

The cost of information sharing in co-creation: How privacy concerns influence the willingness to co-create

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Author: Jesse Christiaan van Dijk
Student number: s1044997
E-Mail: Jesse.vanDijk@student.ru.nl

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Supervisor: Simone Ritter
2nd Supervisor: Herm Joosten

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Abstract

Co-creation enables companies to actively involve consumers in their innovation process and thereby derive reliable information on their wants and needs. This research examined the role of customers' privacy concerns for the willingness to co-create on an imaginary co-creation platform through a mixed-method design. In combination of an experiment and a follow-up questionnaire the relationship between privacy and co-creation engagement was tested. The multivariate analysis of the covariance between two manipulated groups in the experiment revealed two things: First it was found that explicitly communicating the co-creation facilitator's high concern for a responsible handling of privacy issues, in addition to the juridical requirements, did neither raise the number of personal data types shared, nor enhance the willingness to co-create. Second, the confirmatory factor analysis together with structural equation modelling exposed several relationships: (a) privacy concerns were formed through a combination of the perceived privacy and security, (b) the disposition to share information was based on the combination of privacy concerns and perceived security and (c) the privacy concerns negatively influenced the willingness to co-create through the disposition to exchange personal data. And third, the qualitative analysis in comparison of the experiment and the questionnaire showed that the respondents stated to face privacy concerns and hesitated to share personal data or engage in co-creation. Furthermore, this hesitation to share personal data differed among the type of information. Despite its hypothetical frame, this research contributes to the understanding of the connection of privacy concerns and the willingness to co-create by demonstrating their relationship through the mediation of information sharing.

Keywords: Co-creation; Privacy concerns; Perceived privacy; Perceived security; Information sharing; Willingness to co-create.

1. Introduction

In recent years, the collection of dependable customer data became highly relevant for companies to serve future market demands. Companies are processing high amounts of information concerning their customers in order to better understand their purchase behaviors (Baregheh et al., 2009). They opened their innovation processes to develop their products and services directly to their customers' needs (Hillebrand et al., 2011). One way to engage in collaborative innovation is co-creation, where two or more different parties support each other in the development process (Ehlen et al., 2017). From a customer-perspective, people become increasingly aware of the advantages co-creation with companies might offer them (Prahalad & Ramaswamy, 2004). They can create products which directly fit their preferences, work off their creativity or engage socially with others (Constantinides et al., 2015). Co-creation does not only provide advantages, but often also requires the investment of time or the input of creativity, personal data or knowledge (Shen & Ball, 2009). Co-creation processes require that customers actively share personal data in order to create value (Prahalad & Ramaswamy, 2004). The exchange of personal information has experienced a shift of perspective, due to the introduction of the General Data Protection Regulation (GDPR) in 2016. This regulation gives back the control of personal data to the individual (Winegar & Sunstein, 2019). According to GDPR, personal data refers to all data that can directly or indirectly be connected to a natural person (Regulation EU 2016/679). Many customers face privacy concerns regarding the ways in which collaborating companies process their personal data, such as name, date of birth or e-mail-address. Whether people engage in co-creation often depends on an unconscious cost-benefits analysis (Handrich & Heidenreich, 2013). Therefore, companies need to create attractive environments, that assure a risk-free exchange of personal information, to convince potential customers to join their co-creation processes (Payne et al., 2008). Companies should get into dialogue with their customers, trying to handle their concerns (Prahalad & Ramaswamy, 2004) and make a participation in co-creation appealing more attractive. Consequently, adequate data processing according to the GDPR strengthens a company's position (Kamboj et al., 2018).

To put it another way, companies valuing an adequate handling of personal data should be able to convince their consumers to engage in co-creation and share their information. This study examines the influence of privacy concerns on the willingness to co-create. It furthermore evaluated the role of dialogue by investigating whether potential concerns can be counteracted through transparent communication of privacy issues to increase engagement rates.

Only a few scholars have investigated on the relationship between privacy concerns and the customers' willingness to engage in co-creation. One of the first to mention the interaction of co-creation and risk assessment were Prahalad & Ramaswamy (2004), who studied the co-creation of value during a change of market perspective from company-centric towards a more customer focused orientation. They interpreted access to information and transparency as essential to create value through dialog, which finally enables customers to make their own risk assessments. In other words, the findings indicate a higher responsibility of companies to take the concerns of their customers into account. And although the concepts of dialogue, access and transparency are still relevant today, the term of risk assessment has expanded alongside the technological development. More contemporary studies that have been taken recent technological developments into account investigated co-creation in a Social Media environment (Kamboj et al., 2018; Tajvidi et al., 2018). While Kamboj et al. (2018) on the one hand examined the effect of customer motivations and found that the effect of participation on loyalty is mediated by trust, they only mention the correlation of trust and risk assessment without further elaboration. Tajvidi et al. (2018) on the other hand included privacy concerns as a mediating effect, while investigating the effect of social commerce information sharing on co-creation. They found the relationship to be negatively affected by their customers' perception of how their data is being protected by digital tools. A previous study which has been focusing on the effect of risks on the customers' intention has been conducted by Shin (2010) in the area of online purchases. This research not only mentioned a relationship between trust and risk assessment but also described trust as an outcome of the perceptions that the participation will not cause negative effects together with the control the consumers believe to have in the process. The results of this research could be interpreted as that customer motives are indirectly affected by their privacy concerns. All these studies rely on the necessity of data exchange to either participate on Social Media platforms, buy products online or engage in co-creation. They might be connected through the article of Handrich and Heidenreich (2013) who described the effect of information exchange, as one of three dimensions next to customization and effort, on the willingness to engage in co-creation. Unfortunately, they did not further elaborate on the relationship of information sharing with privacy concerns. This research contributed to theory by building a bridge between previous literature in order to estimate existing correlations and depict a better understanding of the underlying relationship of privacy concerns and the willingness to co-create.

For many companies that want to derive on the benefits of co-creation by gathering reliable customer data, the relevance of data protection has been increasing in accordance with

the introduction of the GDPR. In co-creation processes companies want their customers to actively exchange their ideas, knowledge and experiences in order to create value (Prahalad & Ramaswamy, 2004). Privacy concerns, which their participants face, should be taken into account, in order to encourage them to exchange personal data. The source and kind of information obtained in the co-creation process in connection with the purpose of innovation, differentiates companies from one another (von Hippel et al., 1999). This is especially relevant for market-oriented companies aiming to identify innovation potentials (Meissner & Kotsemir, 2016). Thus, a company willing to obtain higher participation rates together with a huge amount of reliable data directly derived from their consumers, should identify ways to handle their customers privacy concerns.

This report is divided into several parts: The theoretical background introduces the research concepts along the recent literature on co-creation and data protection. Based on the concepts research hypotheses were developed and visualized in the conceptual model. In the methodology the research method is specified by depicting the mixed-method design, followed by conceptualizing the measures. Moreover, the population and procedure the respondents followed in this research are thoroughly described. This section ends by pointing out consideration on the research ethics. The analyses, for both the experimental setting as well as questionnaire, are outlined together with the findings in the results section. This report ends with a discussion of those findings, putting them into context, drawing conclusions and presenting implications, managerial recommendations, limitations, as well as future research suggestions in the discussion section.

2. Theoretical background

In the following chapter the background is introduced in consideration of the research question. The concepts of willingness to co-create, information sharing, privacy concerns, perceived security and perceived privacy are briefly discussed among the recent literature in co-creation and data protection. This section describes how privacy concerns are related to willingness to engage in co-creation, mediated through the participants attitude to share personal information. This chapter ends by stating the hypotheses and outlining the conceptual model.

2.1. Willingness to co-create

Within the last decade the research topic of co-creation has received high interest. Ehlen et al. (2017) state that human resources are an essential driver for constant innovations and as companies often lack those resources, they need to involve external entities. Co-creation is the

collaborative and creative development of incremental or radical innovations in the area of products or services (Ehlen et al., 2017). To this a more general understanding of co-creation is suitable, as it can be conducted with various types of external sources which all collaborate in developing social or economic values (Martinez, 2014). Therefore, companies can open their innovation processes to their network of stakeholders or the society at large, like in open innovation (Martinez, 2014) or crowdsourcing (Fedorenko & Berthon, 2017).

A large research stream concentrates on co-creation between a company and its customers, which can be conducted in several ways. Those customers can be involved at different stages. Starting by discovering and analyzing customer needs and continuing with idea generation and assessment, through to product development and design, ending with the test-phase and launch (Bettiga & Cicullo, 2019). According to Fedorenko and Berthon (2017) companies should implement ways to engage their customers in their innovation activities. They can for example be introduced as experts to identify novel ideas that face a high potential to create successful innovation which fit the market trends and decrease time efforts (Poetz & Schreier, 2012). Von Hippel et al. (1999) stated that companies, especially those located in turbulent markets, facing a growing competition should identify the most promising participants, as for example lead users, to stay competitive. One way to reach those participants is via the use of intermediaries, such as co-creation platforms, that specialize in the connection of companies and people interested in co-creation (Komulainen et al., 2005). Such co-creation platforms take then over part of the responsibility towards the participants and represent the company in this case, while also function as platform for the exchange of personal data, such as knowledge, ideas or experiences.

To involve potential customers in co-creation, companies often must attract people to engage in such a collaborative innovation process. Neghina et al. (2017) found that a positive disposition towards co-creation drives their co-creation behaviours. The concept of willingness to co-create has been defined by Handrich and Heidenreich (2013) as “a condition or state in which a customer is prepared and likely to create value together with the company by actively engaging” in their co-creation processes. This motivation is related to different settings as the type of service or the environment (Neghina et al., 2017). Although Constantinides et al. (2015) proved that such motivations to engage do arise from customer benefits, Fedorenko and Berthon (2017) stated that just summing up the benefits is often not enough to attract them. Moreover, Sánchez-Fernández and Iniesta-Bonillo (2007) argue that the willingness to co-create depends on a combination of extrinsic and intrinsic motivations. Bettiga and Cicullo (2019) identified

the investment of resources that highlight the benefits or reduce costs as essential to increase the participation rate among customers.

2.2. Information sharing

Benefits positively affect a customers' willingness to co-create, whereas costs will negatively affect the customers' attitude towards participation. Customers distinguish between the benefits and the costs they face to participate (Payne et al., 2008; Vargo & Lusch, 2008) and they will only engage when the trade-off seems positive (Handrich & Heidenreich, 2013). Managers need to create attractive environments to engage their customers in co-creation (Payne et al., 2008) by lowering the costs or highlighting the benefits. The concept of costs can be characterized by extrinsic motivations, such as monetary expenses and intrinsic motivations, like physical or mental effort or the time invested (Handrich & Heidenreich, 2013). The concept of benefits can be defined by the utilitarian and hedonistic advantages. The utilitarian benefits are cognitive, product- or task-related, whereas the hedonic ones refer to affective, emotional, experiential and non-instrumental values (Sánchez-Fernández & Iniesta-Bonillo, 2007). Handrich and Heidenreich (2013) point out that the most relevant benefit is customization referring to a utilitarian value that the product or service is personalized to the individual customer. Etgar (2008) claims that customization cannot be assessed without customers expressing their personal preferences. This goes along with the perspective of Prahalad and Ramaswamy (2004) who explain that access to and the transparency of, information is the origin of co-creation in value.

For a company or co-creation platform that seeks to involve people in co-creation and increase the potential for successful innovations it is important to pay attention to enabling the exchange of personal information. Personal commitment requires a platform for open communication (Prahalad & Ramaswamy, 2004). Payne et al. (2008) argue that active communication and cooperation with the customers is essential for a company to create value during co-creation. It requires the exchange of personal data, like names or contact details as well as more abstract information, such as ideas or preferences (Shen & Ball, 2009). Nonetheless, in online settings especially, customers might be concerned about their privacy and therefore reluctant to exchange personal data (Handrich & Heidenreich, 2013). On co-creation platforms the protection of personal information is paramount, as the information will be shared with the company or other participants. Once the knowledge, ideas or experiences are shared online, it might also be used for a purpose other than initially intended. The perceived cost of information sharing might be reduced, by ensuring the provided information is processed

adequately. As part of the willingness to co-create, participants with a positive attitude will be more open to share their information (Handrich & Heidenreich, 2013). Customers that are willing to invest effort, personal resources and time, have a higher affinity to engage in co-creation (Neghina et al., 2017). In order to provide such a comfort zone, it is important to understand the drivers and in how far privacy concerns affect the willingness to share information and engage in co-creation activities.

2.3. Privacy concerns

From a company-centric perspective, reliable data are key resources to successfully address their customers with personalized offers. The vast amount of collected data goes along with a steep climb of relevance for market-oriented companies (Menon, 2019; MacDonald, 2020). The integration of data to build the accurate and individual ‘customer profiles’ requires the reduction of numerous data sets to the relevant information (Lukosius & Hyman, 2018). This also refers to co-creation where people are involved in the process of developing new products and services to align innovations to the consumers’ demands. This way of data processing does not solely have positive effects, such as customization described by Handrich and Heidenreich (2013) or the ability for companies to directly address their customers through personalized advertisement. It also has downsides for their customers’ privacy, as a misuse of personal data can cause severe damages to the natural person. The company should feel responsibility to act in an ethically correct manner, as they do not want to be charged for any kind of breach.

A plethora of literature has been written on data protection, mainly covering issues such as the legitimization of data processing from an organizational-centric perspective. Nevertheless, the initial intention was to protect the processing and movement of personal data. Not only has the right to privacy been declared as fundamental (Regulation EU 2016/679), but it has also been incorporated into the human rights law (MacDonald, 2020). To counteract the huge amount of data collection and saving the right of privacy, the GDPR was proposed in 2016 by the European Government. The regulation enables the customer to decide how, where and why their data is being processed (Winegar & Sunstein, 2019). This means, that a participant who has shared personal data with the co-creation platform or the company or published such information within the community, stays in charge of their data. According to the regulation, personal data refers to all data that can directly or indirectly be linked to a natural person (Regulation EU 2016/679). This entails plenty of examples that are also used in co-creation processes, such as names, addresses or payment information. Companies still provide the tools and process the data, but now companies need the permission of the customers to process their

personal data. Therefore, it may be argued that the initial objective has been re-introduced with the GDPR. On the contrary, some people fear that the new regulation contains the risk of not being up to date with new technologies, as artificial intelligence, or machine learning (Wachter et al., 2017). The technological development is fast, whereas regulations often react to things that have been introduced long before. Aside from this discrepancy, Menon (2019) argues that a restriction of the supremacy hinders the freedom of the Internet. As companies must ask for a person's permission to process their data experiences (Regulation EU 2016/679), the GDPR heavily impacts online experiences. Websites that have previously been free to visit, may now require that acceptance of data processing before a service will be provided. As regulations are legally binding, breaches can lead to high fines (MacDonald, 2020) as well as damages to reputation. Also, the preparation of customers to adopt to the new rights provided by the regulation is questionable. Solove (2007) goes one step further by arguing, that not caring about the data processed by companies often causes a wide range of unexpected consequences. The benefits of GDPR will fail when consumers do not make use of them (Koops, 2014). According to his point of view the customers should not take it easy, when they do not know how the company processes their data, as this could be followed by severe ramification (Solove, 2007).

Despite all privacy considerations, customer behavior has often been experienced as different to their previous intentions. For many people a data protection regulation may not seem necessary, as they do not care whether a company processes their name or contact information. This leads to the circumstance that customers easily agree on terms and conditions, although they might be concerned about their privacy (Obar & Oeldorf-Hirsch, 2020). This phenomenon, that people tend to share personal information while they would initially state their privacy concerns, has been described as the privacy paradox (Smith et al., 2011; Baek, 2014). As Obar and Oeldorf-Hirsch (2020) found this effect is often caused by the different intentions that lead to a participation. In co-creation for example people are often interested in the development of new products or to share their experiences socially, but not to protect their personal data. Data protection often means an additional workload that those people tend to avoid. On the contrary, Tajvidi et al. (2018) argue that participants often react according to their level of privacy concerns, as part of their trade-off between costs and benefits. When people are facing higher privacy concerns, they tend to take actions to protect their privacy, such as sharing less personal information. On the contrary, trust is found to decrease the actions taken (Obar & Oeldorf-Hirsch, 2020). Thus, online portals that take the concerns of their participants into account and support them to make decisions which are aligned to their preferences, notice a higher willingness to engage (Pham & Castro, 2019).

2.4. Perceived privacy and perceived security

The potential for innovation depends on the amount of knowledge shared by the participants, who require access and transparency of information themselves (Prahalad & Ramaswamy, 2004). This exchange may be hindered through information asymmetry leading to dissatisfaction (Vargo & Lusch, 2008). Prahalad and Ramaswamy (2004) point out that in the past a lack of information has often been exploited by companies to sell their goods. This traditional perspective is contradicting the idea of co-creation of value, which is based on the shift in the way companies address their customers through marketing (Prahalad & Ramaswamy, 2004). Co-creation requires the company to supervise the development process, ensuring that the new product or service fits the customers' expectations and preferences while controlling the quality of the end product (Etgar, 2008).

According to Shin (2010) the term 'privacy concerns in co-creation' covers two distinct topics. On one side the extent to which a customer believes that participating in co-creation will cause no harm, called the perceived privacy, and on the other side the self-control each participant has on how their personal information is being processed, namely the perceived security. This includes the transfer and exchange of that information. Privacy concerns often derive from the way a website processes their data (Shin, 2010). Negative personal judgements cause negative behavior, such as a decrease of trust, reluctance to share personal data or the complete withdrawal from participation (Bélanger et al., 2002). Vijayasarathy (2004) discovered that users hesitate to participate in online settings when facing privacy concerns. Hence, to increase customers' willingness to participate in co-creation, the company should react to their customers' privacy concerns, take them seriously and identify ways to provide greater security.

The emphasis on data protection, enforced by the introduction of the GDPR, has altered the way companies are handling personal information. Companies are required to inform their customers about how their data is being processed, describing how the data is collected, stored and with whom it is being shared (Menon, 2019). How the data is processed must be explained clearly, using plain language, distinguishable from other information and easily accessible (Regulation EU 2016/679). The customers are then aware of how their data is being processed and by whom. Going one step further, the other participants or community members know that the owner of the data they are processing is aware of what they are doing with the data. The regulation puts emphasis on the process from a company-perspective, regulating the settings of a platform regardless of how the customers are using this website (Data Services Inc., 2018).

When the company communicates actively about how they are processing the collected data, the participants have greater trust in the adequate data processing, leading to a perceived higher control of their own data. Both the perceived privacy and security have the potential to decrease privacy concerns, leading towards a more positive attitude towards engagement in a co-creation process.

2.5. Hypothesis

The following hypotheses were derived from the theoretical background and expressed in the conceptual model:

- H1: The stronger privacy issues are addressed by a co-creation platform, the higher the participants' willingness to create a co-creation account.
- H2: The stronger privacy issues are addressed by a co-creation platform, the higher the participants' willingness to co-create on the platform.
- H3: The stronger privacy issues are addressed by a co-creation platform, the more types of personal data are participants willing to share.
- H4: The participants' perceived privacy positively influences their perceived security.
- H5: The participants' perceived privacy decreases their privacy concerns.
- H6: The participants' perceived security decreases their privacy concerns.
- H7: The participants' perceived security increases their willingness to share personal information.
- H8: The participants' privacy concerns decrease their willingness to share personal information.
- H9: The participants' privacy concerns decrease their willingness to co-create.
- H10: The participants' willingness to share personal information positively influences their willingness to co-create.

2.6. Conceptual model

The conceptual model was based on the conceptualization of the theoretical background and includes the previously described hypotheses. As the hypotheses were tested in combination of two research methods – outlined in the following methodology section – the conceptual framework is simplified for readability reasons. A full draft of the framework can be found in the appendices.

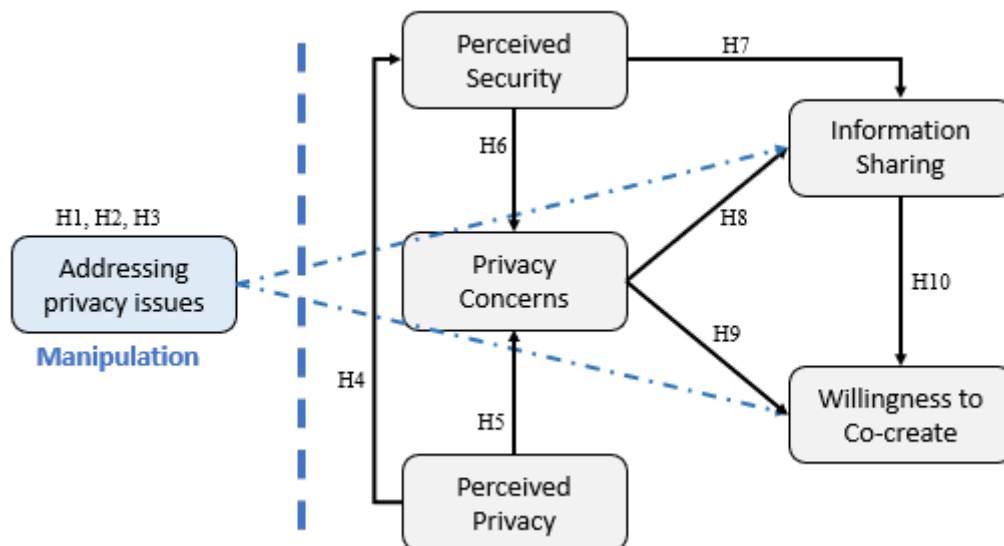


Figure 1: Conceptual Framework.

3. Methodology

In this chapter the research method chosen to investigate the research question and to test the hypothesis are outlined, including the data collection strategy and data analysis strategy. This is done by starting with a description of the sample, followed by the materials used to conduct the research, illustrating the research design and ending with the procedure.

3.1 Participants

The participation in the research was anonymous and voluntary. The survey consisted of an experimental study including the two conditions and a questionnaire. 203 people opened the survey link. 118 respondents completed the entire survey. The experimental part of the survey was completed by 132 people and the questionnaire was completed by 118 people. Due to drop-out during the survey, demographical information of 85 participants is lacking. 62 of the 132 participants (47%) have been assigned to the “privacy plus” condition, whereas 70 respondents (53%) answered their questions based on the “privacy by law” condition. The relatively large and randomly distributed sample size enabled the generalization of the findings and confirmed the underlying structures.

Although the survey was distributed online it was not restricted to geographical boundaries. The sample consisted of 80 participants whose current residence is in Germany, 32 people located in the Netherlands, two respondents from other European countries and four people outside of Europe. This study was restricted to the minimum age of 18. The youngest participant was 19 and the oldest was 67 years old. On average the respondents were 29.44 years old ($SD = 11.8$), while nearly three-fourth were between 20 and 30 (73%). The gender

was equally distributed between 61 male (52%) and 57 female (48%) respondents. The educational level was predominantly based on 32 people with a high school education (27%), 47 respondents had a bachelor's degree (40%) and 38 participants reached a master's degree (32%). There were no participants without at least a high school degree and only one respondent had a doctoral degree (1%). Next to demographical considerations, the participants' previous experience of co-creation was also examined. Most respondents (73%) had never been part of co-creation before, nearly one fourth of the people (26%) had been participating a limited number of times and only one person had more experience. On the contrary, two third of the respondents were interested to participate in future co-creation activities (67%).

3.2 Design

To examine the impact of customers' privacy concerns on their willingness to co-create, the research design was two-fold. The web-based survey entailed both an experimental design and a follow-up questionnaire. This mixed method design allowed for testing the relationships between the constructs in the questionnaire addressing potential concerns and after that obtain information about the subjects' attitude towards co-creation, information sharing or privacy concerns and to investigate whether the attitude towards participation can be increased by addressing privacy concerns by providing more information on privacy issues. Evaluated was the reaction to either by providing the legally required information (condition a) or by giving additional information on privacy (condition b).

At the beginning of the survey, two examples were provided to the respondents as background information, each referring to a different type of co-creation. The first example was in the product development section and described the contribution of designs as well as an online rating system for favorite contributions. The other example described the involvement of participants in the character and story development for a specific computer-based game. Here players discussed their ideas in online discussion forums. Both descriptions of co-creation were real-world examples from 'LEGO Ideas', a co-creation platform of LEGO A/S, and 'World of Warcraft', a computer game offered by Blizzard Entertainment, Inc., intended to create a basic understanding for each participant and enable them to answer questions from the survey hypothetically.

The experimental part of the survey was created in a between-subject design. It started by briefly describing a potential co-creation setting where the participants are asked to assume a potential participation on a co-creation platform, followed by showing an application form of that co-creation platform. Both cases included the participation in a product development

process where participants were asked to co-create a smartwatch. Participants were randomly assigned to two groups, assuming a potential participation on an imaginary co-creation platform. Either platform that actively communicates paying attention to the participants' privacy and strongly visualizing it on the application form, called the "privacy plus" condition, or only provides the juridically necessary information on privacy issues only including a brief link to the privacy statement on the application form, namely the "privacy by law" condition. The second condition was the baseline of privacy communication. The first condition was aimed to investigate the effect of providing additional information on privacy, signaling a high level of transparency, on the participants' attitude towards involvement on the co-creation platform. In the first condition the co-creation platform was characterized as well-known not only for processing personal data adequately, but also for paying special attention to securing the privacy of their participants, as stated in figure 2 which shows the respective extraction from the survey.

Compared to other providers, Creatissimo is well-known to value the privacy of their users and to pay strong attention to issues as data protection. Going beyond the requirements of European law, they see it as their duty to offer you a secure co-creation experience.

Figure 2: Additional text passage for the "privacy plus" condition.

The application form, of the condition "privacy plus" as presented in figure 3 a), included a brief depiction of the high relevance in the subheading "The co-creation platform that values your privacy" and also an expression that the platform will only process the personal data that is mandatory to enable the functioning of the co-creation process. Furthermore, the application form contained a button that indicated the possibility for the participants to get in touch with the platform provider and receive further information on how the provider processes personal data. The descriptive text on the co-creation platform for the second condition "privacy by law" did not include such additional information. Also, the points that made the other application form appealing to pay higher attention to privacy were exchanged for information restricted to innovation as shown in figure 3 b). The subheading was reformulated to "The co-creation platform for innovative solutions". The button led to more information about the platform, without any further direction.

(a)

(b)

Figure 3a & 3b: Application forms demonstrating the “privacy plus” condition (a) and the “privacy by law” condition (b).

The experiment ended by another differentiation between the participants interested to take part in future co-creation projects, dividing the respondents into two groups of either co-creation affine or co-creation averse people and allowed to test both sample bias. The structure of the following questionnaire was not changed for either condition, so all participants received the same follow-up questions. All questions included were asked on the same scale to allow comparisons and increase readability for the respondents. The order of the questions was aligned to the attention curve. Next to reducing the amount of effort required before participants can contribute to the survey, by introducing the topic thoroughly, less complicated questions, such as the demographics, were put to the end of the survey.

3.3 Measurements

The experimental setting was started by manipulating the respondents and thereby dividing them into two groups. The nonmetric condition used for this manipulation contained two levels: “privacy plus” and “privacy by law”. This condition was the independent variable and the three questions that directly followed the manipulation were the dependent variables. A 5-point Likert scale was used to measure two of the dependent variables: the willingness to create a co-creation account and the willingness to engage in the co-creation. Respondents were asked to rate both their willingness to co-create (in the following named as “engagement”) as well as their willingness to create a co-creation account (in the following named as “account creation”) from 1 = “extremely likely” to 5 = “extremely unlikely”. Moreover, the third dependent variable

was a multiple-choice question on a nominal scale which asked the respondents for the information they would share on the co-creation platform (in the following named as “information types”). Multiple choices were possible, but the question also included the option to share no personal data at all. The ten options – Address, Credit card details, Date of Birth, E-Mail-Address, Gender, Interests, Job status, Name/ Surname, Telephone number and None – were derived from the research of Evens and van Damme (2016) and ordered alphabetically. For analysis purposes, this initially nominal dependent variable was transformed by counting the number of different types that the respondents were willing to share, what allowed to measure this then ordinal scale metrically. The fourth question on the respondents’ interest in smartwatches was used as a continuous control variable and ranked from 1 = “extremely interesting” to 5 = “not interesting at all”, also on a 5-point Likert scale. At the end of the experiment respondents were asked whether they would be interested in participating in future co-creation. This nonmetric variable was measured on a binomial scale and contained two levels: “interested in co-creation” and “not interested in co-creation”.

The questionnaire was measured by five latent constructs based on the theoretical background. Nearly all questions used to measure the latent constructs were based on literature and therefore internal reliability was assumed. Due to reasons of comparability and a minimization of translation effects, the original items were kept in English. All constructs covered several items for which participants indicated their agreement with a formulated statement on a 7-point Likert scale, ranging from 1 = “strongly disagree” to 7 = “strongly agree”. Hence, the items were all ordinally scaled, but were then metrically analyzed. The four items describing the dependent variable “willingness to co-create” were based on Shin (2010) and were statements like: “I have positive feelings towards co-creation in general”, “Using co-creation platforms is appealing to me”, “It would be a good idea to use co-creation platforms” or “I intend to use co-creation platforms in the future”. The concept of “information sharing” was measured by four items derived from Handrich and Heidenreich (2013) and covered statements from “I would not like to be forced to provide personal data before I can use a communication platform” or “If necessary, I would give personal information to make co-creation platforms work” over “I am not reluctant to share personal information in order to use a co-creation platform” to “If the usage of a co-creation platform requires some personal data, it would be no problem for me”. The part on privacy concerns was divided into three subscales, namely: “privacy concerns” including four items based on Tajvidi et al. (2018), “perceived privacy” covering four items and “perceived security” with three items both based on Shin (2010). The latent construct of privacy concerns described statements such as “It would bother

me if a co-creation platform asks me for personal information”, “When a co-creation platform asks me for personal information, I would think twice before providing it”, “It would bother me to give personal information to many people” and “I would be concerned that a co-creation platform is collecting too much personal information about me”. The factor of perceived privacy covered the statements “I am confident that I would know all the parties who are able to collect the information I might provide during the use of co-creation platforms”, “I would be aware of the exact nature of information that might be collected during the use of co-creation platforms”, “I would not be concerned that the information I submit to the co-creation platform could be misused” and “I believe there would be an effective mechanism to address any misuse of the information I might provide to the co-creation platform”. Perceived security was measured by ranking the following statements: “I believe the information I might provide co-creation platforms with would not be manipulated by inappropriate parties”, “I am confident that the private information I might provide a co-creation platform with would be secured” and “I believe inappropriate parties could deliberately view the information I might provide the co-creation platform with”. The relationship between all these indicator variables and their latent constructs were reflective, taking into account the measurement error. For analyzation purposes, all items included in the questionnaire were abbreviated: “willingness to co-create” to “WC”; “information sharing” to “IS”; “privacy concerns” to “PC”; “perceived privacy” to “PP” and “perceived security” “PS”. The concepts “information sharing” and the “willingness to co-create” were measured in the experiment and the questionnaire.

The demographic questions were asked at the end of the questionnaire to check for discrepancies and obtain a deeper understanding of the sample. These five items measured the previous experience in co-creation, age, gender, level of education and the current place of residence. The respondents wrote their age into an open textbox. Although this variable was provided in a non-metrically form, the derived data was transformed to their initial ratio scale and then measured metrically. The other variables were measured by a selection of pre-given options. The question for previous experience with co-creation was derived from Neghina et al. (2017) and the options differed from “never” over a “limited number of times” to “often”, so the variable on previous experience had three levels on a nominal scale. The measurement of the highest educational level had five levels, ranging from “lower than high school degree” over “high school degree”, “bachelor’s degree” and “master’s degree” to “doctoral degree” and was therefore measured on an ordinal scale. Gender and current place of residence were measured on a nominal scale. The measurement of gender had three levels: “male”, “female” and “other”; the other one of current place of residence had four levels: “the Netherlands”, “Germany”,

“other European country” and “outside Europe”. An overview of all concepts included in the survey is presented together with their definitions and sources in table 1.

CONCEPT	DEFINITION	SOURCE
Willingness to co-create	Positive disposition of a participant to be part of a company's co-creation process.	Shin (2010) Neghina et al. (2017)
Information sharing	Amount of information a participant is willing to share with other participants of the co-creation process or the collaborating company.	Evens & van Damme (2016) Handrich & Heidenreich (2013)
Privacy concerns	Participants' perception that the collaborating company does not process one's personal data according the applicable data protection regulation.	Tajvidi et al. (2018)
Perceived privacy	Extent to which a participant believes that participating in co-creation will cause no harm to oneself.	Shin (2010)
Perceived security	Extent to which a participant thinks to have control over the processing of one's personal information.	Shin (2010)
Demographics	Previous co-creation experience; Interest in future co-creation activities, Age; Gender; Level of education and place of current residence.	-

Table 1: Concepts, definitions and sources.

3.4 Procedure

The survey was conducted in Qualtrics, an online software program. Participation was enabled on all electronical devices, although the survey was primarily designed for smartphones. A USL link was posted on Facebook, shared on WhatsApp and forwarded through snow-balling. The participation was voluntary, and no financial incentive was provided. The link forwarded the potential participant to the introductory section which informed them about the purpose of the research, the expected duration as well as the topics covered within the study. The background of the research was introduced, including ethical information and then the structure was briefly described. The respondents were informed about the opportunity to end and withdraw from the survey at any time of the process. The introductory section also pointed out that the survey was going to be conducted anonymously, so no personal data of the customers would be required. As the topic of co-creation was not expected to be commonly known throughout the population, the survey provided a general introduction for co-creation. The part of data protection was hold more general. Thus, all questions have been adopted to a basic level of knowledge and no previous experiences on co-creation or data protection were required to fill out the survey. Given the broad population, the topic was introduced thoroughly, providing two examples on co-creation, to assure that all respondents had a basic understanding of the research area.

As the first part of the survey an experiment was conducted to test the effect of transparent communication on the people's attitude to participate in co-creation as well as which personal information they would be willing to share. The experiment started by manipulating the respondents by providing the legally required amount of privacy information in the one condition, or even more information on privacy and how the platform processes personal data in the other condition. All participants, who were initially addressed through the same link, were at this point of the experiment randomly assigned to one of the two conditions, either "privacy plus" or "privacy by law". The respondents were manipulated through a similar co-creation case description, where they were asked to collaborate in the development of new smartwatches and were shown an according application form for an imaginary co-creation platform called "Creatissimo". One case included additional information on privacy issues; the other one kept the information on privacy to the legally required minimum. In addition to the case both groups were asked about their willingness to participate in the case and whether they would like to create an account on that specific co-creation platform, followed by one question about the personal data they were willing to share and ended with one control question about their interest in smartwatches.

The following section was differentiated from the previous one by a short information that more general questions would follow combined with the question whether the respondents would generally be interested in co-creation. The questionnaire was constructed to get some deeper insights on the underlying dimensions and to investigate in how far potential privacy concerns would affect the participants' willingness to co-create. The sections were divided by the five concepts on information sharing, privacy concerns, perceived privacy, perceived security and willingness to co-create. The questions were formulated as statements and the respondents were asked to rate their agreement. At the end of the questionnaire, the participants were asked whether they have participated in co-creation before and if so, how often they took part.

In the end, demographical questions were asked to obtain a better overview of the overall population and the different groups. Finally, all respondents were informed that they have reached the end of the survey and were thanked for their participation. By providing the researchers contact details, the participants were able to get in touch in case of any open questions, comments or interest in the survey's outcome.

3.5 Research ethics

The research was conducted according to the general research restrictions of the Radboud University. At the beginning of each survey the respondent was asked for permission to use their answers. Each survey included an introductory section that informed the participants about the purpose of the study, the expected length to fill it out as well as the covered topics. They were be given the opportunity to end and withdraw from the survey at any time of the process. The introductory section pointed out that the survey was conducted anonymously. All personal data (age, gender, place of current residence and level of education) of the respondents, that were collected during the entire process, were treated according to data protection requirements. All people involved in this research were above 18. The participants of the research as well as the authors of the references included in this study remain the owner of the data provided, as well as the intellectual property invested. All intellectual property rights were announced within this thesis according to the APA Ethics Code (American Psychological Association [APA], 2017). Finally, the research was being conducted in ways to avoid unnecessary personal contact in accordance with the health regulations that were established due to the worldwide outbreak of the coronavirus disease (Covid-19) in the spring of 2020 (World Health Organization [WHO], 2020).

4. Results

This chapter contains a detailed description of the main findings, based on the hypotheses and the concepts visualized in the conceptual model – both described in the theoretical background. A description of the demographics can be found in the method section. I examined the influence of privacy concerns on the participants willingness to co-create, with a mixed-method design, so the analysis has been twofold. First, to investigate the effect of transparent privacy communication on the participants' willingness to share personal data and their attitude towards a potential engagement in co-creation, a one-way multiple analysis of covariance (MANCOVA) was conducted on the experiment Second, the questionnaire was then analyzed using a combination of confirmatory factor analysis (CFA) and structural equation modelling (SEM), to obtain a better understanding of the relationships between privacy concerns and the willingness to co-create. To measure the significance of the findings, an alpha level of $\alpha = .05$ was used.

4.1 Multivariate analysis of covariance

In the experiment, a one-way MANCOVA was conducted to evaluate the influence of a manipulation on the dependent variable willingness to co-create to testify the following three hypotheses. The stronger privacy issues are addressed by a co-creation platform: (H1) the higher the participants' willingness to create a co-creation account; (H2) the higher the participants' willingness to co-create on the platform; and (H3) the more personal data are participants willing to share. The first condition was named "privacy plus" and described the reaction to communication of privacy issues in addition to the second condition "privacy by law" which provided the juridically required amount of information, due to the GDPR. The dependent variable was measured in three subscales: the willingness to co-create on the co-creation platform "Creatissimo" (engagement), the willingness to create a co-creation account for the co-creation platform "Creatissimo" (account creation) and the willingness to share personal information (information types). Those dependent variables initially had different scales. While engagement and account creation were metrically measured, information was non-metric, measured on a nominal scale. The variable on information sharing was therefore transformed to a metric scale by counting the different types of personal data that a participant was willing to share. The covariate on the respondents' interest in smartwatches was also continuous.

Before conducting the MANCOVA, the data was tested on the assumptions. Given the sample size of 132 participants and the division of 62 people for the "privacy plus" as well as 70 people for the "privacy by law" condition, the group sizes were equally distributed. The between-subjects design required at least 60 participants with a division of 30 respondents per group, so the sample was assumed to be large enough to obtain significant insights. As all answers were mandatory for respondents that completed the experiment and answers of those who did not complete the experiment were removed, there were not missing values. Based on the visual inspection of a scatterplot the linear relationship between each pair of dependent variables was found. The same goes for the linear relationship between the covariate and each of the dependent variables. There was homogeneity of regression slopes, as assessed by the interaction term between the interest in smartwatches and communication on privacy, $F(3, 126) = .548, p = .650, ns$. There was homogeneity of variances and covariances, as assessed by Box's M test, $p = .438, ns$. There were no univariate outliers in the data, as assessed by standardized residuals greater than ± 3 standard deviations and only one multivariate outlier in the data, as assessed by Mahalanobis distance, ($p > .001$). The decision was made to keep this outlier, as the removal caused no statistically significant difference in the outcome of the

MANCOVA. The residuals were normally distributed, which was tested by the calculation of skewness and kurtosis for each dependent variable and each group, as presented in table 2 in the appendices. Hence, the assumption of homogeneity of variance has not been violated. The findings revealed that all assumptions were met.

The one-way MANCOVA showed that there were no statistically significant differences between the groups due to the communication of privacy issues on the combined dependent variables after controlling for the respondents' interest in smartwatches ($F(3,127) = 0.12, p = .947$, Wilks' $\Lambda = .997$, *partial* $\eta^2 = .003$). The means and adjusted means were quite similar, as presented in table 3. The combined adjusted group means were not found to be statistically different ($p = .947$). First, the engagement showed comparable results, where the willingness was slightly more positive for the "privacy by law" group ($M = 2.87, SD = 0.9$) than for the "privacy plus" group ($M = 2.81, SD = 1.04$). The number of respondents willing to create an account was on average slightly higher for the "privacy by law" group ($M = 2.87, SD = 0.9$) than for the "privacy plus" group ($M = 2.81, SD = 1.04$). And third, the average number of different types that respondents were willing to share were slightly lower number for the "privacy by law" group ($M = 3.80, SD = 1.99$) than for the "privacy plus" group ($M = 3.81, SD = 1.57$). To sum up, the manipulation, a co-creation platform that communicates to value their participants' privacy above the juridically required amount, did neither increase the account creation nor the engagement. Moreover, the number of information types did not increase. Consequently, the one-way MANCOVA found that none of the hypotheses H1, H2 or H3 was supported. As the covariances between the groups were not significant, the variations for the dependent variables were based on the respondents not on the manipulation.

Group	Willingness to co-create					
	Engagement		Account creation		Information types	
	<i>M</i> (<i>SD</i>)	<i>M</i> _{adj} (<i>SE</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> _{adj} (<i>SE</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> _{adj} (<i>SE</i>)
Privacy plus	2.81 (1.04)	2.8 (0.12)	3.16 (1.04)	3.15 (0.13)	3.81 (1.57)	3.82 (0.23)
Privacy by law	2.87 (0.9)	2.88 (0.11)	3.19 (1.01)	3.19 (0.12)	3.80 (1.99)	3.79 (0.21)

Table 3: Means, adjusted means, standard deviations and standard errors.

As the dependent variable information types was measured by multi choices, it showed further indications. The type of data that most people were willing to share was the e-mail address (81%), followed by gender (76%), name (64%) and date of birth (61%). Interests revealed a positive response by slightly less than half of the participants (43%). The number of respondents willing to share a certain type of personal data further decreased by job status (28%), postal address (17%) and telephone number (10%). Only one of the 132 respondents said to share credit card details. Lastly, 7 people said that they were not willing to share any data at all (5%). A comparison of the different percentages of how many responses per group

where willing to share which type of personal data was presented in table 4 in the appendices. Most interesting is the difference found for sharing no data at all. While only one person (2%) of the “privacy plus” condition did not want to share personal data, this number increased in the “privacy by law” group up to 6 respondents (9%). However, given the small number of people that did not want to share any personal information at all, a potential difference due to the communication of privacy issues was not found to be significant.

4.2 Questionnaire

The questionnaire was analyzed by a combination of CFA and SEM to investigate whether the underlying theoretical considerations could be confirmed. The 19 items and five latent constructs used in the questionnaire were based on previous research, although they were derived from different sources. The sample for the questionnaire included $N = 118$ responses without any missing values, so an adequate sample size was assumed. Based on the theoretical background a potential structure was assumed, as visualized in figure 4. The analysis was conducted to test these paths, clarify the hypotheses, and enable a better understanding of the underlying relationships.

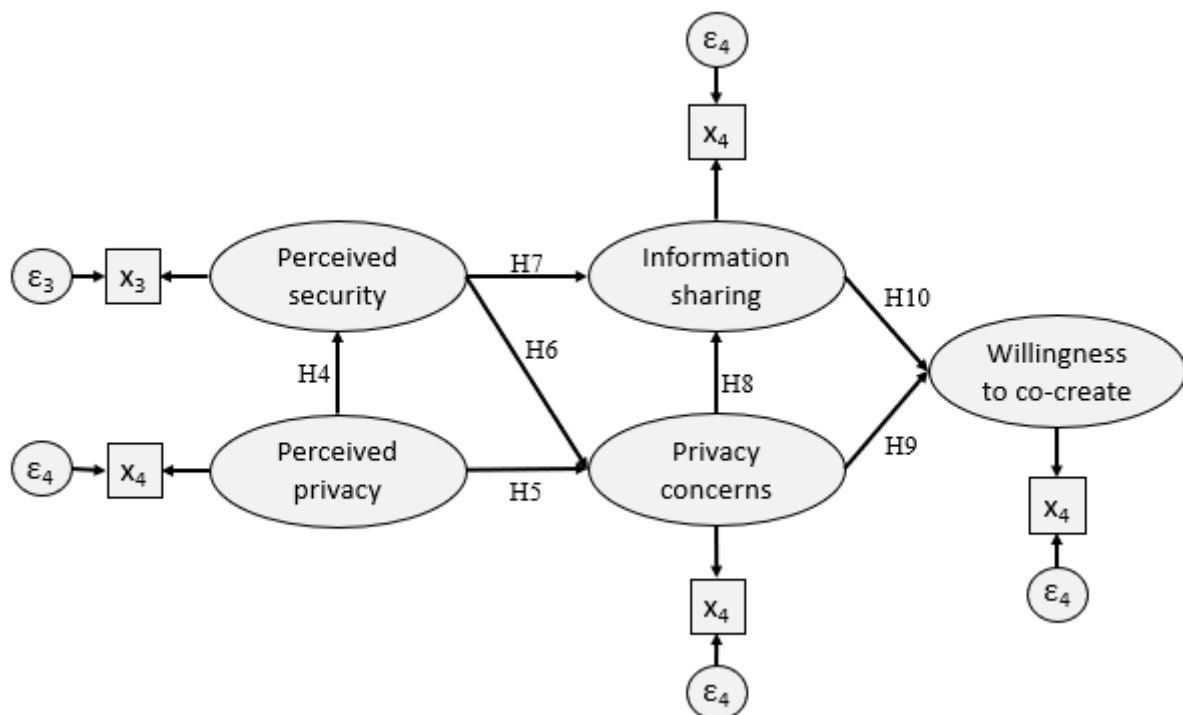


Figure 4: Structural and Measurement model, including the hypotheses.

The overall answers on the questionnaire revealed that the respondents on average had a marginally negative perception that the personal data they would share with the co-creation platform would be processed in their sense (Perceived privacy: $M = 4.3$, $SD = 1.61$) and tended to be sceptic about a potential misuse of their data (Perceived security: $M = 3.77$, $SD = 1.31$).

Furthermore, they were not sure whether they would prefer to provide information or not ($M = 4.17$, $SD = 1.31$). Those average scores were located around the overall average of 4.00 indicating that these perceptions were indifferent. Although they faced a higher degree of privacy concerns ($M = 2.55$, $SD = 1.17$), they were willing to engage in co-creation ($M = 3.15$, $SD = 1.18$). An overview of the means and standard deviations for each item and construct is presented in table 5 in the appendices.

4.2.1 Confirmatory factor analysis

At the beginning of the CFA, the numerous assumptions were tested. The number of factors extracted was set to five based on theoretical considerations. The multi-item measurement increased the internal reliability and validity of the measures. The reflective measures included correlated indicators and took measurement error into account at the item level. All 19 items were measured at Likert scale and analyzed as continuous variables. Bartlett's test of sphericity showed a significance level of $p < .001$, which indicates some degree of multicollinearity. So, construct validity was assumed to have enough correlation between the variables to run a factor analysis. For convergent validity, the standardized regression weights for each indicator loading on their specific factor be above $\beta > .5$., which was for four out of 19 indicators not the case, as shown in table 4. Another test for convergent validity was conducted with the average variance extracted (*AVE*), which should have been above the minimum level of *AVE* of .5 (Hair, 2013, p. 709). Unfortunately, the findings revealed that neither perceived privacy (*AVE* = .41), nor privacy concerns (*AVE* = .39) and information sharing (*AVE* = .4) met this criterion. Only the scores for perceived security (*AVE* = .5) and willingness to co-create (*AVE* = .56) were adequate. Summarized the criterion for convergent validity was not met. Discriminant validity was measured by the maximum shared squared variance (*MSV*) which should be for each construct below their *AVE* values. While the values for perceived privacy (*MSV* = .3), perceived security (*MSV* = .3) and willingness to co-create (*MSV* = .11) were below their average variances extracted, privacy concerns (*MSV* = .42) and information sharing (*MSV* = .42) indicated a lack of discriminant validity. The construct reliability (*CR*) was computed and found to show good reliability values above the threshold of .7 for all constructs: perceived privacy (*CR* = .7), perceived security (*CR* = .73), privacy concerns (*CR* = .71), information sharing (*CR* = .7) and willingness to co-create (*CR* = .83). Accordingly, the data signaled adequate reliability, but especially the convergent validity of the sample should be improved, for example by the deletion of variables.

The unstandardized regression weights showed that the indicator variables were significantly loading on their factors, except for PP3 ($B = 0.34$, $p = .067$, *ns*). The standardized regression weights showed that most indicator variables had a minimum loading of $\beta > .5$, except for PP3 ($\beta = .19$), PS3_reversed ($\beta = .39$), IS3 ($\beta = .38$) and IS1_reversed ($\beta = .44$). These are all candidates for deletion. All indicator variables had been previously recoded, so no negative loadings were shown for the regression weights. The squared multiple correlations showed the amount of variance in a latent construct that can be explained by the indicator variable. There were five items facing low scores each explaining less than 30% of their factor, six factors between 30% up to 50% and even eight indicators that accounted more than half of the variation in their factor. It was interesting that of each latent construct at least one indicator was found to explain more than 70% of the variation (PP1, IS2, IS4, WC2, PC1_reversed, PS1). Table 6 shows the estimated regression weights together with the squared multiple correlation on item level, measured by the maximum likelihood estimation.

Item		Construct	<i>B</i>	<i>SE B</i>	β	R^2	<i>p</i>
PP1	←	Perceived privacy	1.73	.34	.86	.74	***
PP2	←	Perceived privacy	1.48	.29	.73	.53	***
PP3	←	Perceived privacy	0.34	.18	.19	.04	.067
PP4	←	Perceived privacy	1.00	-	.56	.32	-
PS1	←	Perceived security	2.59	.71	.92	.84	***
PS2	←	Perceived security	2.18	.56	.71	.50	***
PS3_reversed	←	Perceived security	1.00	-	.39	.15	-
PC1_reversed	←	Privacy concerns	1.41	.29	.72	.52	***
PC2_reversed	←	Privacy concerns	0.84	.21	.50	.25	***
PC3_reversed	←	Privacy concerns	1.31	.27	.65	.42	***
PC4_reversed	←	Privacy concerns	1.00	-	.58	.37	-
IS1_reversed	←	Information sharing	0.43	.10	.44	.20	***
IS2	←	Information sharing	0.49	.08	.62	.39	***
IS3	←	Information sharing	0.43	.11	.38	.14	***
IS4	←	Information sharing	1.00	-	.93	.86	-
WC1	←	Willingness to co-create	1.03	.19	.69	.48	***
WC2	←	Willingness to co-create	1.52	.23	.88	.78	***
WC3	←	Willingness to co-create	1.09	.18	.78	.61	***
WC4	←	Willingness to co-create	1.00	-	.59	.35	-

Note: *** signalizes a significance level of $p < .001$.

Table 6: Regression weights CFA, including all indicators.

The covariances (unstandardized estimates) indicated that factor perceived privacy shared no significant covariation with three of the four other constructs: willingness to co-create ($Cov = .04$, $p = .582$, *ns*), information sharing ($Cov = .26$, $p = .057$, *ns*) and privacy concerns ($Cov = .05$, $p = .471$, *ns*). Also, the relationship between perceived security and perceived privacy showed no significant covariance ($Cov = .08$, $p = .06$, *ns*). Of special interest were the small amounts of shared covariation between perceived privacy and privacy concerns as well

as perceived security and privacy concerns, where the theoretical background would suggest finding a significant relationship for each one. They ranged from high correlations between the constructs of information sharing and privacy concerns ($r(142) = .64, p < .001$), decreasing down to the lowest correlation found between perceived privacy and willingness to co-create ($r(142) = .06, p = .58, ns$). This suggested a decrease of correlation according to the assumed distances in the conceptual model. The correlation between perceived privacy and privacy concerns was found to be non-significant ($r(142) = .89, p = .466, ns$). Interesting were also the high correlations of Information sharing with the other constructs of perceived security ($r(142) = 0.36, p = .011$), perceived privacy ($r(142) = .24, p = .044$) and willingness to co-create ($r(142) = 0.598, p = .005$). This finding indicated the role information sharing could play as a mediator between privacy concerns and the willingness to co-create. These findings were supported by the correlations (standardized estimates) between the constructs, presented in table 7.

Relationship		<i>Cov</i>	<i>SE</i>	<i>r</i>	<i>p</i>
Perceived privacy	↔ Perceived security	.22	.08	.55	.007
Perceived privacy	↔ Privacy concerns	.05	.07	.09	.471
Perceived privacy	↔ Information sharing	.26	.14	.24	.057
Perceived privacy	↔ Willingness to co-create	.04	.07	.06	.582
Perceived security	↔ Privacy concerns	.09	.05	.29	.060
Perceived security	↔ Information sharing	.22	.09	.36	.020
Perceived security	↔ Willingness to co-create	.10	.05	.30	.033
Privacy concerns	↔ Information sharing	.53	.13	.64	***
Privacy concerns	↔ Willingness to co-create	.15	.06	.32	.020
Information sharing	↔ Willingness to co-create	.33	.12	.33	.007

Note: *** signalizes a significance level of $p < .001$.

Table 7: Covariance and correlation, including all indicators.

The goodness-of-fit (GOF) of the model was tested using different indices. Absolute fit indices, such as the Chi-square (X^2) goodness-of-fit test was significant at a $X^2(142) = 245,808, p < .001$ suggested a lack of fit, which could also be related to the small sample size. The root mean square error of approximation ($RMSEA = .079$) was slightly below 0.08, describing an acceptable fit. In comparison to incremental fit indices, like the Relative Noncentrality Index ($RNI = .66$), the Tucker-Lewis Index ($TLI = .82$) or the Comparative Fit Index ($CFI = .85$), supported the lack of model fit. These numbers proposed that the complete measurement model, including all indicators to their proposed factors, did not have a good model fit.

To increase model fit, convergent validity and reliability of the measurement model, the indicator variables were removed from the sample. As a first variable PP3 was deleted, mainly because of the low standardized regression weight ($\beta = 0.19, p = .063, ns$). The modification indices showed no major error correlations in a single factor, so after checking the model fit further items were removed in the following order starting with IS3 over PS3_reversed and finally IS1_reversed. The reason for their deletion was not only based on the low standardized

factor loadings, but also due to their high standardized residual covariances identifying them as outliers. Furthermore, due to the deletion of four items, two factors – perceived security and information sharing – remained with only two indicator variables. Perceived privacy kept three of the four initial items and the factors of privacy concerns and willingness to co-create remained unchanged. All changes to the model were made in consideration of the model fit construct validity as well as model integrity.

After those four items were excluded from the sample, the resulting unstandardized and standardized regression weights, the squared multiple correlations and the covariances were presented in the tables 8 and 9, which can be found in the appendices. The unstandardized regression weights were all found to be significant ($p < .001$). The correlations between the factors as well as the squared multiple correlation only marginally changed. The biggest difference in the remaining indicators compared to the data with all indicators included was found for the covariation between perceived security and the other constructs: to perceived privacy ($Cov = .42$), to privacy concerns ($Cov = .16$), to information sharing ($Cov = .43$) and to willingness to co-create ($Cov = .21$).

Construct validity was tested with Bartlett's test of sphericity, which showed to be significant ($p < .001$). As those items with low standardized regression weights were removed, the measurement model remained only indicators with values of $b > .5$, indicating that the measurement model then fulfilled convergent validity. Unfortunately, the average variance extracted for the construct of privacy concerns ($AVE = .38$) was not only found to be below the threshold of .5, but also smaller than the maximum shared squared variance ($MSV = .42$), pointing out a lack of convergent and discriminant validity. Nevertheless, this could be explained by the relatively small sample size. Another indicator for convergent validity the construct reliability showed values above the threshold of .7 for all constructs, the values even marginally increased. The measurements for convergent validity (AVE , CR and MSV) were presented in table 10 in the appendices. As further deletion of any indicators did not improve the model fit or model integrity, it was decided to keep the number of indicators for the factor of privacy concerns.

The new model fit was tested with different indices. While the Chi-square (X^2) GOF was still significant ($X^2(80) = 103.99$, $p = .037$), the incremental fit indices showed higher values ($RNI = .79$, $TLI = .94$ and $CFI = .96$.) as well as the root mean square error of approximation ($RMSEA = .05$) indicated acceptable model fit. The root mean square error of approximation of a threshold below .8 in combination with Comparative Fit Index of a threshold above .95 can be accepted (Hair, 2013, p. 672). Due to the improved model fit and the

fulfillment of all assumptions, it was decided to accept this measurement model, although the validity might be reduced by the remaining factor sizes with only two indicators (Hair, 2013, p. 671).

4.2.2 Structural equation modeling

The final measurement model identified through the CFA was taken to conduct the path analysis through SEM for the purpose of evaluating the relationships between the factors. The path diagram is made up of one exogenous construct (perceived privacy) and four endogenous constructs. The regression weights showed highly significant relationships for perceived privacy on perceived security ($\beta = .54, p < .001$) and privacy concerns on information sharing ($\beta = .59, p < .001$). Perceived security significantly predicted privacy concerns ($\beta = .32, p = .042$) and information sharing ($\beta = .23, p = .037$). The findings indicated a marginally non-significant path coefficient for the predicted relationship of information sharing on willingness to co-create ($\beta = .34, p = .052, ns$), which can be explained by the lack of the two items or the relatively small sample size. On the contrary, the relationships of perceived privacy on privacy concerns ($\beta = -.08, p = .579, ns$) and privacy concerns on the willingness to co-create ($\beta = .09, p = .584, ns$) were not significant. They are presented in table 11.

Relationship		<i>B</i>	<i>SE B</i>	<i>B</i>	<i>p</i>
Perceived privacy	→ Perceived security	0.42	.09	.54	***
Perceived privacy	→ Privacy concerns	-0.05	.09	-.08	.579
Perceived security	→ Privacy concerns	0.24	.12	.32	.042
Perceived security	→ Information sharing	0.14	.07	.23	.037
Privacy concerns	→ Information sharing	0.47	.12	.59	***
Privacy concerns	→ Willingness to co-create	0.08	.15	.09	.584
Information sharing	→ Willingness to co-create	0.36	.19	.34	.052

Note: *** signalizes a significance level of $p < .001$.

Table 11: Regression weights structural model, SEM.

Looking at the squared multiple correlations in table 12 the data showed that perceived privacy explained 30% of the variation in perceived security ($R^2 = 0.3$). The explanation of perceived privacy together with perceived security explained 8% of the variation in privacy concerns ($R^2 = 0.08$). Privacy concerns together with perceived security and perceived privacy explained nearly half of the variation in information sharing ($R^2 = 0.48$). And finally, the predictors explained 17% of the variation in willingness to co-create ($R^2 = 0.17$).

Factor	R^2
Perceived privacy	.000
Perceived security	.30
Privacy concerns	.08
Information sharing	.48
Willingness to co-create	.16

Table 12: Squared multiple correlations, SEM.

The model fit indices show that the model fits the data well. Although the X^2 (84, $N = 118$) = 107.23, $p = 0.045$ was marginally significant, it could be explained by the relatively small sample size. Moreover, the incremental indices ($NFI = .84$, $RNI = .8$, $TLI = 0.95$, $CFI = 0.96$) and absolute indices ($RMSEA = 0.05$) indicated good model fit. So, the suggested model turned out to explain the data quite well. This model fit was compared to the CFA model fit to investigate any severe differences. Due to the reduction of four indicator variables the potential of a decreased validity remains. A comparison of the GOF measures can be found in table 13 in the appendices.

The SEM revealed several underlying relationships and enabled propositions on the hypotheses. While H4 describing the relation of perceived privacy on perceived security was supported by the data, no evidence could be found for H5 the causation of perceived privacy on privacy concerns. Accordingly, perceived privacy leads to an increase of perceived security but does not seem to affect privacy concerns. Perceived security seemed to decrease privacy concerns, supporting H6, and had a significant positive effect on information sharing supporting H7. Moreover, the data showed that an increase of privacy concerns led to a decrease of information sharing, so H8 was found to be supported. And finally, while the direct effect of privacy concerns on the willingness to co-create (H9) was not support, a positive relationship to increase engagement in co-creation an increase of shared information went along with an increase of willingness to co-create, supporting H10. In summary five of the seven hypotheses were found to be supported.

5. Discussion

This research evaluated whether actively addressing privacy issues enables companies to raise their customers willingness to engage in co-creation. A mixed-method design was used to investigate the effect of privacy concerns on the willingness to co-create and whether this relationship is mediated through the exchange of personal information. The experiment showed that a higher amount of communicated information on privacy, in addition to the juridically required information, does neither cause any changes on the respondents' intention to engage in co-creation, nor increase the number of types of information that participants were willing to

share. The non-significant effect between the groups found through the MANCOVA corresponds to the study of Obar and Oeldorf-Hirsch (2020) who explored that their respondents did not pay much attention to privacy information. Accordingly, it can be assumed that the mentioning of privacy tends to create negative emotions for the respondents who aspire to continue with the co-creation process without the motivation to pay attention to data protection issues. On the contrary, while the average respondent stated to be concerned about his privacy, the mean of the responses given indicated a hesitation to share personal information or create an account. This fits to research of Winegar and Sunstein (2019), who stated that people tend to take their concerns into account. This corresponds with the number information the respondents were willing to share, as they indicated that their privacy concerns did not affect all personal data equally. The overall order of types of information they indicated through the multiple-choice question was arranged according to the previously discovered order of Evens and van Damme (2016). Only the willingness to share e-mail-addresses experienced a different disposition, as the respondents on average preferred sharing their e-mail-address above gender or name. The SEM revealed that the willingness to exchange such personal information was influenced by both the respondents' perceived security and their privacy concerns. Moreover, privacy concerns were not found to be directly influenced by the perceived privacy, but that this effect was mediated by perceived security. And finally, the willingness to co-create was not directly affected by privacy concerns, but through the mediation of information sharing. Since the low model fit and the lack of convergent and discriminant validity required adoptions to the measurement model, the overall significance of the results discovered through SEM decreased.

5.1 Theoretical implications

The relationship between co-creation, communication and concerns has been the topic of several articles. So, described Prahalad and Ramaswamy (2004) the value of co-creation as a combination of dialogue, access to information, transparency of information and the assessment of risks. Handrich and Heidenreich (2013) determined the willingness to co-create as a combination of benefits and costs. The personal data that the participants must exchange in order to derive from potential benefits, such as the customization of developed innovations to their preferences, have been keenly described in their research. Other authors examined the influence of privacy and trust on the engagement in online settings (Shin, 2010; Tajvidi et al., 2018; Kamboj et al., 2018). This research connected those literature streams to enrich the

understanding of how privacy concerns shape the willingness to engage in co-creation. Due to this connection this study had the following theoretical contributions:

To begin with, the SEM revealed several relationships. Privacy concerns were formed by a combination of the expectation that personal data can be exchanged without negative consequences and that the data will be used for the initial purposes. As the concepts of perceived privacy and perceived security were initially linked to the concept of trust (Shin, 2010) these can successfully be linked to privacy concerns. Furthermore, the exchange of personal data is not only influenced by the privacy concerns, but also by the control participants have on the processing of their information. This indicates that a two-sided control on the processing of personal information, both from a company- and a customer-perspective, might positively shape the exchange of information. Furthermore, although the willingness to co-create was not directly connected to privacy concerns, a higher intention to share personal data was found to shape the higher engagement. The impact of privacy on the exchange of personal data is therefore a crucial step in understanding the motivations to participate in such innovation processes.

Next, the experiment adds to the understanding of how communication of privacy issues influences the willingness to share information or to engage in co-creation. People who have no connection to the platform or company seem not to react to a higher amount of privacy. The theoretical value is based on the understanding of the difficulty to decrease privacy concerns by simply communicating the relevance adequate data processing has for the company.

Finally, a qualitative analysis of the multiple-choice questions revealed that not all personal data experience the same hesitation to be shared. In addition to Evens and van Damme (2016), who identified differences in the attitude to share personal information and rank-ordered them, this study provides a potential explanation. While it might be argued that some people use e-mail-addresses that do not include their personal names and were therefore often not perceived as a personal data, this then should have shown equal results for other types of data, like the telephone number. The paths discovered through SEM point out that the difference between those types of data is based on the level of perceived privacy or perceived security. E-mail contact is often perceived to be less personal (perceived privacy), in opposition to having telephone contact with another human being. Also, the perceived control people have when they are addressed through e-mail or telephone might differ. Whereas in a phone call people are engaged in a direct conversation, written emails offer the respondents more time to react. Hence, these perceptions of communication offer different levels of comfort and thereby lead to a different attitude towards sharing such information.

5.2 Practical implications

There is a high potential for companies and platforms which are interested in involving customers into product or service development processes. The survey showed that 67% of the respondents were interested in future co-creation activities, while 73% of the participants stated to have no previous co-creation experiences. As Hillebrand et al. (2011) described the relevance of including new customers in order to derive from future market benefits, the numbers signalized a high potential to attract future customers by engaging those people in co-creation. Given the relatively spread of the population with regard to education, gender and age these findings seemed to correspond with the general Dutch or German population. Nevertheless, it has to be mentioned that the population within this study was mainly build upon a personal network which reduces the generalizability.

Addressing those people with the value of privacy for the company does not lead to an increase of engagement rates. The experiment has shown that proactive communication of privacy issues does not lead to an increase in the participants' willingness to co-create. When the participants think that all companies process their personal data adequate to the given regulations, such communication might be superfluous. On the contrary, the path analysis revealed a negative influence of privacy concerns on the willingness to share information. Negative expectations, caused for example by the misuse of data or bad publicity, could increase privacy concerns and thereby lead to a decrease of personal data sharing. Nonetheless, Prahalad and Ramaswamy (2004) identified the exchange of information as necessary to co-create value. Consequently, privacy concerns might not only hinder the exchange of information, but thereby also decrease the overall value of the innovation process. This insight is comparable to the research of Füller et al. (2011) who discovered that positive co-creation experience impacts not only the individual's willingness to participate again, but also the quality of their contributions. On the contrary, privacy concerns reduce the positive experience which influences the attitude towards engagement and thereby decreases potential outcomes for the company. Although there was no statistical evidence found for the assumption that data misuse increases privacy concerns and thereby leads to a decrease of information sharing, the relationships found based on the path analysis leave room for this speculation. The SEM showed that privacy concerns tend to influence information sharing negatively, whereas perceived security had a positive impact. Consequently, to address people who are interested in co-creation and convince them of the benefits, companies should pay attention to the way they process personal data and avoid the creation of privacy concerns.

Companies should have an interest in processing personal data in ways perceived as preferable by their customers. The multiple-choice questions on information types that the respondents were willing to share gave an indication of what information they can easily ask for and what information participants might be more hesitating to share. Involving consumers in co-creation processes through stimulating the communication can cause competitive advantages (Mainardes et al., 2017), although the request of personal information should be built upon thoroughly considerations. The experiment pointed out that asking for personal data of some particular types, like credit card details, job status, telephone number or address, might require further explanation, while other types, such as e-mail address, gender, name or date of birth, contain less risk to cause negative reactions. In accordance with the findings of Prahalad and Ramaswamy (2004) companies should enter into dialogue with their customers, trying to handle their concerns and being transparent on the process.

5.3 Limitations and future research suggestions

Given the relatively small sample size for the CFA and SEM the findings showed lower model fit, convergent and discriminant validity. To improve those, it was decided to delete four indicator variables. A larger sample size might have produced stronger values and thereby increased the explanatory power. In this research, 132 out of 203 people who started the survey also answered the experiment. Only 118 out of those 132 also answered the entire survey and gave information on their demographics. This means that 81 respondents left the survey before answering the experiment and another 14 participants who answered the experiment did not complete the survey. Furthermore, as the population is mainly built upon the personal network of the researcher, the generalizability of the findings remains questionable. There is a chance that some of the people who started the survey in a first instance but did not complete it might have made it through in a second attempt, but this number is expected to be relatively small. The high rate of people leaving might be caused by two main limitations:

On the one hand, this research was done on people that might have no experience in co-creation. To make the survey suitable to this population, the questions were formulated hypothetically. The unknown topic to a general population required a longer introduction of co-creation to explain. Thus, the reading time before participating was relatively long and might have deterred participants. Not only should hypothetical questions be avoided to obtain more reliable data but might also have led to incomplete results. To avoid the hypothetical frame of this study and obtain more reliable data from people, a similar research should be conducted with an existing co-creation platform or address companies which are actively involving their

customers in co-creation without the use of an intermediary. Although such a research might discover similar results than the study I conducted, this first needs to be proven.

On the other hand, language difficulties that some respondents might have experienced at the beginning of the survey which could have led participants to leave at an early stage of the survey. The translation into further languages – for example Dutch or German – might have reduced the duration to introduce the topic and increase the understanding by the participants. This way of simplifying the reply could have led to different answers and finally other findings. On the downside, the text length as well as the visual image of the application form would have changed due to translation. An opportunity to avoid language differences would have been to restrict the research to one country and then reduce the number of translations to the respective language. In case of comparability, two independent, but similar studies should have been conducted at two different countries to collate the findings. As the concept of privacy was linked to data protection, the comparability of the findings was bound to the geographical relevance of the GDPR. When comparing behaviors due to privacy concerns outside the European Union, the divergence of the data protection regulations should be considered, as they might cause different results. Due to limited time and the focus on my research question, I left this open for future research.

Another limitation on the experimental setting, the lack of differences between the groups due to the communication of privacy issues, might depend on the manipulation chosen in the survey. As neither the description nor the application forms were pretested, it could therefore be argued that the manipulation might not have been strong enough to force differences. However, to create a higher diversion between the reactions, the manipulation could have included a negative condition. This could have been done by creating an application form which includes no information on privacy at all or adding a statement that the co-creation platform was known for the misuse of personal data. Being aware of this issue, it was still decided to leave this option out, as the information on privacy is legally binding. Although there might be companies misusing personal data, I assume a high probability that potential participants have the option to choose for other platforms which are better represented by the conditions included in this research.

To increase the practical relevance of the findings, interviews could be conducted with company representatives to get a better understanding on how they perceive their customers' reaction to privacy concerns. Those findings could then be compared to the results of this study. It would be interesting to identify similarities, but especially diverse perceptions could be of high practical relevance. Such a comparison could also be used to identify mechanisms which

allow companies or co-creation platforms to actively influence their customers' perceptions in a positive way. As the findings of the SEM indicated, a tool to diminish privacy concerns could not only increase the number of data types shared, but also raise the willingness to co-create.

5.4 Conclusion

This research investigated the influence of privacy concerns on the willingness to co-create through a mixed-method design. The SEM as one of those methods, not only showed that privacy concerns are a combination of the control a participant has over the processing of their personal data and the perceived risk of misuse, but also that the disposition to share and the type of personal information is based on such concerns together with the perception of security. The willingness to engage in co-creation then depends on the exchange of personal data. Accordingly, the negative effect of privacy concerns on the motivation to engage in co-creation is found to be mediated by information sharing. As the respondents on average stated in the questionnaire to face privacy concerns, the answers given in the experiment reflect this attitude by revealing their hesitation to share personal data or to engage in co-creation. Moreover, the one-way MANCOVA revealed that addressing the concerns, by communicating the relevance an adequate data processing has for the facilitator, does neither raise the number of personal information types shared, nor enhance the willingness to co-create. Despite its hypothetical setting, this research contributes to the understanding of the relationship between privacy concerns and the willingness to co-create by connecting those concepts through the mediation of information sharing. Although this study may only be a small step in showing the value of a thoroughly handling of privacy, I hope to have given an incentive for future researchers.

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7. Appendices

7.1 Survey

Welcome,

Thank you for your interest in participating in my survey. My name is Jesse van Dijk and I am conducting a research as part of my master thesis. I am interested in motivations of people to participate in co-creation. The survey will be conducted anonymously; all data is going to be processed confidentially. You can leave the research at any stage. The findings will be only processed for scientific research and are not forwarded to any third entities except the Radboud University of Nijmegen. Your participation is voluntary.

This research starts by introducing the concept of co-creation to you before you will be asked questions on a specific case. This part will be followed by more general questions. Both parts can be conducted without any previous experience or any knowledge on a specific topic. I would be grateful if you would give me ten minutes of your time to complete this questionnaire.

By switching to the next side, you agree to have read this information and that you are at least 18 years old. In case of any open questions or comments, please feel free to get in touch with me via e-mail: Jesse.vanDijk@student.ru.nl or phone: +49 1779 131 752.

Thank you for your support.

Yours faithfully,

Jesse van Dijk

Business Administration – Marketing

Radboud University Nijmegen

Before answering my questions, I would like to offer you a brief explanation of co-creation. Co-creation is the collaborative development of products or services between a company and their customers.

One example is ‘LEGO Ideas’ where people are asked to develop their own creations to a given theme and publish them online. Other people can then vote on their favourite designs. The most positively rated designs may become produced by Lego and are rewarded financially. Through the campaign Lego does not only receive a lot of innovative ideas, but also collect information on their customers’ preferences.

In the computer game ‘World of Warcraft’ people actively contribute to the development of characters or the story. On discussion forums people share experiences and ideas, describing their expectations of how the game should evolve. Such games often have a strong intrinsically driven community that interacts to create their own gaming experience, looking for benefits as social contacts, acknowledgment, or platform assistance. Based on the people’s contribution, the company can develop the game according to their customers’ preferences.

START OF EXPERIMENT

Condition “Privacy Plus”:

Please imagine that you would like to share your ideas, knowledge, or personal experiences in an online co-creation platform. Creatissimo is a co-creation platform that connects people as contributors to companies that are looking for specific solutions. Compared to other providers, Creatissimo is well-known to value the privacy of their users and to pay

strong attention to issues as data protection. Going beyond the requirements of European law, they see it as their duty to offer you a secure co-creation experience.

Imagine you want to participate in the development of a new smartwatch. The smartwatch measures multiple things, such as the heart rate or the number of calories burned and can be used for daily activities or sports. You are asked to test a prototype of the watch, share your experiences, and suggest ideas for product improvements. Other participants have access to and can comment on your contributions. As a reward, the company offers a financial compensation for the most promising contributions.

To participate you have to create a Creatissimo user account, which requires some personal information. Please take a close look at the application form presented below. On the next page we will ask you a couple of questions about the website.



Creatissimo.
The co-creation platform that values your privacy

Create User Account
We just need a few pieces of information for your Creatissimo account

Name

Mail

Date of Birth

Address

We only process personal data necessary to run the platform

Concerns on your privacy? Please get in touch with us.

How we handle your data:

[PRIVACY](#)

☐ Accept [Terms of Service](#)

When you agree to the Terms of Service you also consent to our use of your personal information to process and operate your Creatissimo account.

[NEXT](#)

[Already have a Creatissimo account?](#)

Condition “Privacy by law”:

Please imagine that you would like to share your ideas, knowledge, or personal experiences in an online co-creation platform. Creatissimo is a co-creation platform that connects people as contributors to companies that are looking for specific solutions.

Imagine you want to participate in the development of a new smartwatch. The smartwatch measures multiple things, such as the heart rate or the number of calories burned and can be used for daily activities or sports. You are asked to test a prototype of the watch, share your experiences, and suggest ideas for product improvements. Other participants have access to and can comment on your contributions. As a reward, the company offers a financial compensation for the most promising contributions.

To participate you have to create a Creatissimo user account, which requires some personal information. Please take a close look at the application form presented below. On the next page we will ask you a couple of questions about the website.



Creatissimo.
The co-creation platform for innovative solutions

Create User Account
We just need a few pieces of information for your Creatissimo account

Name

Mail

Date of Birth

Address

The platform that connects creative minds for innovations

Any open questions? Please get in touch with us.

Want to know more about:

CREATISSIMO.

☐ Accept [Terms of Service](#)

When you agree to the Terms of Service you also consent to our use of your personal information to process and operate your Creatissimo account.

NEXT

[Already have a Creatissimo account?](#)

Willingness to co-create

- Would you like to co-create on the Creatissimo platform?
- How likely is it that you would create an account?
- To create a user account for co-creation, which information would you provide?
 - Address
 - Credit card details
 - Date of Birth
 - E-mail address
 - Gender
 - Interests
 - Job status
 - Name / Surname
 - Telephone number
 - None
- Are you interested in smartwatches?

END OF EXPERIMENT – START OF QUESTIONNAIRE

In the following sections I would like you to answer more general questions about co-creation.

- Would you like to participate in online co-creation activities in the future?
 - Yes
 - No

Information Sharing

1. I would not like to be forced to provide personal data before I can use a communication platform.
2. If necessary, I would give personal information to make co-creation platforms work.
3. I am not reluctant to share personal information in order to use a co-creation platform.
4. If the usage of a co-creation platform requires some personal data, it would be no problem for me.

Privacy concerns

<ol style="list-style-type: none"> 1. It would bother me if a co-creation platform asks me for personal information. 2. When a co-creation platform asks me for personal information, I would think twice before providing it. 3. It would bother me to give personal information to many people. 4. I would be concerned that a co-creation platform is collecting too much personal information about me.
Perceived privacy <ol style="list-style-type: none"> 1. I am confident that I would know all the parties who are able to collect the information I might provide during the use of co-creation platforms. 2. I would be aware of the exact nature of information that might be collected during the use of co-creation platforms. 3. I would not be concerned that the information I submit to the co-creation platform could be misused. 4. I believe there would be an effective mechanism to address any misuse of the information I might provide to the co-creation platform.
Perceived security <ol style="list-style-type: none"> 1. I believe the information I might provide co-creation platforms with would not be manipulated by inappropriate parties. 2. I am confident that the private information I might provide co-creation platforms with would be secured. 3. I believe inappropriate parties could deliberately view the information I might provide the co-creation platform with.
Willingness to co-create <ol style="list-style-type: none"> 1. I have positive feelings towards co-creation in general. 2. Using co-creation platforms is appealing to me. 3. It would be a good idea to use co-creation platforms. 4. I intend to use co-creation platforms in the future. - How often have you participated in such co-creation projects in the past? <ul style="list-style-type: none"> ▪ Never ▪ Limited number of times ▪ Often
END OF QUESTIONNAIRE – START OF DEMOGRAPHICS
<p>You are close to the finish! Just a few last questions to answer.</p> <p>Demographics</p> <ol style="list-style-type: none"> 1. How old are you? 2. What is your gender? <ul style="list-style-type: none"> • Male • Female • Other 3. What is your highest educational degree? <i>(If your degree is not included here, please choose the most equivalent.)</i> <ul style="list-style-type: none"> • Less than high school degree • High school degree • Bachelor's degree • Master's degree • Doctoral degree 4. What is your place of current residence? <ul style="list-style-type: none"> • The Netherlands • Germany

- Other European country
- Outside Europe

This is the end of the questionnaire. Thank you for participating!

I would like to inform you, that if you are interested in the outcome of this research, you are welcome to get in touch with me by phone: +49 1779 131 752 or send me an email via: Jesse.vanDijk@student.ru.nl.

Yours faithfully,

Jesse van Dijk

Business Administration – Marketing

Radboud University Nijmegen

END OF SURVEY

7.2 Conceptual models

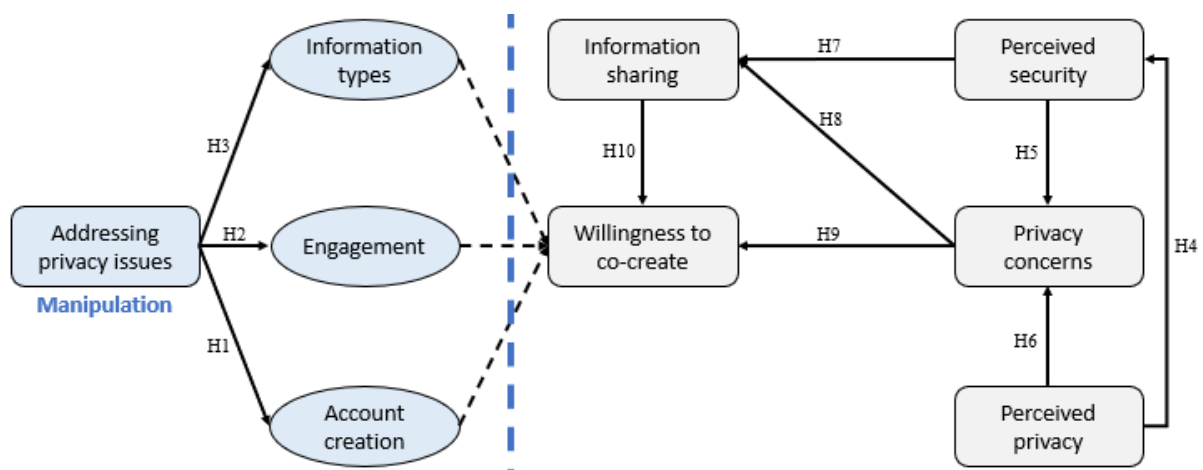


Figure 5: Overall conceptual model combining the experiment and the questionnaire.
 Note: “Addressing privacy issues” is the term used to describe the manipulation. “Information types”, “engagement” and “account creation” are no concepts, but dependent variables that together indicate the “willingness to co-create”.

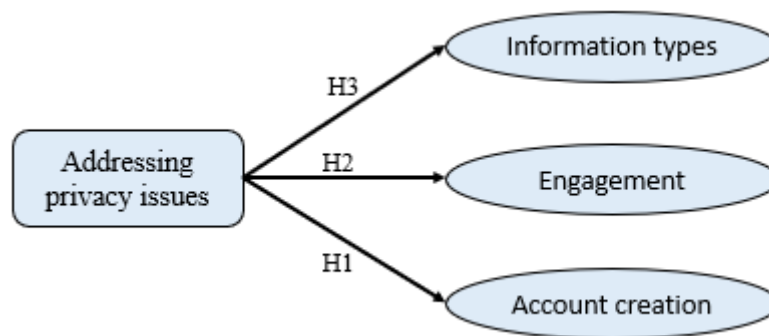


Figure 6: Model for the experiment including the hypotheses H1 to H3.
 Note: “Addressing privacy issues” is the term used to describe the manipulation. “Information types”, “engagement” and “account creation” are no concepts, but dependent variables that together indicate the “willingness to co-create”.

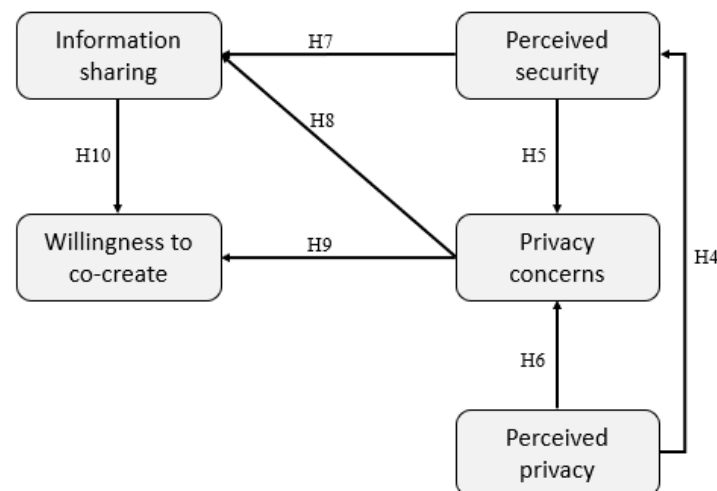


Figure 7: Conceptual model for the questionnaire including the hypotheses H4 to H10.

7.3 Tables and Figures

The following tables and figures provide further insights in the analyses of the results section. The structure of the tables and figures was aligned to the respective analyses.

7.3.1 Tables and Figures of Experiment

Dependent variable	Privacy plus		Privacy by law	
	z kurtosis (SE kurtosis)	z skewness (SE skewness)	z kurtosis (SE kurtosis)	z skewness (SE skewness)
Willingness to co-create	-0.875 (0.599)	0.222 (0.304)	-0.883 (0.566)	0.341 (0.287)
Willingness to create an account	-1.092 (0.599)	-0.23 (0.304)	-1.071 (0.566)	-0.014 (0.287)
Willingness to share information	-0.833 (0.599)	-0.26 (0.304)	-0.531 (0.566)	-0.082 (0.287)

Table 2: Normal distribution of residuals, skewness and kurtosis.

Type of information	Overall	Condition	
		Privacy plus	Privacy by law
E-Mail address	81.1%	85.5%	77.1%
Gender	75.8%	80.6%	71.4%
Name, Surname	63.6%	62.9%	64.3%
Date of Birth	61.4%	64.5%	58.6%
Interests	43.2%	41.9%	44.3%
Job status	28.0%	21.0%	34.3%
Address	16.7%	14.5%	18.6%
Telephone number	09.8%	08.1%	11.4%
Credit card details	00.8%	01.6%	00.0%
None	05.3%	01.6%	08.6%
N =	132	62	70

Table 4: Types and amount of people willing to share the type of information (in percent).

7.3.2 Tables and Figures of Questionnaire

Item		<i>M</i>	<i>SD</i>
Perceived Privacy		4.30	1.61
PP1	I am confident that I would know all the parties who are able to collect the information I might provide during the use of co-creation platforms.	4.51	1.71
PP2	I would be aware of the exact nature of information that might be collected during the use of co-creation platforms.	4.13	1.73
PP3	I would not be concerned that the information I submit to the co-creation platform could be misused.	4.63	1.48
PP4	I believe there would be an effective mechanism to address any misuse of the information I might provide to the co-creation platform.	3.92	1.52
Perceived Security		4.11	1.31
PS1	I believe the information I might provide co-creation platforms with would not be manipulated by inappropriate parties.	3.97	1.31
PS2	I am confident that the private information I might provide co-creation platforms with would be secured.	3.85	1.42
PS3	I believe inappropriate parties could deliberately view the information I might provide the co-creation platform with. (reverse coded)	4.5	1.19
Privacy Concerns		2.55	1.17
PC1	It would bother me if a co-creation platform asks me for personal information.	3.35	1.24
PC2	When a co-creation platform asks me for personal information, I would think twice before providing it.	2.23	1.07
PC3	It would bother me to give personal information to many people.	2.08	1.27
PC4	I would be concerned that a co-creation platform is collecting too much personal information about me.	2.52	1.09
Information sharing		4.17	1.31
IS1	I would not like to be forced to provide personal data before I can use a communication platform. (reverse coded)	5.75	1.28
IS2	If necessary, I would give personal information to make co-creation platforms work.	3.18	1.05
IS3	I am not reluctant to share personal information in order to use a co-creation platform.	3.89	1.49
IS4	If the usage of a co-creation platform requires some personal data, it would be no problem for me.	3.87	1.42
Willingness to co-create		3.15	1.18
WC1	I have positive feelings towards co-creation in general.	2.75	1.12
WC2	Using co-creation platforms is appealing to me.	3.42	1.29
WC3	It would be a good idea to use co-creation platforms.	2.65	1.05
WC4	I intend to use co-creation platforms in the future.	3.77	1.27

Table 5: Mean and standard deviation of items and latent factors.

Item		Construct	<i>B</i>	<i>SE B</i>	β	R^2	<i>p</i>
PP1	←	Perceived privacy	1.87	.35	.89	.80	***
PP2	←	Perceived privacy	1.53	.29	.72	.52	***
PP4	←	Perceived privacy	1.00	-	.54	.29	-
PS1	←	Perceived security	1.25	.22	.94	.88	***
PS2	←	Perceived security	1.00	-	.69	.48	***
PC1_reversed	←	Privacy concerns	1.42	.28	.72	.52	***
PC2_reversed	←	Privacy concerns	0.84	.21	.49	.24	***
PC3_reversed	←	Privacy concerns	1.31	.27	.65	.42	***
PC4_reversed	←	Privacy concerns	1.00	-	.58	.34	-
IS2	←	Information sharing	0.54	.10	.65	.43	***
IS4	←	Information sharing	1.00	-	.89	.79	
WC1	←	Willingness to Co-create	1.03	.18	.69	.47	***
WC2	←	Willingness to Co-create	1.52	.23	.89	.76	***
WC3	←	Willingness to Co-create	1.09	.17	.78	.61	***
WC4	←	Willingness to Co-create	1.00	-	.59	.35	-

Table 8: Regression weights and squared multiple correlation, after deleting the items PP3, IS3, IS1_reversed and PS3_reversed.

Note: *** signalizes a significance level of $p < .001$.

Relationship		<i>Cov</i>	<i>SE</i>	<i>r</i>	<i>p</i>
Perceived privacy	↔ Perceived security	.42	.13	.53	.002
Perceived privacy	↔ Privacy concerns	.05	.06	.09	.468
Perceived privacy	↔ Information sharing	.20	.12	.20	.096
Perceived privacy	↔ Willingness to co-create	.04	.07	.06	.577
Perceived security	↔ Privacy concerns	.16	.08	.27	.043
Perceived security	↔ Information sharing	.43	.16	.35	.005
Perceived security	↔ Willingness to co-create	.21	.09	.29	.019
Privacy concerns	↔ Information sharing	.51	.13	.65	***
Privacy concerns	↔ Willingness to co-create	.15	.06	.32	.019
Information sharing	↔ Willingness to co-create	.36	.12	.38	.003

Table 9: Covariance and correlation, after deleting the items PP3, IS3, IS1_reversed and PS3_reversed.

Note: *** signalizes a significance level of $p < .001$.

Construct	<i>CR</i>		<i>AVE</i>		<i>MSV</i>	
	BD	AD	BD	AD	BD	AD
Perceived privacy	0.70	0.77	0.41	0.54	0.30	0.28
Perceive security	0.73	0.80	0.50	0.68	0.30	0.28
Privacy concerns	0.71	0.71	0.38	0.38	0.42	0.42
Information sharing	0.70	0.75	0.40	0.61	0.42	0.42
Willingness to co-create	0.83	0.83	0.55	0.55	0.11	0.14

Table 10: Validity and reliability measures, before (BD) and after (AD) deletion of the indicators PP3, PS3_reversed, IS1_reversed and IS3.

GOF Index	SEM	CFA
Absolute Measure		
X ² (chi-square)	106.951	103.99
Degrees of freedom	83	80
Probability	.040	.037
RMSEA	.050	.051
Incremental Fit Measure		
NFI	.84	.84
RNI	.80	.79
TLI	.95	.94
CFI	.96	.96

Table 13: Comparison of Goodness-of-Fit (GOF) indices between SEM and CFA Models.

Note: Template derived from Hair (2013, p. 743).

7.4 Initial research strategy

In the proposal I announced the idea to run a survey directly with people that are actively involved in co-creation. That population should have been addressed via companies that actively engage in co-creation, such as LEGO, DHL, or Anheuser-Busch. Unfortunately, this did not work out, as I was not able to convince these companies to support my research. A main reason for the difficulties can be explained by the coronavirus disease (World Health Organization [WHO], 2020), which caused severe damages not only to the human being, but indirectly also to the whole economy. As the corona-crises was a world crisis, it has not been possible to switch the geographic area, for example from companies located in the Netherlands to companies located in Germany, France or for example the US. Furthermore, the economic disadvantages were not bound to a specific business sector but affected most areas in a similar manner. In times where managers responsible for their employees had to decrease their workload to a minimum, it is understandable that they face more relevant issues than supporting a master thesis. To avoid a delay in thesis writing and being able to finish the master program in the given duration, I decided to adapt my method and address a broader population. Nevertheless, this step was not possible without having to make additional changes to the survey.

One of the most crucial points was to take out the concept of trust. People that have experiences in co-creation and thereby have worked together with either a co-creation platform or the seeking company, might be able to give an answer on the question how much trust they pay to the collaboration partners. For someone who has no experience with co-creation such then hypothetically formulated questions would have been difficult to answer. Questions on trust then would have probably sounded like “assume you would be co-creating on a co-creation platform, how much trust would you pay in their way of data processing”. Without a doubt there are still some correlations between the concept of trust and the other concepts, especially as the concepts of perceived privacy, perceived security are closely connected to trust, as for example the research of Shin (2010) has shown.

By changing the population towards a broader one, the knowledge and experience in co-creation was assumed to have decreased. To adapt to these differences, two examples of co-creation were provided at the beginning of the survey. The description aimed to set the frame and give the participant some information to be able to assume taking part. The necessity of describing the frame caused longer text passages than they would have been required for people that already know what co-creation is about. This increase of reading time not only increased the overall duration of the survey but may have also led to a decrease of motivation to fill out

the entire survey. This might explain the large number of 85 people who did start the survey but did not fill it out until the last question.

Another change that I have made due to the change of population refers to the hypothetical formulation of questions asked in the survey. As I assumed that the participants were not familiar with the topic and therefore had to imagine being part in an unknown setting, I formulated the entire survey more openly. In some parts the answers provided by the broader population would probably be like the one's co-creation experts would have given. In other parts this might not be the case. It is hard to guess which questions these are and to be entirely sure I would suggest running the same survey within the more specific population as soon as this is possible.

The hypotheses and the initial conceptual framework, that have been described in the research proposal, are shown in the following. Before, I want to point out that these are based on an early stage of the research and might therefore not be the ultimo ratio. Since this initial study aimed to confirm the underlying theory, structural equation modelling could have been used to get a better understanding of how these concepts are related.

- H1: The customers' willingness to co-create is influenced by their privacy concerns.
- H2: The level of the customers' privacy concerns is based on the level of transparency.
- H3: The level of the customers' privacy concerns depends on his level of trust.
- H4: The level of trust depends on the customers' privacy concerns.
- H5: The customers' trust the company is influenced by the company's transparency on how they process personal data.

First draft of the preliminary structural model based on the conceptualization of chapter 2:

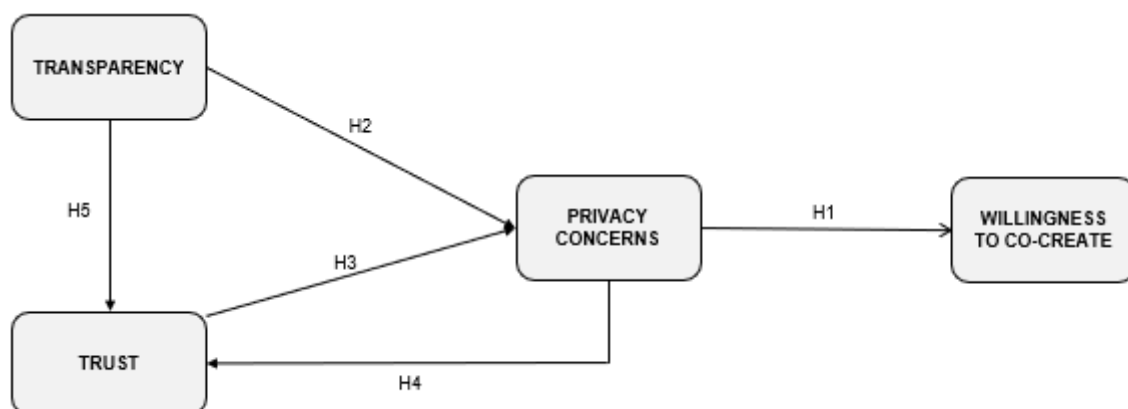


Figure ...: Draft of the structural model including the hypotheses: H1, H2, H3, H4 and H5.

7.5 Research Integrity Form - Master thesis

Name: Jesse Christiaan van Dijk	Student number: 1044997
RU e-mail address: Jesse.vanDijk@student.ru.nl	Master specialization: Marketing

<p>Thesis title:</p> <p>The cost of information sharing in co-creation: How privacy concerns influence the willingness to co-create.</p>
<p>Brief description of the study:</p> <p>The master thesis investigates the influence of privacy concerns on the willingness to co-create and whether this is mediated through the exchange of personal data. The research is conducted through a mixed-method design, combining an experimental setting with a follow-up questionnaire. While the MANCOVA showed that actively addressing customers through communicating the value of privacy for the company does neither increase the exchange of personal information types nor lead to higher engagement. Nevertheless, the structural equation modelling revealed that privacy concerns and willingness to co-create are related negatively, but only through the mediation of information sharing. Finally, a qualitative analysis of the data collected revealed that although the respondents hesitated to provide personal data, these concerns differ by the type of information. To conclude, although the research was conducted hypothetically and the sample size could have been higher, the findings indicate the importance of dialogue to counteract the negative effect of privacy concerns on the motivation to engage in co-creation.</p>

It is my responsibility to follow the university's code of academic integrity and any relevant academic or professional guidelines in the conduct of my study. This includes:

- providing original work or proper use of references;
- providing appropriate information to all involved in my study;
- requesting informed consent from participants;
- transparency in the way data is processed and represented;
- ensuring confidentiality in the storage and use of data;

If there is any significant change in the question, design or conduct over the course of the research, I will complete another Research Integrity Form.

Breaches of the code of conduct with respect to academic integrity (as described / referred to in the thesis handbook) should and will be forwarded to the examination board. Acting contrary to the code of conduct can result in declaring the thesis invalid.

Student's Signature: _____

van Dijk

Date: 15.06.2020

To be signed by supervisor

I have instructed the student about ethical issues related to their specific study. I hereby declare that I will challenge him / her on ethical aspects through their investigation and to act on any violations that I may encounter.

Supervisor's Signature: _____

Date: _____

7.6 Consent Form for submitting a thesis in the Radboud thesis Repository

Radboud University Nijmegen (hereafter Radboud University) has set up a thesis repository. The purpose of this repository is twofold:

1. To archive theses for a minimum period of seven years, in accordance with legal requirements (Wet versterking kwaliteitswaarborgen hoger onderwijs, Art. 7.3, lid 5).
2. Wherever possible and allowed, make theses available to potential users inside and outside Radboud University.

This supports the process of creation, acquisition and sharing of knowledge in the educational setting.

The repository serves as an archive in which all theses will be included. This consent form serves to also enable the publication of those theses.

By submission and publication in the theses repository copyright is not transferred. Therefore, students can at any time revoke their consent for publication.

Rights and obligations of the student

If the student grants permission to Radboud University to make his/her thesis available within the thesis repository to users inside and outside Radboud University, the student states that:

- Users are allowed to use the thesis private study and/or educational and research purposes, in accordance with the provisions of the Copyright Act (Auteurswet), with full mention of the name of the student and the location of the thesis.
- Neither the organization offering internship nor the client of the thesis has any objections against making the thesis publicly available in the thesis repository.
- The student has obtained permission from the copyright holder of any material used in the thesis to incorporate this material as part of the thesis in the theses repository and make it available to others inside and outside Radboud University.
- The student grants Radboud University the right to make the thesis available in the thesis repository for a minimum period of seven years, barring earlier withdrawal by the student. Permission to make the thesis available to third parties will take effect on the date indicated on this form.
- The student grants Radboud University the right to change the accessibility of the thesis and limit it if compelling reasons exist.

Rights and obligations of Radboud University

- The student's non-exclusive license grants Radboud University the right to make the thesis available to users inside and outside Radboud University.
- Radboud University is allowed to include the thesis, in accordance with legal requirements, in the theses repository for a minimum period of seven years.

- Radboud University can make the thesis freely accessible for users of the theses repository inside and outside Radboud University and allow them to use the thesis for private study and/or educational and research purposes, in accordance with the provisions of the Copyright Act (Auteurswet), with full mention of the name of the student and the location of the thesis.
- Radboud University will ensure that the author of the thesis is listed and make clear that if the thesis is used, the origin must be clearly stated.
- Radboud University will make clear that for any commercial use of the thesis the student's explicit consent is required. In relevant cases, explicit consent of the organization offering internship or the client of the thesis is required as well.
- Radboud University has the right to change the accessibility of the thesis and limit it if compelling reasons exist.

Rights and duties of the user

As a consequence of this consent form a user of the theses repository may use the thesis for private study and/or educational and research purposes, in accordance with the provisions of the Copyright Act (Auteurswet), with full mention of the name of the student and the location of the thesis.

Student number : 1044997

Student name : Jesse Christiaan van Dijk

Thesis title : The cost of information sharing in co-creation: How privacy concerns influence the willingness to co-create.

- ☒ Yes, I grant permission to make available my thesis with the above title in the Radboud thesis Repository.
- ☐ No, I do not grant permission to make available my thesis with the above title in the Radboud thesis Repository, but the thesis is allowed to make available with effect from (temporary embargo).
- ☐ No, I do not grant permission to make available my thesis with the above title in the Radboud thesis Repository (permanent embargo).

Student's Signature: van Dijk

Date: 15.06.2020