chatbot that has not answered properly. Also, the choice of channel type is mainly based on habitats and experiences from the past. While mail is often used because it is common, and customers are used to it. Those habits have possibly influenced the adoption of SSTs. Some interviewees mentioned that they accidentally tried to chat and were surprised by it. Furthermore, it was often thought that an SST was not able to answer the questions interviewees would ask. However, that is questionable. Another given reason for interviewees to use or to not use a certain channel is that they found that chatbots and knowledge bases have the disadvantage that there is no opportunity to address feature requests. Or that a chatbot doesn't have the opportunity to teach more than you have asked for, while a knowledge base or human assisted channel could provide by coincidence additional lessons.

Pring & Lo (2009) stated that low-quality customer support is a reason for customers to cancel their subscription. This research contributes to this by finding that the lack of human-assisted contact or multi-channels is not directly a reason to cancel the subscription, this is the case if the product fails, and it is not possible to contact a support agent.

The results of this research suggest that SaaS customers use different channels for different reasons and types of questions. This follows Z. W. Y. Lee et al. (2019), who found out that channel integration quality dimensions have a positive effect on customer engagement in both low- and high-involved products, this research contribute on this by providing practical examples of underlying reasons why SaaS customers use certain channels. In addition to this, the results show that the preference for using certain channels changes the reason to use other channels. For example, some customers use the phone for questions that are hard to explain, while others prefer mail since they have more time to ask the question properly. The ones that use mail for more difficult questions, then used phone for easy and quick questions where the answer is easy to be given and vice versa. Also, it became clear during the interviews that not the interaction with service agents, but the seeing of features in the application provided as idea by the customer causes more bonding with the application and higher the barrier to switch. This is inconsistent with the findings from Doney et al. (2007) who says that social interaction has directly a positive impact on loyalty commitment and indirectly via trust.

Managerial implications

In practice, it is needed to be aware of those results. Kettinger & Lee (1997, 2005) defined two norms for service quality (Zones of Tolerance (ZOT)), namely the desired service and adequate service. The desired service is what customers believe is possible and should be delivered. The adequate service is the minimum level of is accepted. The results provided insights into those norms for customers in the SaaS industry. By meeting those norms, the satisfaction of the products increases (Benlian et al., 2011). Benlian et al. (2011) found that 'responsiveness' (as customer perception that the service provider is willing to help customers and not leave their requests unanswered) is one of the two key factors that influences customer satisfaction and perceived usefulness the most. Benlian et al. (2011) also stated that IT managers should focus on the SaaS vendor's capabilities on those two key factors, by for

example negotiating on IT helpdesk response time. This is somehow in line with the results and partly contradictory since results also show that the expected level of service depends on the involvement of the product in the company, for low-involvement products (e.g., daily processes can continue without the product) the level of expected service is lower as well.

Vendors of SaaS-products should take those levels into consideration when adopting SSTs in their support strategy. There is an ongoing trend in the SaaS industry to automate service tasks by making software products as self-explaining as possible. However, according to the results I suggest managers to determine the involvement of their products by implementing SSTs in the support process. For example, for high-involvement products SSTs should only be additional to HACs and customers should never be forced to use SSTs.

Based on the general opinion of interviewees about SSTs I would advise managers of B2B SaaS products to remain at least one HAC as support channel, but also to improve their SSTs as much as possible for easy and common questions, which enables growth and gave the opportunity for customers to reach out via a HAC. Also, managers should keep the opportunity for customers to easily suggest feature requests for the product.

Limitations & future research

This research investigated the impact of SSTs on customer satisfaction in which semi-structured interviews are used to collect data. A limitation of this approach is that it only collects data on the intentions of the customers and not on the actual behavior by, for example, experiments or a longitudinal study which is a direction for future research. Furthermore, the research is based on data from only one SaaS vendor which offers only one level of maturity of the application. For further research, it would by interesting to use different SaaS application to better investigate the effect of configurability.

The relation between the perceived knowledge of the product and the opinion on SSTs is investigated, however all interviewees except one rated themselves as experienced which made it impossible to answer this research question properly and which needs future research. Furthermore, a negative opinion on SSTs is found, in particular chatbots. The assumption is that this negative opinion is influenced by bad experiences with chatbots before. Since implementations of AI have gained enormous popularity and AI chatbots like for example ChatGPT are getting better, the expectation is that outcomes differ in the near future.

While age is not taken into consideration by selecting interviews during, it is noticed that younger interviewees were more likely to use and adopt SSTs compared to older interviewees and used channels with different purposes. Future research needs to be done to further investigate this relationship.

Conclusion

During this research, the impact of SSTs in SaaS-application on customer satisfaction is explored. By conducting 12 semi-structured interviews from customers of 1 SaaS vendor this research shows that SSTs certainly do not increase customer satisfaction and often decrease customer satisfaction if a SaaS vendor solely provides SSTs as support channel. The preference for using channels (both SSTs and human-assisted) varies due to different reasons. An important side note for considering SSTs is that the expected level of service depends on the involvement of the SaaS product. While it was expected beforehand that interaction with service agent leads to bonding with the product, the research found that the seeing of feature requests in the product leads to bonding.

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Appendices

a. Interview guide

- Welcome & Introduction

- Welcome, thank you for your time.

- Through this interview, I want to gather information about your opinions on various types of support channels, such as chatbots, etc.

- Everything you say will be processed anonymously. It will be recorded, but this recording will be deleted as soon as possible after processing.

- Consent form?

Knowledge of the Application

Table 7 Questions knowledge of application

Question	Concept	RQ
• How often have you had questions about <name software vendor> in the last 6 months?	Client's knowledge of the software	RQ1
◦ How do you go about getting these questions answered?	Client's knowledge of the software	RQ1
◦ To whom did you address the question?	Client's knowledge of the software	RQ1
◦ Only to <answer> or also to others? For example, colleagues?	Client's knowledge of the software	RQ1
◦ Which support channel did you use?	Client's knowledge of the software	RQ1

Question	Concept	RQ
o What kind of questions were they?	Client's knowledge of the software	RQ1
• How would you rate your experience with <name software product>?	Client's knowledge of the software	RQ1

Questions About Channels

Knowledge Base

- Familiar with it?

- In brief, a knowledge base is a central place where information about using the application is stored. For example, information on how to use specific modules, adjust settings, add users, etc.

- No interaction or communication with a support representative.

- You have to find the answer yourself.

- Generic answers applicable to all customers, not specifically tailored to your situation.

- Available 24/7.

- No waiting times.

- You can find your answer without assistance from someone else.

Questions about the knowledge base:

Table 8 Questions knowledge base

Question	Concept	RQ
• Have you ever used a knowledge base?	Opinion on SST	RQ4
o Why or why not?	Opinion on SST	RQ4/RQ5
▪ For what purpose?	Opinion on SST	RQ4/RQ5
• What are your expectations regarding the quality of this channel?	Opinion on SST	RQ2/RQ3/RQ4.1

Question	Concept	RQ
• How does using a knowledge base align with your personal preference?	Opinion on SST	RQ4
• What do you expect in terms of reliability?	Opinion on SST	RQ2/RQ3/RQ4
o How often do you think there might be an incorrect answer?	Opinion on SST	RQ4.1
• For what type of question would you use a knowledge base?	Opinion on SST	RQ5/RQ5.1
• What advantages or disadvantages do you see in this channel?	Opinion on SST	RQ2/RQ3/RQ4.1
• How satisfied would you be with <name software product> if the knowledge base were our only support channel?	Customer satisfaction	RQ2/RQ3/RQ4
o Rating?	Customer satisfaction	RQ2/RQ3/RQ4
o Do you think we treat customers fairly when using this channel?	Customer satisfaction	RQ2/RQ3/RQ4
o How does that compare to your expectations of <name software product>?	Customer satisfaction	RQ2/RQ3/RQ4

Forum

Familiar with it?

In brief, a forum is an online space for customers to communicate with each other, ask and answer questions, share ideas and information. Sometimes, there is also interaction or communication with support representatives.

- You can ask and answer questions.

- You can search for previously asked questions and answers.

- Answers can be tailored to your specific situation.

- You can access previously asked questions and answers 24/7, but it's uncertain when you'll get an answer to your own question.

- There may be a waiting time.

- You mainly help each other.

Questions about the forum:

Table 9 Question forum

Question	Concept	RQ
• Have you ever used a forum?	Opinion on SST	RQ4
o Why or why not?	Opinion on SST	RQ4/RQ5
▪ For what purpose?	Opinion on SST	RQ4/RQ5
• What are your expectations regarding the quality of this channel?	Opinion on SST	RQ2/RQ3/RQ4.1
o How does this channel fit your personal preference?	Opinion on SST	RQ4
• What do you expect in terms of reliability?	Opinion on SST	RQ2/RQ3/RQ4
o How often do you think there might be an incorrect answer?	Opinion on SST	RQ4.1
• For what type of question would you use a forum?	Opinion on SST	RQ5/RQ5.1
o Do you prefer asking questions yourself or just searching for answers?	Opinion on SST	RQ4.1
• What advantages or disadvantages do you see in this channel?	Opinion on SST	RQ2/RQ3/RQ4
• How satisfied would you be with our product if the forum were our only support channel?	Customer satisfaction	RQ2/RQ3/RQ4
o Rating?	Customer satisfaction	RQ2/RQ3/RQ4
o Do you think we treat customers fairly when using this channel?	Customer satisfaction	RQ2/RQ3/RQ4
o How does that compare to your expectations of <name software product>?	Customer satisfaction	RQ2/RQ3/RQ4

Chatbot

- Familiar with it?

- In brief, a chatbot is a computer-driven assistant that attempts to mimic a human support representative through text or speech.

- No interaction or communication with a 'human' support representative.

- You can ask your question; the bot will provide the best possible answer. Otherwise, you'll be redirected to a human collegae.

- The chatbot is available 24/7; the human backup is not.

- Almost no waiting time, almost no queue.

Questions about chatbots:

Table 10 Question chatbots

Question	Concept	RQ
• Have you ever used a chatbot?	Opinion on SST	RQ4
○ Why or why not?	Opinion on SST	RQ4/RQ5
• What are your expectations regarding the quality of this channel?	Opinion on SST	RQ2/RQ3/RQ4.1
○ How does this channel fit your personal preference?	Opinion on SST	RQ4
• What do you expect in terms of reliability? How often do you think there might be an incorrect answer?	Opinion on SST	RQ2/RQ3/RQ4
• For what type of question would you use a chatbot?	Opinion on SST	RQ5/RQ5.1
• What advantages or disadvantages do you see in this channel?	Opinion on SST	RQ2/RQ3/RQ4.1
• How satisfied would you be with our product if a chatbot were our only support channel?	Customer satisfaction	RQ2/RQ3/RQ4
○ Rating	Customer satisfaction	RQ2/RQ3/RQ4
○ Do you think we treat customers fairly when using this channel?	Customer satisfaction	RQ2/RQ3/RQ4
○ How does that compare to your expectations of <name software product>?	Customer satisfaction	RQ2/RQ3/RQ4

Email

- Sending emails to a support team and having a conversation via email.

- Full interaction and communication with a support representative.

- You can ask your question yourself.

- The support representative will gather the answer.

- Answers can be personalized and tailored, but they can also be non-personalized and standard.

- Only available during business hours.

- There may be a waiting time.

- No queue.

Questions about email:

Table 11 Question email

Question	Concept	RQ
• Have you ever used email as support channel?	Opinion on SST	RQ4
• What are your expectations regarding the quality of this channel?	Opinion on SST	RQ2/RQ3/RQ4
o How does this channel fit your personal preference?	Opinion on SST	RQ4.1
• What do you expect in terms of reliability? How often do you think there might be an incorrect answer?	Opinion on SST	RQ2/RQ3/RQ4
• For what type of question would you use email?	Opinion on SST	RQ5/RQ5.1
• How satisfied would you be with our product if email were our only support channel?	Customer satisfaction	RQ2/RQ3/RQ4
o Rating?	Customer satisfaction	RQ2/RQ3/RQ4
o Do you think we treat customers fairly when using this channel?	Customer satisfaction	RQ2/RQ3/RQ4
o How does that compare to your expectations of <name software product>?	Customer satisfaction	RQ2/RQ3/RQ4

Phone

- Calling a support team/representatives.

- Full and direct interaction and communication with a support representative.

- Personalized, no standard answers.

- Only available during business hours.

- No waiting time, but there can be queues.

Questions about the phone:

Table 12 Question phone

Question	Concept	RQ
• Have you ever used the phone as support channel?	Opinion on SST	RQ4
• What are your expectations regarding the quality of this channel?	Opinion on SST	RQ2/RQ3/RQ4
o How does this channel fit your personal preference?	Opinion on SST	RQ4.1
• What do you expect in terms of reliability? How often do you think there might be an incorrect answer?	Opinion on SST	RQ2/RQ3/RQ4
• For what type of question would you use the phone?	Opinion on SST	RQ5/RQ5.1
• How satisfied would you be with our product if the phone were our only support channel?	Customer satisfaction	RQ2/RQ3/RQ4
o What would be your opinion of our company if we did that?	Customer satisfaction	RQ2/RQ3/RQ4
o Do you think we treat customers fairly when using this channel?	Customer satisfaction	RQ2/RQ3/RQ4
o How does that compare to your expectations of <name software product>?	Customer satisfaction	RQ2/RQ3/RQ4

Chat

- Have you ever used it?

- Chatting (in-app) with a support representative.

- Full interaction and communication with a support representative.

- You ask the question yourself, and the representative searches/provides the answer.

- Answers can be both personalized and non-personalized.

- Only available during business hours.

- Waiting time for a response.

Questions about chat:

Table 13 Question chat

Question	Concept	RQ
• Have you ever used chat?	Opinion on SST	RQ4
o Why have you/why haven't you?	Opinion on SST	RQ4
• What are your expectations regarding the quality of this channel?	Opinion on SST	RQ2/RQ3/RQ4.1
• How does this channel fit your personal preference?	Opinion on SST	RQ4
• What do you expect in terms of reliability? How often do you think there might be an incorrect answer?	Opinion on SST	RQ2/RQ3/RQ4
• For what type of question would you use chat?	Opinion on SST	RQ5/RQ5.1
• How satisfied would you be with our product if chat were our only support channel?	Customer satisfaction	RQ2/RQ3/RQ4
o What would be your opinion of our company if we did that?	Customer satisfaction	RQ2/RQ3/RQ4
o Do you think we treat customers fairly when using this channel?	Customer satisfaction	RQ2/RQ3/RQ4
o How does that compare to your expectations of <name software product>?	Customer satisfaction	RQ2/RQ3/RQ4

Opinion on Self-Service

Of the 6 channels, the first three are self-service channels, where you as a customer help yourself without the involvement of a support representative. Let's delve deeper into this.

Table 14 Question opinion on self-service

Question	Concept	RQ
• How important is it for you to have interaction with a support representative?	Opinion on SST	RQ2/RQ3/RQ4
○ In the initial phase of use?	Opinion on SST	RQ2/RQ3/RQ4
○ During standard use?	Opinion on SST	RQ2/RQ3/RQ4

Question	Concept	RQ
○ In case of potential cancellation (or thinking about it)?	Opinion on SST	RQ2/RQ3/RQ4
• Suppose we provide support through all 6 channels; which one would be your preference and why?	Opinion on SST	RQ2/RQ3/RQ4
▪ Would a non-human/self-service support channel affect your satisfaction with the product, and why?	Customer satisfaction	RQ2/RQ3/RQ4
• Would this factor into a potential subscription cancellation?	Switching intentions	RQ2/RQ3/RQ4.2
• Would you keep the subscription if we only offered computer-driven support?	Switching intentions	RQ2/RQ3/RQ4.2
• Are you willing to pay more for support answered by a human?	Opinion on SST	RQ2/RQ3/RQ4
• Do you think you would have been able to fully navigate our application on your own? Of course, with the right materials (instructional videos, manuals, etc.), but without human contact.	Opinion on SST	RQ2/RQ4

b. Maturity model

Table 15 SaaS Maturity model with the concept of vendor-supported and client-enabled configurations of Zainuddin & González (2011)

Maturity level	SaaS maturity level characteristics
Level 1	The software application is customized for individual clients and does not offer any configuration option. At this point, the software application does not support multi-tenancy.
Level 2	The software application offers minimal configurability options. These configurability options are mostly vendor-supported. There are limited instances of software applications available and vendors provide extensive configuration services to clients. Thus, the software application does not support multi-tenancy, and is not self-serviced.
Level 3	The software application offers extended configurability options for clients. The configurability options are a combination of vendor-supported and client enabled. The software fully supports multi-tenancy, and only a single instance of the software application is available to all clients. However, vendors provide some configuration services to clients. The software application is not fully self-serviced
Level 4	The software application offers extended, client-enabled configurability options for clients. Thus, the software application supports multi-tenancy and full self-service.
Level 5	Apart from supporting extended client-enabled configurations, the software application is hosted in a multi-tiered architecture. The software is highly configurable, self-serviced, and scalable.

c. Assessment communication channel

Table 16 Channeltype assessment Knowledge base

Questions	Scales	Answer
Assisted (personal service) or non-assisted (technological self-service)		Non-assisted
What is the level of interaction between the user and the technology (channel) 1=no interaction	1=No interaction 2=Rarely 3=Sometimes 4=Often 5=Constant interaction	5
What is the level of communication between the user and the service provider agent during the usage? 1=constant communication	1=Constant communication 2=Often 3=Sometimes 4=Rarely 5=No communication	5
What is the presence of service provider agents? 1=constant presence (agent constantly answering)	1=Constant presence 2=Often 3=Sometimes 4=Rarely 5=No presence	5
What is the level of customer involvement during the usage? 1= no involvement	1=No involvement 2=Rarely 3=Sometimes 4=Often 5=Constant involvement	5
What is the level of personalization? 1=full personalization 5= full standardization	1=fully personalized 2=slightly personalized 3=undecided 4=slightly standardized 5=fully standardized	5
Avg.		**5**

Table 17 Channeltype assessment Forum

Questions	Scales	Answer
Assisted (personal service) or non-assisted (technological self-service)		Semi-assisted
What is the level of interaction between the user and the technology (channel) 1=no interaction	1=No interaction 2=Rarely 3=Sometimes 4=Often 5=Constant interaction	3
What is the level of communication between the user and the service provider agent during the usage? 1=constant communication	1=Constant communication 2=Often 3=Sometimes 4=Rarely 5=No communication	3
What is the presence of service provider agents? 1=constant presence (agent constantly answering)	1=Constant presence 2=Often 3=Sometimes 4=Rarely 5=No presence	3
What is the level of customer involvement during the usage? 1= no involvement	1=No involvement 2=Rarely 3=Sometimes 4=Often 5=Constant involvement	4

Questions	Scales	Answer
What is the level of personalization? 1=full personalization 5= full standardization	1=fully personalied 2=slightly personalized 3=undecided 4=slightly standardized 5=fully standardized	3
Avg.		**3,2**

Table 18 Channeltype assessment Chatbot

Questions	Scales	Answer
Assisted (personal service) or non-assisted (technological self-service)		Semi-assisted
What is the level of interaction between the user and the technology (channel) 1=no interaction	1=No interaction 2=Rarely 3=Sometimes 4=Often 5=Constant interaction	3
What is the level of communication between the user and the service provider agent during the usage? 1=constant communication	1=Constant communication 2=Often 3=Sometimes 4=Rarely 5=No communication	5
What is the presence of service provider agents? 1=constant presence (agent constantly answering)	1=Constant presence 2=Often 3=Sometimes 4=Rarely 5=No presence	5
What is the level of customer involvement during the usage? 1= no involvement	1=No involvement 2=Rarely 3=Sometimes 4=Often 5=Constant involvement	3
What is the level of personalization? 1=full personalization 5= full standardization	1=fully personalied 2=slightly personalized 3=undecided 4=slightly standardized 5=fully standardized	3
Avg.		**3,8**

Table 19 Channeltype assessment Mail

Questions	Scales	Answer
Assisted (personal service) or non-assisted (technological self-service)		Assisted
What is the level of interaction between the user and the technology (channel) 1=no interaction	1=No interaction 2=Rarely 3=Sometimes 4=Often 5=Constant interaction	2
What is the level of communication between the user and the service provider	1=Constant communication 2=Often	3

Questions	Scales	Answer
agent during the usage? 1=constant communication	3=Sometimes 4=Rarely 5=No communication	
What is the presence of service provider agents? 1=constant presence (agent constantly answering)	1=Constant presence 2=Often 3=Sometimes 4=Rarely 5=No presence	3
What is the level of customer involvement during the usage? 1= no involvement	1=No involvement 2=Rarely 3=Sometimes 4=Often 5=Constant involvement	2
What is the level of personalization? 1=full personalization 5= full standardization	1=fully personalied 2=slightly personalized 3=undecided 4=slightly standardized 5=fully standardized	2
Avg.		2,4

Table 20 Channeltype assessment Phone

Questions	Scales	Answer
Assisted (personal service) or non-assisted (technological self-service)		Assisted
What is the level of interaction between the user and the technology (channel) 1=no interaction	1=No interaction 2=Rarely 3=Sometimes 4=Often 5=Constant interaction	2
What is the level of communication between the user and the service provider agent during the usage? 1=constant communication	1=Constant communication 2=Often 3=Sometimes 4=Rarely 5=No communication	1
What is the presence of service provider agents? 1=constant presence (agent constantly answering)	1=Constant presence 2=Often 3=Sometimes 4=Rarely 5=No presence	1
What is the level of customer involvement during the usage? 1= no involvement	1=No involvement 2=Rarely 3=Sometimes 4=Often 5=Constant involvement	3
What is the level of personalization? 1=full personalization 5= full standardization	1=fully personalied 2=slightly personalized 3=undecided 4=slightly standardized 5=fully standardized	1
Avg.		1,6

Table 21 Channeltype assessment Chat

Questions	Scales	Answer
Assisted (personal service) or non-assisted (technological self-service)		Assisted
What is the level of interaction between the user and the technology (channel) 1=no interaction	1=No interaction 2=Rarely 3=Sometimes 4=Often 5=Constant interaction	2
What is the level of communication between the user and the service provider agent during the usage? 1=constant communication	1=Constant communication 2=Often 3=Sometimes 4=Rarely 5=No communication	2
What is the presence of service provider agents? 1=constant presence (agent constantly answering)	1=Constant presence 2=Often 3=Sometimes 4=Rarely 5=No presence	2
What is the level of customer involveement during the usage? 1= no involvement	1=No involvement 2=Rarely 3=Sometimes 4=Often 5=Constant involvement	2
What is the level of personalization? 1=full personalization 5= full standardization	1=fully personalied 2=slightly personalized 3=undecided 4=slightly standardized 5=fully standardized	2
Avg.		**2**

d. Data structure

Table 22 Data structure

1st order	2nd order	Aggregate dimension
● Is willing to use channel: knowledge base	1.1 Positive about knowledge base	Positive opinion SST
● knowledge base: as standalone: if comprehensive, it is okay	1.1 Positive about knowledge base	Positive opinion SST
● Knowledge base: learn more than other	1.1 Positive about knowledge base	Positive opinion SST
● knowledge base: often used it	1.1 Positive about knowledge base	Positive opinion SST
● Knowledge base: positive experiences	1.1 Positive about knowledge base	Positive opinion SST
● Knowledge base: potential use case	1.1 Positive about knowledge base	Positive opinion SST
● must choose SST: knowledge base	1.1 Positive about knowledge base	Positive opinion SST
● Reason for using knowledge base: features are not clear	1.1 Positive about knowledge base	Positive opinion SST
● knowledge base: almost never used it	1.2 Negative about knowledge base	Negative opinion SST
● Knowledge base: as standalone causes decrease in satisfaction	1.2 Negative about knowledge base	Negative opinion SST
● knowledge base: could not imagine a question to use it	1.2 Negative about knowledge base	Negative opinion SST
● knowledge base: doesn't give answer to question	1.2 Negative about knowledge base	Negative opinion SST
● knowledge base: don't use it, wants to trial and error	1.2 Negative about knowledge base	Negative opinion SST
● knowledge base: won't use is it since it's only about standard answer	1.2 Negative about knowledge base	Negative opinion SST
● knowledge base: would not miss it	1.2 Negative about knowledge base	Negative opinion SST
● Level of satisfaction is insufficient if knowledge base is only channel	1.2 Negative about knowledge base	Negative opinion SST
● reason for not using knowledge base: cost more time	1.2 Negative about knowledge base	Negative opinion SST
● knowledge base: as standalone: reason to churn	1.2 Negative about knowledge base 7.2.1 SST decrease satisfaction	Negative opinion SST

1st order	2nd order	Aggregate dimension
● Experienced with channel: knowledge base	1.3 Neutral about/ opinions of knowledge base	
● flow of accessing channel: knowledge base	1.3 Neutral about/ opinions of knowledge base	
● knowledge base: as standalone: no reason for churn under certain conditions	1.3 Neutral about/ opinions of knowledge base	
● Knowledge base: did not knew software vendor has one	1.3 Neutral about/ opinions of knowledge base	
● knowledge base: don't use it due to habitats	1.3 Neutral about/ opinions of knowledge base	
● Knowledge base: familiar with concept in general	1.3 Neutral about/ opinions of knowledge base	
● knowledge base: frequency in usage: not often (few times per year)	1.3 Neutral about/ opinions of knowledge base	
● knowledge base: next steps if customer can't find answer	1.3 Neutral about/ opinions of knowledge base	
● knowledge base: only for standard questions	1.3 Neutral about/ opinions of knowledge base	
● knowledge base: partly familiar with concept	1.3 Neutral about/ opinions of knowledge base	
● Knowledge base: type of question: complex action in application	1.3 Neutral about/ opinions of knowledge base	
● Knowledge base: used it before at other vendor	1.3 Neutral about/ opinions of knowledge base	
● Community: as idea box	2.1 Positive about community	Positive opinion SST
● community: enlarged commitment of users	2.1 Positive about community	Positive opinion SST
● community: quality of answer is lower, but can be helpful	2.1 Positive about community	Positive opinion SST
● community: reason for using: able to find previous asked question and answers	2.1 Positive about community	Positive opinion SST
● community: type of question: technical (errors, how-to etc.)	2.1 Positive about community	Positive opinion SST
● community: willingness to use: yes, but only if answers are given by experts	2.1 Positive about community	Positive opinion SST

1st order	2nd order	Aggregate dimension
● community: would try it	2.1 Positive about community	Positive opinion SST
● community: disadvantage: lots of noise in threads	2.2 Negative about community	Negative opinion SST
● community: disadvantage: need to create account for asking questions	2.2 Negative about community	Negative opinion SST
● community: opinion is pessimistic	2.2 Negative about community	Negative opinion SST
● community: reason for not using: not the right answers	2.2 Negative about community	Negative opinion SST
● community: reason for not using: publicity	2.2 Negative about community	Negative opinion SST
● Community: reason for not using: stupid answers	2.2 Negative about community	Negative opinion SST
● community: standalone channel: decrease in satisfaction	2.2 Negative about community	Negative opinion SST
● community: willingnes to use: interviewee cannot think of type of question to be asked in this channel	2.2 Negative about community	Negative opinion SST
● less preferred channel: community	2.2 Negative about community	Negative opinion SST
● reason for not using community: costs more time	2.2 Negative about community	Negative opinion SST
● Reason for not using community: not willing to share business related information online	2.2 Negative about community	Negative opinion SST
● channel used in the past: community	2.3 Neutral about/opinions of community	
● community: for question that doesnt need to fixed directlt	2.3 Neutral about/opinions of community	
● community: has used channel	2.3 Neutral about/opinions of community	
● community: is familiar with channel	2.3 Neutral about/opinions of community	
● Community: not asked question, only viewing answers	2.3 Neutral about/opinions of community	
● community: usage depends on type of product	2.3 Neutral about/opinions of community	
● community: value depends on type of users (different sizes of clients)	2.3 Neutral about/opinions of community	

1st order	2nd order	Aggregate dimension
● Have not used the channel in business circumstance: community	2.3 Neutral about/opinions of community	
● chatbot: better planable	3.1 Positive about chatbot	Positive opinion SST
● chatbot: possible use case: more human likely conversation	3.1 Positive about chatbot	Positive opinion SST
● chatbot: used if phone is unreachable	3.1 Positive about chatbot	Positive opinion SST
● must choose SST: Chatbot (due to converstation)	3.1 Positive about chatbot	Positive opinion SST
● pros for chatbot	3.1 Positive about chatbot	Positive opinion SST
● chatbot as primary channel: not customer friendly	3.2 Negative about chatbot	Negative opinion SST
● chatbot as standalone: gives wrong answer, customer is stuck	3.2 Negative about chatbot	Negative opinion SST
● Chatbot won't be used, but is not directly reason for churn	3.2 Negative about chatbot	Negative opinion SST
● chatbot: as standalone and without service agent back up would decrease satisfaction IF chatbot is not able to answer correctly	3.2 Negative about chatbot	Negative opinion SST
● chatbot: as standalone satisfaction would insufficient	3.2 Negative about chatbot	Negative opinion SST
● chatbot: bad experiences	3.2 Negative about chatbot	Negative opinion SST
● chatbot: barrier to contact directly	3.2 Negative about chatbot	Negative opinion SST
● chatbot: can't understand the question correctly	3.2 Negative about chatbot	Negative opinion SST
● chatbot: dislike virtual assistant	3.2 Negative about chatbot	Negative opinion SST
● chatbot: doesnot trust the answers given	3.2 Negative about chatbot	Negative opinion SST
● chatbot: expectation: chatbot is not able to answer correct	3.2 Negative about chatbot	Negative opinion SST
● Chatbot: is not able to answer easy questions	3.2 Negative about chatbot	Negative opinion SST
● Chatbot: is not smart enough	3.2 Negative about chatbot	Negative opinion SST

1st order	2nd order	Aggregate dimension
● chatbot: less freedom in answering	3.2 Negative about chatbot	Negative opinion SST
● chatbot: only for standard information	3.2 Negative about chatbot	Negative opinion SST
● Chatbot: takes too much time	3.2 Negative about chatbot	Negative opinion SST
● chatbot: would decrease satisfaction, but less compared to knowledge base or community	3.2 Negative about chatbot	Negative opinion SST
● chatbot: would not use it	3.2 Negative about chatbot	Negative opinion SST
● less preferred channel: chatbot	3.2 Negative about chatbot	Negative opinion SST
● chatbot: depends on type of product	3.3 Neutral about/opinions of chatbot	
● chatbot: expectation: chatbot is able to answer standard questions	3.3 Neutral about/opinions of chatbot	
● chatbot: expectation: chatbot is not able to answer difficult/complex question correctly	3.3 Neutral about/opinions of chatbot	
● chatbot: expectation: should be able to answer easy questions	3.3 Neutral about/opinions of chatbot	
● chatbot: is not able to change settings etc	3.3 Neutral about/opinions of chatbot	
● chatbot: type of question	3.3 Neutral about/opinions of chatbot	
● chatbot: understanding of advantages for service provider	3.3 Neutral about/opinions of chatbot	
● chatbot: understanding of advantages in common: no need to search for contact details	3.3 Neutral about/opinions of chatbot	
● chatbot: used before	3.3 Neutral about/opinions of chatbot	
● chatbot: used before (with triage to support agent)	3.3 Neutral about/opinions of chatbot	
● chatbot: as standalone with triage to agent would not decrease satisfaction	3/6 Neutral/positive about chatbat as/with triage	
● chatbot: as triage is okay	3/6 Neutral/positive about chatbat as/with triage	
● chatbot: expectation: chatbot is able to forward to knowledge base	3/6 Neutral/positive about chatbat as/with triage	
● chatbot: triage is important	3/6 Neutral/positive about chatbat as/with triage	

1st order	2nd order	Aggregate dimension
● channel type used in the past: mail reason:good experiences with it	4.1 Positive about mail	Positive opinion HAC
● channel used most: mail	4.1 Positive about mail	Positive opinion HAC
● chat: reason for not using: more flexibility in composing mails	4.1 Positive about mail	Positive opinion HAC
● mail: assured of answer compared to SST	4.1 Positive about mail	Positive opinion HAC
● Mail: can take more time to answer, increase of quality	4.1 Positive about mail	Positive opinion HAC
● mail: positive about the quick responses	4.1 Positive about mail	Positive opinion HAC
● mail: positive aspect is evidence of communication	4.1 Positive about mail	Positive opinion HAC
● Mail: prefered outside opening hours	4.1 Positive about mail	Positive opinion HAC
● mail: reason for using: flexibility in composing mail	4.1 Positive about mail	Positive opinion HAC
● mail: takes less time	4.1 Positive about mail	Positive opinion HAC
● mail:better planable	4.1 Positive about mail	Positive opinion HAC
● Preferred channel: mail: reason: evidence	4.1 Positive about mail	Positive opinion HAC
● Reason behind using mail: need for evidence (by using mail)	4.1 Positive about mail	Positive opinion HAC
● used to mail, doesn't switch to chat	4.1 Positive about mail	Positive opinion HAC
● less preferred channel: mail: reason: not in the lead	4.2 Negative about mail	Negative opinion HAC
● Mail: takes more time to converse	4.2 Negative about mail	Negative opinion HAC
● Channel type used in the past: Mail	4.3 Neutral about/opinions of mail	
● channel type used in the past: mail reason:opening hours of servicedesk	4.3 Neutral about/opinions of mail	
● Mail: contradiction in expectations lead time in answer and fix issue	4.3 Neutral about/opinions of mail	
● Mail: expectation of lead time in fixing issue: low priority	4.3 Neutral about/opinions of mail	

1st order	2nd order	Aggregate dimension
● Mail: expectation of lead time in fixing issues: high priority	4.3 Neutral about/opinions of mail	
● mail: expectation of lead time: example of question with quick-answer expectation	4.3 Neutral about/opinions of mail	
● Mail: expectation of lead time: general question: longer time	4.3 Neutral about/opinions of mail	
● mail: if answer is delayed, notification about it is appreciated	4.3 Neutral about/opinions of mail	
● mail: only for standard information	4.3 Neutral about/opinions of mail	
● mail: question type: changes in software	4.3 Neutral about/opinions of mail	
● Mail: type of question: ordering new hardware and licenses	4.3 Neutral about/opinions of mail	
● mail: type of question: tips	4.3 Neutral about/opinions of mail	
● Mail: understands advantages for vendor: planable	4.3 Neutral about/opinions of mail	
● mail: using due to habitats	4.3 Neutral about/opinions of mail	
● Phone: check if question is understood	5.1 Positive about phone	Positive opinion HAC
● Phone: easiest to use	5.1 Positive about phone	Positive opinion HAC
● Phone: is quickers solved	5.1 Positive about phone	Positive opinion HAC
● Phone: prefered if question is about financial	5.1 Positive about phone	Positive opinion HAC
● phone: use for higher priority tickets	5.1 Positive about phone	Positive opinion HAC
● Phone: use general number: if question is complex (difficult to explain in text)	5.1 Positive about phone	Positive opinion HAC
● Phone: with standard voicemail is no problem	5.1 Positive about phone	Positive opinion HAC
● preferred channel: phone	5.1 Positive about phone	Positive opinion HAC
● Preferred channel: phone (only for high prio)	5.1 Positive about phone	Positive opinion HAC
● prefers phone: reason: travels a lot by car	5.1 Positive about phone	Positive opinion HAC

1st order	2nd order	Aggregate dimension
● written communication: misses emotions and interpretation	5.1 Positive about phone	Positive opinion HAC
● phone: costs more time for find the right person	5.2 Negative about phone	Negative opinion HAC
● Phone: dislikes voicemail	5.2 Negative about phone	Negative opinion HAC
● phone: not preferable channel due to personal opinion	5.2 Negative about phone	Negative opinion HAC
● chat: type of question: software failure	5.3 Neutral about/ opinions of phone	
● Haven't used phone by software vendor	5.3 Neutral about/ opinions of phone	
● If asnwer is delayed, then uses phone	5.3 Neutral about/ opinions of phone	
● phone: easy question	5.3 Neutral about/ opinions of phone	
● phone: has often direct numbers of employees	5.3 Neutral about/ opinions of phone	
● phone: not preferred with long que	5.3 Neutral about/ opinions of phone	
● phone: queue is no problem	5.3 Neutral about/ opinions of phone	
● phone: use general normal: only for less important question	5.3 Neutral about/ opinions of phone	
● Mail: expectation of lead time depends on priority	5.3 Neutral about/ opinions of phone 4.3 Neutral about/opinions of mail	
● mail: expectation of lead time: <48h	5.3 Neutral about/ opinions of phone 4.3 Neutral about/opinions of mail	
● Chat (whatsapp); takes less attention during the day	6.1 Positive about chat	Positive opinion HAC
● Chat (whatsapp): easy to use	6.1 Positive about chat	Positive opinion HAC
● chat: 2nd preferred due to direct conversation	6.1 Positive about chat	Positive opinion HAC
● Chat: good experiencies	6.1 Positive about chat	Positive opinion HAC
● Chat: positive reason: expert knowledge	6.1 Positive about chat	Positive opinion HAC
● Chat: positive reason: no constant interaction	6.1 Positive about chat	Positive opinion HAC
● chat: preference because it is in-app	6.1 Positive about chat	Positive opinion HAC
● chat: sees possibilities for collegeaus	6.1 Positive about chat	Positive opinion HAC
● Chat: used for easy questions	6.1 Positive about chat	Positive opinion HAC

1st order	2nd order			Aggregate dimension
● chat: used for quick answers	6.1 Positive about chat			Positive opinion HAC
● prefers chat	6.1 Positive about chat			Positive opinion HAC
● written communication: positive about evidence of it	6.1 Positive about chat 4.1 Positive about mail			Positive opinion HAC
● preferred channel: chat and phone	6.1 Positive about chat 5.1 Positive about phone			Positive opinion HAC
● chat: no added value	6.2 Negative about chat			Negative opinion HAC
● chat(bot): closing the window	6.2 Negative about chat 3.2 Negative about chatbot			Negative opinion HAC
● chat: does not have a reason why not using it	6.3 Neutral about/opinions of chat			
● Chat: expectation of lead time depends on priority	6.3 Neutral about/opinions of chat			
● chat: have not used channel (also not at others)	6.3 Neutral about/opinions of chat			
● chat: knows the channel	6.3 Neutral about/opinions of chat			
● chat: never used chat of SaaS Vendor	6.3 Neutral about/opinions of chat			
● chat: prefers whatsapp over in-app chat	6.3 Neutral about/opinions of chat			
● chat: would use it to order new licenses (haven't used it before)	6.3 Neutral about/opinions of chat			
● question asked in the past via chat	6.3 Neutral about/opinions of chat			
● reason for not using SSTs	7.2 Negative about SST			Negative opinion SST
● SST: cannot be used in feature requests or bugs	7.2 Negative about SST			Negative opinion SST
● SST: feels unpersonal	7.2 Negative about SST			Negative opinion SST
● SST: possibility to find wrong answer	7.2 Negative about SST			Negative opinion SST
● SST: takes more time	7.2 Negative about SST			Negative opinion SST
● SST: won't use it due to habitats	7.2 Negative about SST			Negative opinion SST
● No direct contact dissatisfies	7.2.1 SST decrease satisfaction			Negative opinion SST
● SST as standalone casues dissatisfaction	7.2.1 SST decrease satisfaction			Negative opinion SST
● SST: causes dissatisfaction	7.2.1 SST decrease satisfaction			Negative opinion SST

1st order	2nd order	Aggregate dimension
● Would not be satisfied with only self-serviced channels	7.2.1 SST decrease satisfaction	Negative opinion SST
● Mixed opinion about churn in case of only SST	7.3 Neutral about/opinions of SST	
● SST: for simple questions	7.3 Neutral about/opinions of SST	
● SST: only used for standard question	7.3 Neutral about/opinions of SST	
● SST: type of question: easy question (contactdetails)	7.3 Neutral about/opinions of SST	
● SST: type of question: technical	7.3 Neutral about/opinions of SST	
● SST: usage is age dependent	7.3 Neutral about/opinions of SST	
● bonding with product due to personal contact	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● chat: disadvantage is no direct contact	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● churn: would be done via personal contact	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● Decrease in satisfaction due to less direct contact	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● direct contact due to necessary quick fixes	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● direct contact has added value	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● Direct contact with employee of software vendor Reason:increase of priority	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● Direct contact with software vendor	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● direct contact: better answers	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● direct contact: easier to explain complex questions	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● direct contact: emotions explainable	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● direct contact: faster	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● Direct contact: reason: being sure of understanding	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● direct contact: should stay	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● direct contact: thinks service is higher	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC

1st order	2nd order	Aggregate dimension
● direct contact: urgency is better understood	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● direct contant: advantage is quicker fix time	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● Expert knowledge of service provider is important	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● has often complex question and needs direct contact	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● human-assisted channels teaches beyond question	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● Interaction with person is important	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● Is willing to pay more for direct contact	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● personal contact = valuable	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● personal contact: faster	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● personal contact: reason: expert knowledge	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● Preferred channel: mail	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● preferred channel: mail reason: as reminder	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● preferred channel: mail reason: convenience	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● preferred channel: mail, phone and chat combined	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● prefers direct contact	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● Prefers mail	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● Prefers personal contact	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● Prefers phone	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● would choose business with direct contact above one without	8.1 Positive about direct contact/human assisted channels	Positive opinion HAC
● prefers phone: reason: direct contact	8.1 Positive about direct contact/human assisted channels 5.1 Positive about phone	Positive opinion HAC
○ Direct contact	8.3 Neutral about/opinions of direct contact	Positive opinion HAC

1st order	2nd order	Aggregate dimension
● Direct contact with employee of software vendor	8.3 Neutral about/opinions of direct contact	Positive opinion HAC
● general support channels for general question	8.3 Neutral about/opinions of direct contact	Positive opinion HAC
● personal contact: reason: incidents	8.3 Neutral about/opinions of direct contact	Positive opinion HAC
● Support flow starts with chat, continues via mail	8.3 Neutral about/opinions of direct contact	Positive opinion HAC
● support flow starts with personal contact	8.3 Neutral about/opinions of direct contact	Positive opinion HAC
● Google: often finds the answer	Additional channels	
● Other channels used: FAQ	Additional channels	
● Other channels used: Google	Additional channels	
● Other channels used: YouTube	Additional channels	
● prefers physical conversations	Additional channels	
● churn: thinks smaller businesses would prefer indirect contact	Channels among customer life-time phases	
● had support requests during onboarding phase	Channels among customer life-time phases	
● onboarding phase	Channels among customer life-time phases	
● onboarding phase: good support is very important	Channels among customer life-time phases	
● Permission needed for submitting support request	Channels among customer life-time phases	
● questions asked in the past: mainly in onboarding phase due to technical errors	Channels among customer life-time phases	
● SSTs: can be useful in start phase of customer-life time	Channels among customer life-time phases	
● support request starts first at internal collegeaus	Channels among customer life-time phases	
● Used channel remains the same among different phases	Channels among customer life-time phases	
● Used knowledge base during start of using application	Channels among customer life-time phases	
● Uses phone and mail in onboarding phase at other software vendor	Channels among customer life-time phases	

1st order	2nd order	Aggregate dimension
● Would advise to have direct contact in onboarding phase	Channels among customer life-time phases	
● Client's knowledge of the software: Highly skilled	Client's knowledge of software	Drivers
● Client's knowledge of the software: sufficient	Client's knowledge of software	Drivers
● Evaluate oneself as experienced	Client's knowledge of software	Drivers
● Evaluate oneself as not experienced	Client's knowledge of software	Drivers
● Gains knowledge by doing	Client's knowledge of software	Drivers
● High level of knowledge caused by high frequency of usage	Client's knowledge of software	Drivers
● Key user of software	Client's knowledge of software	Drivers
○ Skill acquisition	Client's knowledge of software	Drivers
● Costs for submitting support requests	Costs for support	Drivers
● discount necessary if product stops offering direct support	Costs for support	Drivers
● Is not willing to pay for direct contact	Costs for support	Drivers
● is willing to pay more for better support	Costs for support	Drivers
● is willing to pay more for better support if product is important	Costs for support	Drivers
● Application is easy to use	Product affect support	Drivers
● bonding with product due to feature requests	Product affect support	Drivers
● Complexity of application	Product affect support	Drivers
● Drawback of application	Product affect support	Drivers
● Learning curve	Product affect support	Drivers
● more freedom to do changes by user causes less support tickets (maturity of application)	Product affect support	Drivers
● Pro-active support, automatic triggers from application	Product affect support	Drivers
● SST: is product is consistent, experience/satisfaction will remains the same. But if not it will decrease	Product affect support	Drivers

1st order	2nd order	Aggregate dimension
● Technological change	Product affect support	Drivers
● self-reliance of user influences satisfaction about SST	self-reliance	Drivers
● SST: user learns by doing, thus starts with finding the anser themselves	self-reliance	Drivers
● Starts with finding the answer themself	self-reliance	Drivers
● Thinks most answers can be find themself	self-reliance	Drivers
● Bad service without improvement is reason for churn	Service expectations	Drivers
● Channel type depends on target group/audience	Service expectations	Drivers
● direct contact is not needed if use of software is less complex	Service expectations	Drivers
● dislikes difficulties to have direct contact	Service expectations	Drivers
● expected level of support depends on dependency of product as customer	Service expectations	Drivers
● Good support is most important aspect in satisfaction	Service expectations	Drivers
● Limited channel type is no reason for churn	Service expectations	Drivers
● long openinghours are valuable	Service expectations	Drivers
● Lower service is accepted if frequency of support ticket is low	Service expectations	Drivers
● Lower service level is accepted if price of product is low as well	Service expectations	Drivers
● Mail and phone is minimum expected service level	Service expectations	Drivers
● mismatch in service expectations can be a reason for churn	Service expectations	Drivers
● Multi-channel aproach is valuable	Service expectations	Drivers
● Need for interaction: depends on complexity of question	Service expectations	Drivers

1st order	2nd order	Aggregate dimension
● No problems with product causes zero support requests	Service expectations	Drivers
● Personal preferences	Service expectations	Drivers
● Proactivity is valuable	Service expectations	Drivers
● Profile of company affects support expectations	Service expectations	Drivers
● Understands if SaaS vendor discontinues mail and phone as channel	Service expectations	Drivers
● frequency of question asked in the past: 1 in last half year	Support requests in the past	
● frequency of questions in the past: not often	Support requests in the past	
● number of question in the past	Support requests in the past	
● question asked in the past: financial	Support requests in the past	
● question asked in the past: installation issue	Support requests in the past	
● Reason for support request	Support requests in the past	
● Response rate: quick/satisfied	Support requests in the past	
● Satisfied with product	Support requests in the past	
● summary of support request in the past	Support requests in the past	
● Type of question asked in the past: bugs	Support requests in the past	
● Type of question asked in the past: changes in software	Support requests in the past	
● Type of question asked in the past: support agents needed	Support requests in the past	
● type of questions asked in the past	Support requests in the past	
● Warranty request	Support requests in the past	

e. Results per customer segment

Left column: Gr= number of codings (different from the number of quotations, as multiple codes from the same code group could be linked to the same quotation.) GS =number of codes in code group.

Top row: Gr = number of quotations selected for this thesis

Cells = how often a code that belongs to the 2nd order theme in the left column was selected

Table 23 Results per interviewee

	1 Gr=76	2 Gr=103	3 Gr=102	4 Gr=87	5 Gr=58	6 Gr=36	7 Gr=28	8 Gr=48	9 Gr=20	10 Gr=30	11 Gr=25	12 Gr=22	Totals
1.1 Positive about knowledge base Gr=18; GS=8	2	5	2	1	0	0	0	4	0	1	2	1	18
1.2 Negative about knowledge base Gr=17; GS=10	4	2	1	0	2	2	3	1	1	0	1	0	17
1.3 Neutral about/ opinions of knowledge base Gr=32; GS=12	3	10	3	3	3	3	0	2	0	3	1	1	32
2.1 Positive about community Gr=12; GS=7	1	4	1	3	0	0	0	1	0	1	1	0	12
2.2 Negative about community Gr=21; GS=11	7	5	3	2	1	1	0	1	0	1	0	0	21
2.3 Neutral about/opinions of community Gr=23; GS=8	3	3	4	2	1	2	1	2	0	2	2	1	23
3.1 Positive about chatbot Gr=8; GS=5	0	0	0	2	0	2	1	1	0	0	0	2	8
3.2 Negative about chatbot Gr=36; GS=20	4	5	3	11	0	1	3	4	1	2	1	1	36
3.3 Neutral about/opinions of chatbot Gr=30; GS=10	2	8	4	4	2	2	0	2	0	1	1	4	30
3/6 Neutral/positive about chatbat as/with triage Gr=14; GS=4	1	1	3	0	1	2	0	1	0	1	1	3	14
4.1 Positive about mail Gr=32; GS=15	0	5	6	6	1	0	2	4	0	3	3	2	32
4.2 Negative about mail Gr=3; GS=2	0	0	0	0	1	2	0	0	0	0	0	0	3
4.3 Neutral about/opinions of mail Gr=28; GS=16	5	8	5	2	0	2	1	1	0	3	1	0	28
5.1 Positive about phone Gr=28; GS=13	2	6	1	7	4	3	0	3	0	0	1	1	28
5.2 Negative about phone Gr=3; GS=3	0	0	1	1	0	1	0	0	0	0	0	0	3
5.3 Neutral about/ opinions of phone Gr=15; GS=10	2	3	1	0	2	1	2	2	1	1	0	0	15
6.1 Positive about chat Gr=26; GS=13	4	2	2	6	4	1	0	1	0	3	0	3	26
6.2 Negative about chat Gr=2; GS=2	0	1	0	0	0	0	0	0	0	0	1	0	2
6.3 Neutral about/opinions of chat Gr=11; GS=8	1	4	2	1	3	0	0	0	0	0	0	0	11
7.2 Negative about SST Gr=12; GS=6	1	2	1	0	3	1	0	0	3	1	0	0	12
7.2.1 SST decrease satisfaction Gr=10; GS=5	0	0	1	0	2	1	1	3	2	0	0	0	10
7.3 Neutral about/opinions of SST Gr=8; GS=6	0	1	1	3	0	0	1	1	0	0	0	1	8
8.1 Positive about direct contact/human assisted channels Gr=93; GS=35	19	19	9	6	5	9	4	8	4	4	4	2	93
8.3 Neutral about/opinions of direct contact Gr=14; GS=6	7	1	2	2	1	1	0	0	0	0	0	0	14
Additional channels Gr=10; GS=5	1	0	0	4	3	1	1	0	0	0	0	0	10
Channels among customer life-time phases Gr=27; GS=12	3	2	5	3	1	1	2	1	1	3	2	3	27
Clients knowledge of software Gr=20; GS=8	1	2	7	3	1	1	1	1	0	1	1	1	20
Costs for support Gr=14; GS=5	1	0	2	1	4	1	1	0	1	1	1	1	14
Product affect support Gr=19; GS=9	2	4	6	0	2	1	1	2	0	0	0	1	19
self-reliance Gr=7; GS=4	0	0	3	2	0	0	0	0	1	0	1	0	7
Service expectations Gr=37; GS=19	2	0	3	8	9	2	2	4	6	0	0	1	37
Support requests in the past Gr=27; GS=14	3	5	8	2	1	1	1	2	0	1	2	1	27
Totals	81	108	90	85	57	45	28	52	21	33	27	30	657

f. Framework for configurability, maturity and co-creation of value in SaaS

Figure 3 `Framework for Configurability, Maturity and Co-creation of Value in Saas` (Zainuddin & González, 2011)