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The interrelationship of supplier satisfaction and supplier relation specific interorganisational systems investments, a case study at VDL ETG Almelo.

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Abstract

Buying firms are more and more dependent on their suppliers for competitive advantage in the competitively increasing environment they find themselves in. To obtain preferential treatment from suppliers, buying organisations would need to be a preferred customer with supplier satisfaction being a necessary condition to obtain this status. Moreover, good interorganisational information systems between buyers and suppliers can be a source of competitive advantage as well and interorganisational systems might have an increasing presence with the ever-growing data produced, used and shared in the supply chain. With the implementation of interorganisational systems requiring relation specific investments from both parties in a buyer-supplier relationship. Thus, the prime objective of this study is to confirm the antecedents of supplier satisfaction and in addition to that, the antecedents to motivating suppliers to make relation specific interorganisational systems investments are examined. In this paper first a short literature review is conducted on the main concepts of supplier satisfaction and relation specific interorganisational information systems. The literature review is followed by the methodology in which the case company VDL ETG Almelo is introduced, and the survey data collection method is explained. The questionnaire used in this paper is adopted from multiple previous studies. The survey resulted in a response rate of 28.5% (N=113), from which 85 responses were used for the partial least squares structural equation modelling assisted by Smart PLS. Overall, the findings of this study show that no significant interconnection exist between supplier satisfaction and supplier relation specific interorganisational systems investments. ($\alpha = .05$) Nevertheless, growth opportunity, profitability and dependence have been identified as the antecedents of supplier relation specific interorganisational systems investments. Moreover, in order to keep the suppliers of VDL satisfied, it is recommended to maintain good relational behaviour and relationship continuation, as those were the significant variables for the dependent variable.

Key words: Supplier satisfaction; Preferred customer status; Relation specific investments; Interorganisational systems; IOS; Relationship continuation

Contents

Index of abbreviations

AVE	Average Variance Extracted
EDI	Electronic Data Interchange
H	Hypothesis
HTMT	Hetrotrait-Monotrait
IO(I)S	Interorganisational (Information) Systems
IS	Information Systems
IT	Information Technology
MGA	Multi-Group Analysis
OEM	Original Equipment Manufacturer
PLS	Partial Least Squares
RSI	Relation specific investments
SEM	Structural Equation Modelling
SME	Small Medium Enterprise
VDL	VDL Enabling Technology Group Almelo (case company)
VIF	Variance Inflation Factor

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1. Introduction: Supplier satisfaction and interorganisational systems increasingly more important for obtaining competitive advantage

The purchasing function has gained relevance and received an increasing amount of attention in practice and literature as a separate discipline over the years due to, among other things, the trends of advancements in technology and globalisation. (Bapeer, 2018, p. 52; Van Weele & Van Raaij, 2014, p. 62) Today the purchasing function has evolved into a strategic function with the aim of gaining competitive advantage. (Steinle & Schiele, 2008, p. 12; Van Weele & Van Raaij, 2014, p. 57) Together with the trend of a decreasing number of potential suppliers (Hüttinger, Schiele, & Schröer, 2014, p. 697), it has become a challenge and competition for buyers to attain supplier's resources and create a sustainable competitive advantage. (Hüttinger, Schiele, & Veldman, 2012, p. 1194) The competition for capable suppliers is in contrast with the classical view, which assumed suppliers competing for customers. This phenomena was already identified by Blenkhorn and Banting (1991, p. 185) as reverse marketing. '(…) only, research in supplier satisfaction and the preferred customer concept takes the viewpoint of customers competing for capable suppliers.' (Vos, Schiele, & Hüttinger, 2016, p. 4613)

Supplier satisfaction research has in recent years become a more widely known and researched topic. (Vos et al., 2016, p. 4613) Supplier satisfaction is a necessary condition for attaining a preferred customer status and preferential treatment. (Schiele, Calvi, & Gibbert, 2012, p. 1178; Vos et al., 2016, p. 4613) The reason for the increased importance of reverse marketing comes in two-fold, namely supplier scarcity and a fundamental change in supply chain organisations that allocates more responsibilities to the suppliers. (Schiele et al., 2012, p. 1178) Firstly, 'In current supply markets, customers often face the challenge of a decreasing number of potential suppliers.' (Hüttinger et al., 2014, p. 697) One of the reasons for this decrease is that '(…) companies, especially in mature markets, reduce their supply base to receive benefits, such as lower transaction costs and larger economies of scale. However, this behaviour causes supplier reduction or even supplier scarcity, which can lead to oligopolistic supply market structures' (Lavie, 2007, p. 1207; Vos et al., 2016, p. 4613) Secondly, customers have become more dependent on their suppliers, as all non-core activities are outsourced. (Schiele et al., 2012, p. 1178)

Thus, due to the decreasing supply base and increased supplier dependence, it is now more than ever important to know how to satisfy suppliers as. '(…) suppliers who are very satisfied with a buyer have a higher tendency to give the buying firm preferred status and ultimately treat the firm better than its competitors.' (Vos et al., 2016, p. 4622)

Consequently, it is important to know how buying firms can increase the satisfaction of their suppliers and become a preferred customer in attempt to create a sustainable competitive advantage. The antecedents for supplier satisfaction have already been researched in the past. Hüttinger et al. (2014) proposed an already elaborated research model including growth opportunity, innovation potential, operative excellence, reliability, support, involvement, contact accessibility and relational behaviour. Vos et al. (2016) extended the research model by introducing the profitability antecedent and differing between direct and indirect procurement. This comprehensive model by Vos et al. (2016) can be considered state-of-art and this research will build upon this research model.

Apart from obtaining competitive advantage through supplier satisfaction leading to a preferred customer status, organisations are looking at various sources for creating a sustainable competitive advantage. As mentioned above, there is a current trend towards new technologies of the fourth industrial revolution. (Bapeer, 2018, p. 45) In this trend lies another possible competitive advantage for organisations, as in the past the key driver of the third industrial revolution, namely data or digitalisation, has proven to be a source of competitive advantage. (Schiele & Torn, 2020, p. 511) Nowadays, the data produced by organisations is increasing exponentially and will increase at a faster rate when more technologies of the fourth industrial revolution are more commonly adopted. (Frank, Dalenogare, & Ayala, 2019, pp. 16-17) Moreover, it is argued that having the correct information systems integrated across the supply chain is crucial for adequate information sharing and management of business-to-business relationships. (Pereira, 2009, p. na; Rajaguru & Matanda, 2013, p. 620; Surati & Shah, 2018, pp. 1758-1761; Thomas & Griffin, 1996, p. na) For the management of business-to-business relationships, the purchasing function can make use of interorganisational systems (IOS), with interorganisational systems are becoming ever more valuable due to the rapid increase in business-to-business transactions. (Han, Kauffman, & Nault, 2008, p. 181) However, the 'implementation and

maintenance of interorganisational systems (IOS) require investments by all the participating firms.' (Han et al., 2008, p. 181) Thus, in the current competitive environment with a competition over suppliers; the reliance of businesses on data and information exchange with suppliers and; the trend towards industry 4.0, make it important to understand for purchasers what drives suppliers to collaborate and invest in boundary spanning information systems for creating a competitive advantage together with suppliers.

In the research of Vos et al. (2016, p. 4621), it is argued that the findings of the study '(…) highlight the importance of research in the field of supplier satisfaction and urge scholars to further improve the explanatory as well as predictive performance of satisfaction measures.' Further, it is suggested in research that organisations who invest in information systems would anticipate significant improvements in, among other things, inter-organisational relationships (Rajaguru & Matanda, 2013, p. 621; Wook Kim, 2012, p. 260). Moreover, it is suggested that interorganisational information systems can influence the supply chain capabilities such as the satisfaction in a buyer-supplier relationship (Rajaguru & Matanda, 2013, p. 622) Thus, suggesting that investment in information systems and specifically interorganisational information systems would reciprocate in a higher supplier satisfaction. Furthermore, in the research of Ilkay (2019, p. 50), a deeper look has been taken into the operative excellence antecedent of supplier satisfaction and it is suggested that in future research a further look would be needed into the effect of information systems on supplier satisfaction as literature suggested information systems improved supplier processes. With suggested as well that, due to the megatrends of acceleration of innovation and industry 4.0 (Bapeer, 2018, p. 45), it would be interesting to look into the effect of information systems specifically on supplier satisfaction. Lastly, in the study of Ellegaard and Koch (2012, p. 155), it is suggested that future research should look into the methods and approaches buying companies engage in to affect supplier investments into the exchange relationship.

For the multiple reasons mentioned above, it can be argued that a research gap exists in the knowledge regarding the explanatory as well as predictive performance of satisfaction measures along with a lack of knowledge regarding the antecedents of a supplier's willingness to make relation specific interorganisational systems investments. Moreover, no research exists of the interrelation between supplier satisfaction and supplier relation specific interorganisational systems investments.

Therefore, the following two research questions have been set up:

RQ1: To what extent can the findings of this case study affirm the existing antecedents of supplier satisfaction?

RQ2: What are the antecedents to motivating a supplier to make relation specific interorganisational systems investments and what is the effect of supplier satisfaction?

To be able to answer these research questions, a case study will be conducted at VDL Enabling Technologies Group (ETG) Almelo, further referred to as VDL. Firstly, a literature research will be conducted. Secondly, a questionnaire will be sent to the suppliers of VDL to gain empirical data that can be quantitatively analysed to determine the significance and effect of the antecedents for supplier satisfaction and supplier relation specific interorganisational systems investments.

The practical contribution of this paper will be that the focal company will get specific insights into how their suppliers perceive VDL as a customer and which antecedents are most important in their industry. Moreover, the insights can partially be generalised and provide practitioners a deeper understanding on how to satisfy their suppliers. With the still going trend of digitalisation and as necessary step towards the mega trend of industry 4.0 (Bapeer, 2018, p. 50), it would be nice to know for practitioners what factors influence suppliers to make relation specific investments and invest in interorganisational information systems. Theoretically, this paper will contribute to the existing literature on supplier satisfaction of Vos et al. (2016) and fortify with quantitative data the understanding of the antecedents and extent it with knowledge of a different business environment. Moreover, the understanding of supplier satisfaction will be extended with the knowledge of how buyer

interorganisational systems investment influence supplier satisfaction and how supplier satisfaction would influence supplier interorganisational systems investments.

The outline of this paper will be structured as follows: The following section, section 2, provides a literature review on the relevant concepts of supplier satisfaction, preferred customer status and interorganisational information systems. Further, in this section hypothesis will be set up with the expected relationships between the identified antecedents and concepts of the literature. Lastly, an adapted research model will be proposed based with the basis of the existing model of Vos et al. (2016, p. 4620). In section 3, the case company is introduced, a detailed description is given of the research design and the quantitative data collection method of partial least squares structural equation modelling method is explained in the context of this research. Next, in section 4, descriptive statistics and the results of the data analyses assisted by SmartPLS are presented. Lastly, in section 5, the findings will first be interpreted in a critical discussion; conclusion will be made with practical business insights in general and for VDL specifically; the contributions of this paper to the field of research will be stated; and the limitations of this paper will be discussed with added suggestions for future research.

2. Theory: Supplier satisfaction, the preferred customer status and interorganisational information systems

2.1 Supplier satisfaction can lead to a preferred customer status which in turn can brings preferential treatment and thus creating a sustainable competitive advantage

2.1.1 Reverse marketing in supplier satisfaction research due to increased competition for suppliers due to mainly the decrease in supplier base and increasing supplier dependence

Traditionally, suppliers would take the initiative and try to persuade a buying organisation to buy its materials. However, a shift has occurred and the initiative in the buyer-supplier relationship has moved from the supplier to the buyer. This shift has been named reverse marketing. The term reverse marketing was already introduced in literature in 1991 by Blenkhorn and Banting (1991). In that paper, reverse marketing is defined as'(…) the buyer tries to persuade the supplier to provide exactly what the buyer's organisation needs.' (Blenkhorn & Banting, 1991, p. 187) In the paper of Blenkhorn and Banting (1991, pp. 186-187) two example benefits were mentioned namely, the possibility to acquire goods and technology needed over what is offered. The reason for the initial shift towards reverse marketing was, among others, a new way to save costs and a new way to achieve supply objectives. (Blenkhorn & Banting, 1991, p. 188) In supplier satisfaction research the viewpoint is taken of customers competing for capable suppliers. (Vos et al., 2016, p. 4613) Thus, having an almost identical viewpoint as the reverse marketing look, but with the important notation of 'competition' for suppliers. There are multiple reasons for the reverse marketing viewpoint in supplier satisfaction research and why obtaining suppliers has become a competition in current supply markets.

Firstly, 'In current supply markets, customers often face the challenge of a decreasing number of potential suppliers.' (Hüttinger et al., 2014, p. 697) One of the reasons for this decrease is that '(…) companies, especially in mature markets, reduce their supply base to receive benefits, such as lower transaction costs and larger economies of scale. However, this behaviour causes supplier reduction or even supplier scarcity, which can lead to oligopolistic supply market structures' (Lavie, 2007, p. 1207; Vos et al., 2016, p. 4613) Moreover, Cordón and Vollmann (2008, p. 55) stated that 'really good suppliers' are in high demand. Secondly, customers have become more dependent on their suppliers. Schiele et al.

(2012, p. 1178) argues that the reason is that nowadays all non-core activities are outsourced. Moreover, supplier dependence has increased as a shift has happened among buying firms from closed innovation in owned laboratories towards open innovation with suppliers, increasing supplier dependence. (Chesbrough, 2003, p. 562; Gianiodis, Ellis, & Secchi, 2010, p. 8; Schiele, 2012, p. 44)

Therefore, due to the decreasing supply base and increased supplier dependence, it is now more than ever important '(…) that buyers should view the supplier as a key source of competitive advantage and innovation and try to achieve preferred customer status.' (Schiele, Veldman, & Hüttinger, 2011, p. 2; Vos et al., 2016, p. 4613) In addition, '(…) suppliers who are very satisfied with a buyer have a higher tendency to give the buying firm preferred status and ultimately treat the firm better than its competitors.' (Vos et al., 2016, p. 4622) Thus, supplier satisfaction can lead to a preferred customer status which can lead to preferential treatment. Therefore, in the next section it will be further investigated how to attain satisfied suppliers in light of obtaining a preferred customer status and the possible beneficial treatment associated with the status.

2.1.2 Supplier satisfaction as prerequisite for becoming a preferred customer and obtaining preferential treatment argued with the social exchange theory

In the previous sections the term preferred customer status has been mentioned. The term preferred customer status can be defined as '(…) a buyer to whom the supplier allocates better resources than less preferred buyers because the supplier favours the buyer's behaviours, practices, business values, or some combination thereof'. (Pulles, Schiele, Veldman, & Hüttinger, 2016, p. 136) Obtaining preferential treatment from being a preferred customer is already discussed in literature as early as 1970 with the work of Hottenstein. (1970, p. 46; Schiele et al., 2012, p. 1179) The reason for aiming to obtain a preferred customer status is manifold. The main arguments made for the importance of obtaining a preferred customer status are to secure resources and get beneficial treatment, possibly leading to a competitive advantage. (Schiele et al., 2012, pp. 1178-1179)

Already mentioned above, in the paper of Schiele et al. (2012, p. 1180) the circle of preferred customership is introduced. The cycle of preferred customership is illustrated in Figure 1. It is argued that for a customer to receive a preferred customer status it should first be attractive towards the supplier, for the relationship to even initiate. 'Even though both customer attractiveness and supplier satisfaction build on the notion of supplier value, they are conceptually different.' (Pulles et al., 2016, p. 136) Where with customer attractiveness the focus lies with expected value in a future relationship, supplier satisfaction is determined by perceived value in a current relationship. (Pulles et al., 2016, p. 132) Therefore, a customer can be attractive but does not automatically mean the supplier would be satisfied with the customer. (Hüttinger et al., 2012, p. 1198) Secondly, after the relationship is initiated, the buyer should satisfy the supplier as in this stage the supplier has the choice of continuing or discontinuing the relationship. It is possible that suppliers may have multiple satisfactory customers, but not all customers can receive preferential treatment and thus the preferred customer status. (Hüttinger et al., 2012, p. 1200) Therefore, lastly, a buyer should aim to obtain the preferred customer status. However, solely being the largest customer of a supplier does not automatically grant preferred customer status. (Bemelmans, Voordijk, Vos, & Dewulf, 2015, p. 192)

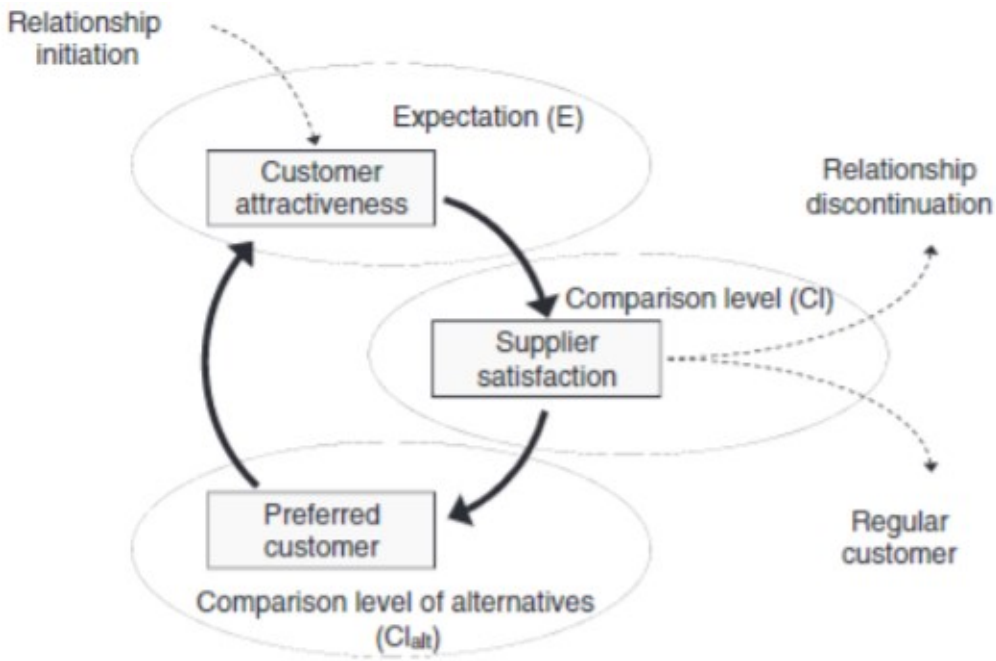

Figure 1:The cycle of preferred customership. (Schiele et al., 2012, p. 1180)

The three steps of customer attractiveness, supplier satisfaction and preferred customer status '(…) can be embedded in the context of the social exchange theory, which is widely used as a foundation of work that addresses attractiveness.' (Schiele et al., 2012, p. 1179) The 'social exchange theory concerns the social processes that obligate the recipient of an inducement to reciprocate in-kind by voluntarily providing some benefit in return.' (Blau, 1964, p. na; Ellis, Henke, & Kull, 2012, p. 1260) The social exchange theory would provide a good fit with the concept of preferred customership as '(…) the core issues discussed by the social exchange theory include questions of relationship initiation, termination and continuation' (Kelley & Thibaut, 1978, p. na; Schiele et al., 2012, p. 1179), similarly to the stages in a buyer-supplier relationship. Thus, under the assumption that buyer-supplier relationships are social exchange processes, it can be said that customer attractiveness is based on the expectation of the relationship, supplier satisfaction is based on the evaluation of the buyer and the preferred customer status is based on the comparison of alternative exchange relationships. (Schiele et al., 2012, p. 1180)

Therefore, when supplier satisfaction is reached, and a preferred customer status is obtained it can lead to a multitude of benefits. Multiple benefits of preferential treatment for customers are identified such as, product quality and innovation, support, delivery reliability, price and costs. (Nollet, Rebolledo, & Popel, 2012, p. 1187) Overall, preferred customers can expect preferential allocation of resources and time. (Steinle & Schiele, 2008, p. 11) This benefits is especially important in thin supply markets or when supply chains are disrupted as a preferred customer could expect delivery of products, where less preferred customers might not. (Steinle & Schiele, 2008, p. 11)

To conclude, based on the empirical evidence of the research of Vos et al. (2016) and the theoretical reasoning from the social exchange theory, it can be argued that in order to obtain the preferred customer status and preferential treatment a prerequisite condition is to have satisfied suppliers. (Schiele et al., 2012, p. 1179)

2.1.3 Supplier satisfaction is reached when expectations are met or exceeded with growth opportunity, profitability, relational behaviour and operative excellence as the most important antecedents

In the first section of this chapter the shift and importance of reverse marketing or supplier satisfaction is highlighted. To fully understand how to satisfy suppliers the concept of supplier satisfaction would need to be defined. Multiple scholars have tried to define supplier satisfaction with Benton and Maloni (2005, p. 2) defining the concept as 'a feeling of equity with the supply chain relationship no matter what power imbalances exists between the buyer–seller dyad.' Whereas, Essig and Amann (2009, p. 103) defined supplier satisfaction as '(…) a supplier's feeling of fairness with regard to buyer's incentives and supplier's contributions within an industrial buyer–seller relationship.' Even though the definitions are different in the situation they describe, both definitions have the core message that suppliers should have a feeling of fulfilment in the relationship. 'Supplier satisfaction can therefore be seen as a condition that is achieved if the quality of outcomes from a buyer-supplier relationship meets or exceeds the supplier's expectations.' (Pulles et al., 2016, p. 131; Schiele et al., 2012, p. 1181)

As explained in the previous section, in the current literature and in practice, the concept to satisfy suppliers has become widely accepted. In history the importance of supplier satisfaction has not always been apparent, with research of Sprowls and Asimow (1962, p. 321) stating that dissatisfaction should be the determinant for search for another supplier. The first scientific research indicating the importance of having satisfied suppliers was in 1988 by Leenders and Blenkhorn (1988) introducing the reverse marketing strategy. Even though supplier satisfaction benefits were indicated, research did not follow up for many years. A. Wong (2000, p. 431) was the first to follow up on the importance of supplier satisfaction and indicated that 'if the companies can sustain their commitment to meeting the needs of their suppliers, they can improve supplier satisfaction.' In this research multiple enablers were mentioned for creating supplier satisfaction namely: co-operative culture; commitment to supplier satisfaction and; constructive controversy. (A. Wong, 2000, p. 430) After the publishment of the research of A. Wong (2000), in the years following multiple papers were published adding to the knowledge of supplier satisfaction. Only a few years

later the first extensive set of possible antecedents of supplier satisfaction were discussed. (Maunu, 2002, p. na; Vos, 2017, p. 6) A clear separation was made between business related factors and communication factors. However the proposed antecedents were not empirically tested, this was done by Benton and Maloni (2005) whom assessed empirically the buyer-seller relationships on supply chain satisfaction. Research following extended the knowledge on supplier satisfaction and its antecedents. A more larger advancement was made with the paper published by Schiele et al. (2012). In this paper the circle of preferred customership is discussed and explained using the social exchange theory that a relationship is initialised through buyer attractiveness, the relationship continuation is based on supplier satisfaction and preferential treatment is given based on the preferred customer status. (Schiele et al., 2012, p. 1180) Related to the study of Schiele et al. (2012), Hüttinger et al. (2014) expanded the knowledge of the preferred customership cycle by exploring the antecedents of customer attractiveness, supplier satisfaction and preferred customer status. In this research an extensive theoretical framework was introduced and tested for significance. The antecedents used for supplier satisfaction in this model were growth opportunity, innovation potential, operative excellence, reliability, support, involvement, contact accessibility and relational behaviour. Two years later Vos et al. (2016) extended the research model by introducing the profitability antecedent and differing between direct and indirect procurement. Using the model introduced in the study of Vos et al. (2016, p. 4620) as a basis, multiple scholars have researched and explored additional antecedents leading to supplier satisfaction. Most noteworthy are the antecedents culture (Henn, 2018; Lasschuijt, 2021) and trust (Veen, 2018) as an extension to the state-of-the-art framework, as they have proven to have significant effects on supplier satisfaction. Similarly, but not based on the model of Vos et al. (2016, p. 4620), Caniëls, Vos, Schiele, and Pulles (2018, p. 344) studied how relative dependence in buyer-supplier relationships effects supplier satisfaction. To the contrary what would have been expected the results of the study of Caniëls et al. (2018, p. 348) found that, next to the expected positive effect of mutual dependence, asymmetric dependence can be related to higher supplier satisfaction. The most recent addition to supplier satisfaction research is the contribution by Vos, Van der Lelij, Schiele, and Praas (2021). In the research by Vos et al. (2021, p. 6) the concepts of buyer power, consisting out of reward power and coercive power, status and conflict are explored in relation to supplier satisfaction. Vos et

al. (2021, p. 5) argue that status could increases the value of the buyer brought to the relationship and potentially making the relationship more important for the supplier. In this context buyer status is defined as ’(…) the rank of an entity within a hierarchy.’ (Vos et al., 2021, p. 4) From this study it was found that buyer status has both a direct and indirect positive significant effect on supplier satisfaction. (Vos et al., 2021, p. 9)

The comprehensive model by Vos et al. (2016, p. 4620) can be considered state-of-art and this research will build upon this research model with the addition of status. The model of Vos et al. (2016) is shown in Figure 2.

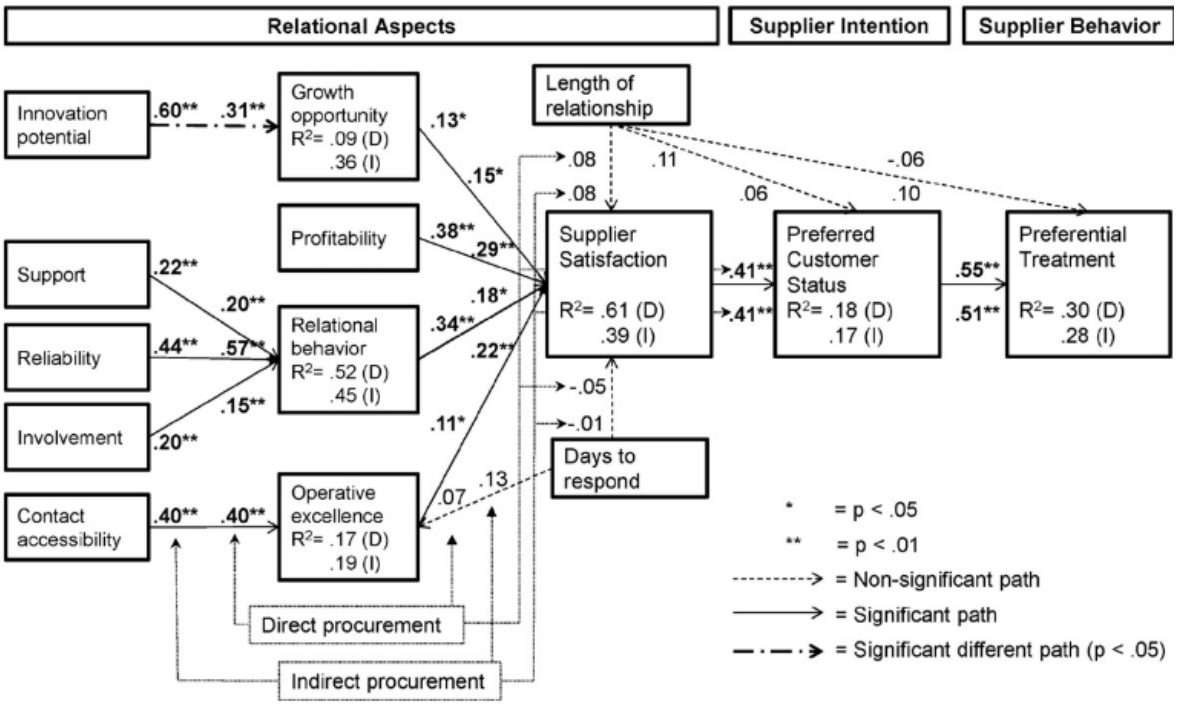

Figure 2: State of the art research model of the antecedents leading to supplier satisfaction. (Vos et al., 2016, p. 4620)

2.2 Interorganisational information systems in buyer-supplier relationships

2.2.1 Interorganisational information systems in purchasing and the mega trend towards industry 4.0 leading to an increase in available data

Organisations nowadays cannot be competitive without the many information technology (IT) systems that are in use. (Steinfield, 2014, p. 1) For example, in order to operate modern businesses, data is needed for tasks such as: '(…) managing employee data, keeping track of sales and inventory, engaging in product development, forecasting future demand, and maintaining customer information.' (Steinfield, 2014, p. 1) When describing the function of purchasing there are multiple stages in which information systems have become crucial. Schiele (2019, p. 54) describes, at the category management level, that a purchasing unit could be depicted with six activities in a cycle. During the executing activity of a purchaser, the serial purchasing of material is '(…) typically done automatically through connected IT systems.'(Schiele, 2019, p. 58) In the purchasing department cycle there is even an activity dedicated to solely IT process support. (Schiele, 2019, p. 61) Common form of IT systems that fall under the digitalisation of procurement processes are, among others, E-procurement or EDI (Electronic Data Interchange). (Schiele, 2019, p. 61) Moreover, IT tools can often overcome the organisational boundaries and the aforementioned IT tools can be considered interorganisational information systems (IOIS). Interorganisational systems (IOS) are information systems (IS) that facilitate the exchange of products, services and information between firms (Han et al., 2008, p. 181) Thus, a common platform is provided between the exchange partners (Radhakrishnan, Davis, Sridharan, Moore, & David, 2018, p. 559) in which, interorganisational systems can facilitate real-time information sharing (Park, El Sawy, & Fiss, 2017, p. 648; Saeed, Malhotra, & Grover, 2011, p. 38; Sandberg, Mathiassen, & Napier, 2014, p. 445) digitize inter-firm practices and processes (Sambamurthy, Bharadwaj, & Grover, 2003, p. 245) and benefit the development and utilisation of inter-firm capacities. (Lee, Wang, & Grover, 2020, p. 4) The term interorganisational systems (IOS) or interorganisational information systems (IOIS) can be used interchangeably and for the remainder of this paper it will be referred to as interorganisational systems (IOS). 'Over the years, the academic community has continued to pay attention to the study of basic issues related to IOISs.' (Liu, Esangbedo, & Bai, 2019, p. 3) With one of the most dated literature sources coming from the 1960's, in which

Kaufman (1966, p. na) argued for the adaption of information systems across the organisational boundaries as it was believed to be the key for developing and maintaining a firm's competitiveness. Including but not limited to, 'IOS systems include EDI, Internet-based EDI, supply chain management systems, SRM, CRM, e-procurement systems, open-standard IOS (that uses Extensible Markup Language (XML) or Javascript Object Notation (JSON) data interchange formats), and other inter-organisational process automation systems.' (Radhakrishnan et al., 2018, p. 559) Thus, multiple information systems can aid the current business and buyer-supplier relationship.

However, advances in technology over the past few years have led to the beginning of a new revolution in the industry. This phenomenon is often referred to as the fourth industrial revolution or Industry 4.0, first introduced in Germany 2011 under the name of 'industrie 4.0'. (Frank et al., 2019, p. 15; Sony & Naik, 2020, p. 1) 'Industry 4.0 is characterised by cyber-physical systems with autonomous machine-to-machine communication.' (Schiele & Torn, 2020, p. 512) Previous to industry 4.0, there have been 3 other industrial revolutions and each marked by a pacemaker technology. (Schiele & Torn, 2020, p. 511) With first steam power, second electric power and third microprocessor-enabled digitalisation as the key technologies of the first to third industrial revolutions respectively. (Schiele & Torn, 2020, p. 511) According to the study of Bapeer (2018, p. 47), in the industrial setting, the trend of industry 4.0 has been found to be the most important trend among procurement professionals. In the study of Bapeer (2018, p. 51) it is stated that: 'Technological innovation is still today a subject that keeps getting important and companies need to keep up with new developments.' Together with the fact that information systems can be considered as a strategic resource as they offer a competitive advantage to the organisation. (Gunasekaran & Sandhu, 2010, p. 772) Therefore, it can be argued that many organisations are more focused on improving and moving towards cyber-physical systems and autonomous processes to follow the trends and adapt to the market in order to have a competitive advantage over the competition. Thus, with this trend, an increase of available data would be expected.

The trend towards industry 4.0 will not only result in an increase of available data, but it would also be expected that the volume of data exchange with suppliers would increase in parallel. In the research of Veile, Schmidt, Müller, and Voigt (2020, p. 1), it is argued that industry 4.0 will not only affect the individual company but also have an influence on interconnected companies. Moreover, they argue that '(…) digital technologies act as integrative mechanisms, changing buyer-supplier relationships (BSRs) and creating new forms of cooperation.' (Veile et al., 2020, p. 1) The research of Barata, Rupino Da Cunha, and Stal (2018, p. 1) also notes the importance of industry 4.0 by highlighting that, in the future, there will be heavily relied on data acquisition and sharing throughout the supply chain. Therefore, in the next section the influence and importance of interorganisational systems in buyer-supplier relationships will be further discussed.

2.2.2 Adequate interorganisational systems crucial for information sharing in buyer-supplier relationship and source of competitive advantage

With an expected increase in volume and complexity of information exchange with suppliers, there will be more reliance on interorganisational systems, as '(…) information technologies have the opportunity to increase the volume and complexity of information that can be shared between partners.' (Bartelink, 2019, p. 31) Furthermore, '(…) it has become apparent that an important source of competitive advantage in the marketplace derives from investments in information technology.' (Weber & Kantamneni, 2002, p. 311) Thus, the importance of having reliable and good interorganisational information systems together with the suppliers is marked by the fact that it can be a source of competitive advantage, with the added argument by Radhakrishnan et al. (2018, p. 567) that information exchanges, through interorganisational systems, can bring about superior joint capabilities and thus be considered a source of competitive advantage.

Moreover, using various interorganisational information systems in collaboration with supply chain partners has proven beneficial. (Radhakrishnan et al., 2018, p. 558; Saeed et al., 2011, p. 7; Wang & Wei, 2007, p. 647) Examples of '(…) such benefits are, among other things, lesser inventory, better customer service, lower cost, shorter new product development time, better delivery performance, better flexibility, better product quality,

improved material flows, and ultimately superior financial results for the buyer firm.' (B. Flynn, Huo, & Zhao, 2010, p. 58; Frohlich & Westbrook, 2001, p. 195; Radhakrishnan et al., 2018, p. 558; Rosenzweig, Roth, & Dean Jr, 2003, p. 450; C. Y. Wong, Boon-Itt, & Wong, 2011, p. 605) However, 'obtaining competitive advantages from the application of information and communication technologies is not an easy task.' (Gunasekaran & Sandhu, 2010, p. 773) From a similar standpoint to that of Radhakrishnan et al. (2018), it is argued by Surati and Shah (2018, pp. 1758-1761) that 'having the correct information systems integrated across the supply chain is crucial for adequate information sharing.' Where 'the extent to which information is shared can create opportunities for firms to work collaboratively to remove supply chain inefficiencies, and thus have a significant direct impact on the relationship between buyer and the supplier.' (Hsu, Kannan, Tan, & Leong, 2008, p. 298) This ability to access important information may lead to benefits and provide opportunities. For example Hsu et al. (2008, p. 298) highlighted that when '(…) additional supply chain information becomes available, firms can take advantage of this increased visibility to modify existing actions or plan future operations.' Moreover, Spekman and Carraway (2006, p. 18) highlight that 'having a single information technology platform upon which collaboration is built can enhance inter-firm business processes.' Lastly, '(…) the types of the information that companies exchange via IOSs go far beyond the simple data exchange regarding the processed invoices, orders, and payments. Some companies, such as Wal-Mart, Chrysler, and Ford, force their suppliers to deploy an IOS for the better coordination and collaboration.' (Teryokhin & Hannås, 2018, pp. 7-8) More specifically 'Chrysler has forged new types of supplier relationships, resulting in an annual savings of more than $1.7 billion due to faster product cycles and reduced manufacturing costs.' (Son, Narasimhan, & Riggins, 2005, p. 322) With scholars believing that the establishment of the new trading partner relationships can be devoted to interorganisational systems, such as EDI. (Son et al., 2005, p. 322) Thus, with the aforementioned reasons, the conclusion is compounded that good interorganisational information systems are a source of competitive advantage.

However, the 'implementation and maintenance of interorganisational systems (IOS) require investments by all the participating firms' (Han et al., 2008, p. 181) and 'supplier

resource mobilisation is a core determinant of competitive advantage (…)'. (Ellegaard & Koch, 2012, p. 149) Therefore, in the next section it will be investigated what moves suppliers to make relation specific investments.

2.3 Antecedents of supplier relation specific interorganisational systems investments

2.3.1 Interorganisational systems investments are always relation specific and require asset acquisition and noncontractible investment from both exchange partners with economic safeguards as solution to possible opportunistic behaviour from either side

As mentioned in the previous section, an investment from both exchange partners would be required for the implementation of boundary spanning information systems. Interorganisational systems '(…) often requires significant investments in the personnel training' (Teryokhin & Hannås, 2018, p. 10), while often highly customised to the contractual parties as well. This results in investments that are specific to the exchange relationship, as the investments cannot be easily transferred to other exchange relationships. (Hannås, Buvik, & Andersen, 2015, p. 418). General relation specific investments (RSI) can be defined as '(…) non-recoverable expenditures a firm makes to support a specific interorganisational relationship with another firm.' (Wagner & Bode, 2014, p. 67; Williamson, 1985, p. na) 'Because implementation of IOS always involves some degree of customisation and integration with internal corporate systems such as enterprise resource planning systems, specificity of investments always arise even under complete standardisation of technologies.' (Han et al., 2008, p. 184) To be more specifically, Han et al. (2008, pp. 181-182) specify interorganisational systems investments in two types of investment, namely asset acquisition investment and noncontractible investment. Firstly, asset acquisition investments would include the cost occurred with obtaining the necessary hardware, software packages, network and communication technologies. Whereas, cost related to system and process redesign, systems integration, data conversion, data synchronisation and maintenance to ensure continued interoperability, are considered noncontractible investments. Both investments are needed for business to create value in interorganisational systems.

However, what needs to be kept in mind is that (…) when IOS are used to manage inter-firm dependencies, information systems become more specific and it is not easy to replicate them to new suppliers without substantial costs. (Hannås et al., 2015, p. 418) Moreover, with relation specific investments in general, both parties could position themselves in a riskier position '(…) by making investments, tangible and intangible, which cannot be readily redeployed from one supplier to another.' Thus, this could lead to buyers finding themselves in a vulnerable position due to the asymmetrical investments made and more reliant. It is proposed that economic safeguards could be put into place such as a contractual agreement of mutual sunk cost commitment. This would result that '(…) economic safeguarding mechanisms ensure substantial negative consequences if the exchange relationship is terminated; thereby reducing the exchange partner's incentives to behave opportunistically.' (Kang, Mahoney, & Tan, 2009, p. 119)

However, economic safeguards are only a solution to possible negative effects that arise from making relation specific investments, it does not explain why supply partners would make relation specific investments. One example for this drive would be that '(…) organisations that strive for increased competitiveness through IT investments are likely to commit resources in relation specific IT assets and improved access to strategic business information for selected business partners.' (Hannås et al., 2015, p. 418) Except for the competitive drive to make investments in relation specific interorganisational systems, in the next section there will be looked at which antecedents would as well move suppliers to make relation specific (IOS) investments.

2.3.2 Buyer investments signals commitment and together with relationship continuation, trust, communication and size most important factors for supplier's willingness to make relation specific interorganisational systems investments

It is now clear that both parties in an exchange relationship would have to invest if on where to implement interorganisational systems. When looking at a buyer-supplier relationship in which the buyer would like to implement interorganisational systems, it is necessary to know how to convince the supplier to make relation specific investments as well. Literature suggest that multiple antecedents exist for explaining the willingness of

suppliers to make relation specific investments. As argued above that interorganisational systems implementation is a relation specific investment, the factors found for influencing the willingness of suppliers to make relation specific investments would also hold for relation specific interorganisational systems investments.

Firstly, closely related to the social exchange theory, '(…) if the buying company does not make the first move, showing that the [buyer] is willing to invest in the relationship (through dedicated supplier resources or status), it is unlikely that the supplier will do that anyway. (Patrucco, Moretto, Luzzini, & Glas, 2020, p. 9) Thus, in terms of reciprocity, it could be said that what you give is what you get. Moreover, relation specific investment of a buyer in the relationship is also argued to lead to closer relationships, especially in the situation of thin supply markets. (Bensaou & Anderson, 1999, p. 460) Furthermore, in the study of Son et al. (2005, p. 347), in which the factors of EDI usage, an (somewhat outdated) interorganisational systems technology, were researched, it was found that offering buyer investments would be an effective factor to increase usage. Even though this study might be old, it was anticipated that the results would apply to future interorganisational systems technologies as well.

Secondly, in the research of Moon and Tikoo (2003, p. 61) it is indicated that '(…) manufacturers can enhance the supplier's willingness to invest in the manufacturer's line if they clearly communicate their intentions of maintaining a long-term relationship with the supplier.' This could thus similarly be expected for supplier's willingness to make relation specific investments in interorganisational systems. This reasoning is further supported by the research of Son et al. (2005, p. 347), in which it is argued that 'perceived uncertainty' in the relationship would negatively impact the suppliers cooperation, which could freely be interpreted as less willing to make relation specific investments. Thus, leading to believe that relationship continuation would be a contributing factor to the supplier's willingness to make relation specific investments.

Thirdly, for the supplier to make relation specific investments, trust in the relationship is important. An important reason is that '(…) trust moderates the association between power imbalance and the allocation of specific investments.' (Ebers & Semrau,

2015, p. 416) It would also moderate the need for economic safeguards needed, as ‘contractual holdup hazards will be mitigated (…)’ (Kang et al., 2009, p. 131). Partially the effect of trust on supplier’s willingness to make relation specific investments is build up from customer firm communication as argued by Zhang, Wu, and Henke Jr (2015, p. 86). Communication of the customer firm directly positively impacts supplier’s willingness to invest but does also through trust as more communication and information sharing would increase the trust in the relationship. This reasoning could be further substantiated by the study of Morgan and Hunt (1994, p. 22). In this study it was argued that communication is one of the factors building trust which would lead to relationship commitment and cooperation.

As fourth, specifically for interorganisational systems adoption and thus willingness to invest in it is also determined by the suppliers size as argued by Hughes, Golden, and Powell (2003, p. 277). In this paper it is explained that investments made by smaller organisations, such as SME’s, could have major repercussions, both positive and negative, and would therefore have less incentive to make investments.

Lastly, multiple smaller factors are named in literature for their supposed effects on supplier’s willingness to make relation specific investments. Ebers and Semrau (2015, p. 415) argue that resource dependence alongside trust would drive the allocation of specific investments. Based on the resource dependency theory it is argued that actors more dependent on the relationship are more eager to make relation specific investments. In the research of Kang et al. (2009, p. 127), multiple benefits of relation specific investment are mentioned as drivers for making the investments. It is argued ‘(…) that firms are more likely to make such investments [referring to ‘unilateral relationship-specific investments’] when the investment yields positive economic spill over values for other transactions with the same exchange partners (…)’. (Kang et al., 2009, p. 117)

In Table 1 an overview is given of the antecedents found in literature explaining the supplier’s willingness to make relationship specific investments.

Table 1: Theoretical factors explaining supplier's willingness to make relation specific investments

Antecedent	**Source**
Buyer commitment	(Patrucco et al., 2020, p. 9) & (Bensaou & Anderson, 1999, p. 460) & (Son et al., 2005, p. 347)
Perceived uncertainty (relationship continuation)	(Son et al., 2005, p. 347) & (Moon & Tikoo, 2003, p. 61)
Trust (trust worthiness)	(Ebers & Semrau, 2015, p. 415) & (Son et al., 2005, p. 347) & (Zhang et al., 2015, p. 91) & (Kang et al., 2009, p. 127) & (Steinfield, 2014, p. 2)
Communication	(Zhang et al., 2015, p. 91)
Company size	(Hughes et al., 2003, p. 277) & (Steinfield, 2014, p. 7)
Resource dependence (power)	(Ebers & Semrau, 2015, p. 415) & (Steinfield, 2014, p. 2)
Potential capabilities spill over	(Kang et al., 2009, p. 127)
Potential knowledge spill over	
Potential reputation spill over	

To conclude, in order to mobilise resources of the supplier multiple factors can determine the willingness. Starting with buyers to make relation specific investments which signals commitment to the supplier, which leads to suppliers being able to reciprocate. This is in line with what could be expected based the social exchange theory. In Figure 3 the factors named in Table 1 and explained above are visualised. In the next section the connection between the models of supplier satisfaction and supplier relation specific interorganisational systems investments will be discussed.

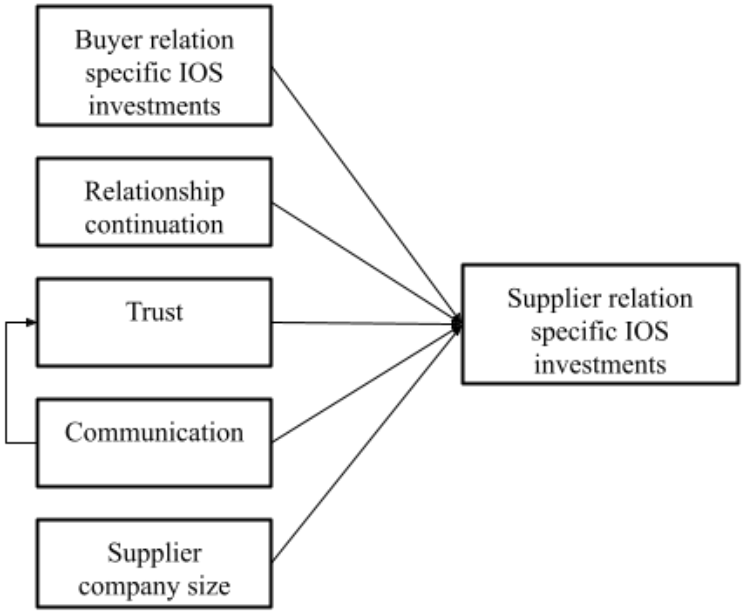

Figure 3: Antecedents explaining supplier's willingness to make relation specific investments

2.4 Exploring the link between interorganisational systems buyer and supplier investments and supplier satisfaction and its antecedents: Supplier satisfaction and supplier relation specific interorganisational systems investments connected through the same antecedents

While both concepts of supplier satisfaction and supplier relation specific interorganisational systems investments can be studied individually. A high correlation between the two concepts is believed to exist. Moreover, Essig and Amann (2009, p. 103) stated that 'analysing supplier satisfaction should take into account interaction processes within buyer–supplier relationships (e.g., exchange of information).' That a high correlation between the concepts exists is first supported by Hsu et al. (2008, p. 296), when they argued that; '(…) the integration of a firm's information/decision systems and business processes with those of supply chain partners, is an antecedent of collaborative buyer-supplier relationships, defined in terms of supply chain and relationship architecture.' Moreover, in the study of Rajaguru and Matanda (2013, p. 623), the effect of interorganisational systems integration on supply capabilities, under which relationship satisfaction, was studied. From this study became clear that interorganisational systems integration could have positive effects on relationship satisfaction. Thus, a relation exists from interorganisational systems to supplier satisfaction. Secondly, the reverse is happening as well. When supplier satisfaction is achieved, it could lead to beneficial treatment and allocation of resources.

(Ellegaard & Koch, 2012, p. 149; Steinle & Schiele, 2008, p. 11) Moreover, '(…) EDI integration of the parties' (Beering, 2014, p. 7) (where EDI is an interorganisational system) has been discussed as being a benefit of the preferred customer status which can only be obtained through supplier satisfaction. Thirdly, both supplier satisfaction and interorganisational systems implementation with key suppliers could be considered sources of competitive advantage as argued above. Lastly, Ilkay (2019, p. 25) studied more extensively how operative factors would positively influence supplier satisfaction and argued that one factor was interorganisational systems for improving the information flow and subsequently improving the process efficiency. (Spekman & Carraway, 2006, p. 15)

However, further connection between both concepts have been limited in literature. Even though both concepts together are not well documented [yet] in literature, individually they are more thoroughly. When theoretically investigating both the antecedents, an interconnectedness of the antecedents of supplier satisfaction and supplier's willingness to invest in relation specific interorganisational could already be observed either in a direct relationship if not in an indirect path. In the next section the interconnectedness will be further reasoned and on the basis of this reasoning hypotheses will be suggested. The hypotheses will later be used and tested with the obtained data from the survey.

2.5 Hypotheses regarding the antecedents of supplier satisfaction and supplier relation specific interorganisational systems investments

2.5.1 Hypothesised positive effect of the antecedents of supplier satisfaction, a replication of previous research

In the research of Vos et al. (2016, p. 4621) it is called upon researches to expand and improve the explanatory as well as predictive performance of satisfaction measures. Along with other researchers, supplier satisfaction was found to be a necessary condition for obtaining the preferred customer status.(Hüttinger et al., 2014, p. 697; Vos et al., 2016, p. 4613) Thus, it could be hypothesised that for this research similar findings would be expected. Moreover, to improve the predictive performance of satisfaction measures, the antecedent and their relative relationships used in the research model of Vos et al. (2016, p.

4620) will be replicated. This would give a basis of comparison and provide further insights in the explanatory weights of each antecedent respectively.

Furthermore, from the literature review it has become apparent that in the recent study of Vos et al. (2021) status has a significant effect on supplier satisfaction. Thus, a '(…) high-status buying firms can benefit from their rank through increased satisfaction and extract increased benefits from a supplier; potentially gaining more resources from the relationship.' (Vos et al., 2021, p. 10) Thus, in order to further consolidate this antecedent for supplier satisfaction research, the antecedent is added to the model. Overall, similar findings, to the previously mentioned studies, would be expected and therefore, the following hypotheses are set up:

H1a: *Growth opportunity has a positive effect on supplier satisfaction*
H1b: *Profitability has a positive effect on supplier satisfaction*
H1c: *Relational behaviour has a positive effect on supplier satisfaction*
H1d: *Operative excellence has a positive effect on supplier satisfaction*
H1e: I*nvolvement has a positive effect on relational behaviour*
H1f: *Reliability has a positive effect on relational behaviour*
H1g: *Support has a positive effect on relational behaviour*
H1h: *Contact accessibility has a positive effect on operative excellence*
H1i: Su*pplier satisfaction has a positive effect on preferred customer status*
H1j: *Buyer status has a positive effect on supplier satisfaction*
H1k: *Innovation potential has a positive effect on growth opportunity*
H1l: *Preferred customer status has a positive effect on preferential treatment*

2.5.2 Hypothesised positive relationship between supplier satisfaction and supplier relation specific interorganisational systems investments and a positive relationship between the preferred customer status and supplier relation specific interorganisational systems investments

As argued by Vos et al. (2016, p. 4613) 'Supplier satisfaction is a necessary condition for gaining and maintaining access to capable suppliers and their resources in this new competitive environment.' With satisfied suppliers giving more likely to give preferential

treatment, it could therefore be hypothesised that a positive effect between supplier satisfaction and supplier's willingness to make relation specific interorganisational systems investments. Thus, supplier's willingness to invest in relation specific interorganisational systems could be seen as a preferential treatment and the following hypotheses is set up:

H2a: *Supplier satisfaction has a positive effect on supplier relation specific* interorganisational systems *investments*

However, as argued by Hüttinger et al. (2012, p. 1200), it is possible that suppliers may have multiple satisfactory customers, but not all customers can receive preferential treatment. Therefore, the positive effect of supplier satisfaction on supplier relation specific interorganisational systems investments might be only a mediating effect. Moreover, as Beering (2014, p. 7) suggested is that interorganisational systems integration, and possibly thus the investments in, could be a benefit of the preferred customer status. Thus, the following could be hypothesised:

H2b: T*he preferred customer status has a positive effect on supplier relation specific* interorganisational systems *investments*

2.5.3 Hypothesised positive relationship of buyer relation specific interorganisational systems investments, relationship continuation and the antecedents of supplier satisfaction on supplier relation specific interorganisational systems investments

Firstly, in the research of Kang et al. (2009, p. 122) it was suggested that the greater the possible knowledge, economic and reputation spill over from making relation specific investments the more likely the supplier would make those investments. As 'growth opportunity refers to the suppliers' ability to grow together with the buying firm and to generate new potential business opportunities through the relationship' (Hüttinger et al., 2014, p. 703), a similarity can be noticed between the spill overs mentioned by Kang et al. (2009, p. 122) and the growth opportunity variable. Furthermore, suppliers would be more willing to invest in resources that are more difficult to move between suppliers, and thus take a risk, when a high profitability, high reward, is expected as well. Thus, growth opportunity

and future economic gains is detrimental for suppliers to make relation specific investments and a positive effect would be expected. Thus, the following hypothesis could be set up:

H3a: *Growth opportunity has a positive effect on supplier relation specific interorganisational systems investments*

H3b: *Profitability has a positive effect on supplier relation specific interorganisational systems investments*

Secondly, as found and mentioned in the literature review, in buyer-supplier relationships trust has often been found to be essential. This has been the conclusion of Bennett and Gabriel (2001, p. 425) as well when it comes to supplier relation specific investments. As relation specific investments are sunk costs it would be expected that suppliers are not willing to make the investment if there is no trust between the supply partners. However, in the operationalisation of relational behaviour trust is already partially included. Therefore, relational behaviour would be expected to have a positive effect on supplier relation specific interorganisational systems investments. Moreover, in the study of (Hannås et al., 2015, p. 432), it was found that interorganisational systems investments go '(…) far beyond the transactional and requires more comprehensive relational governance.' Thus, adding to the expectancy of a positive effect and the creation of the following hypothesis:

H3c: *Relational behaviour has a positive effect on supplier relation specific interorganisational systems investments*

Thirdly, operative excellence is expected to have a positive effect on the willingness of suppliers to make relation specific interorganisational systems investments. The reasoning for this is that in the literature review, communication was found to be one of the determinants of supplier's willingness to make relation specific investments. (Zhang et al., 2015, p. 91) Where communication and contact accessibility are part of the operationalisation of operative excellence. Thus, a direct positive effect would be expected.

H3d: *Operative excellence has a positive effect on supplier relation specific interorganisational systems investments*

In addition, as explained in the literature review, suppliers would be expected to act reciprocal when buyers would make the initial investment. (Bensaou & Anderson, 1999, p. 460; Patrucco et al., 2020, p. 9; Son et al., 2005, p. 347) Further, in the study of Patrucco et al. (2020, p. 8) it was found that buyer commitment, by for example making relation specific interorganisational systems investments, would positively influence supplier commitment as '(…) suppliers that perceive higher dependence from a buyer are likely increasing their commitment.' (Patrucco et al., 2020, p. 8) Empirical evidence of the study of Son et al. (2005, p. 347) also confirm that offering reciprocal investments is an effective strategy to increase interorganisational systems usage, which could be expected for investments as well. Therefore, buyer relation specific interorganisational systems investments signal commitment and would be expected to have a positive effect leading to the following hypothesis:

H3e: *Buyer relation specific* interorganisational systems *investments has a positive effect on supplier relation specific* interorganisational systems *investments*

Moreover, literature dictates that suppliers '(…) facing a higher level of this uncertainty [referring to primary uncertainty] from its current customer will not be motivated to cooperate with the customer, which in tum, contributes to less cooperative trading partnerships in the customer-supplier interfirm relationship.' (Son et al., 2005, p. 330) In the paper of Moon and Tikoo (2003, p. 61) it was found that '(…) supplier expectation of continuity of a relationship is a key characteristic of relational exchange.' Thus, clearly communicated intentions to maintain a long-term relationship would increase supplier's intention to make relationship specific investments. Therefore, the following hypothesis is set up:

H3f: *Relationship continuation has a positive effect on supplier relation specific interorganisational systems investments*

Lastly, the social exchange theory and the concept of reciprocity can be used to expect the previously proposed positive effects. The reason for this is that it would be expected that the higher the growth opportunity, profitability, relational behaviour, operative excellence and status, the higher the willingness of suppliers to make relation specific interorganisational systems investments, as they want to reciprocate.

H3g: *Buyer status has a positive effect on supplier relation specific interorganisational systems investments*

However, interrelationship between antecedents exist as well, as one might argue that higher relational behaviour might diminish the positive effect of growth opportunity on supplier relation specific interorganisational systems investments. Another interrelationship might be between growth opportunity and profitability. When profitability is low but growth opportunity high, a supplier may still make high relation specific interorganisational systems investments focussing on the future. Thus, a negative relationship mediating the effect of growth opportunity on the relationship between profitability and supplier relation specific interorganisational systems investments might exist. Multiple of these interrelationships might exist and will be tested in the model without adding them as hypotheses.

2.5.4 hypothesised positive relationship of buyer relation specific interorganisational systems investments and relationship continuation on supplier satisfaction

As defined earlier, supplier satisfaction is achieved if the quality of outcomes meets or exceeds the supplier's expectations. (Schiele et al., 2012, p. 1181) It could be argued that suppliers may expect buyers to make relation specific interorganisational systems investments. Moreover, when interorganisational systems are in place it can have the effect of increasing the coordination and therefore improving the process efficiency. (Ilkay, 2019, p. 25; Spekman & Carraway, 2006, p. 15) Thus, when buyers increase their relation specific interorganisational systems investments it could meet or exceed the supplier's expectation and thus result in satisfaction. Moreover, in the study of Yen and Hung (2017, p. 286), it was found that asset specific investments from the supplier would lead to an increase buyer satisfaction, trust and commitment to the buyer-supplier relationship. This could similarly be argued for supplier satisfaction and buyer specific investments. In a market with a low

number of capable suppliers, in which supplier satisfaction is more prominent, it can be argued that a similar reversed effect could be expected. Therefore, in this study it would be hypothesised that buyer relation specific interorganisational systems investments would increase supplier satisfaction.

Furthermore, a positive effect of relationship continuation on supplier satisfaction would be expected. In the study of Morgan and Hunt (1994, p. 22), the effects of relationship commitment and trust were measured on relationship cooperation. In the context of their study commitment was measured as commitment to continue the relationship. One could similarly argue that the positive effects would hold for supplier satisfaction as well. Consequently, based on the reasoning, the findings of the mentioned studies and the social exchange theory the following hypotheses are set up:

H4a: *Buyer relation specific interorganisational systems investment has a positive effect on supplier satisfaction*

H4b: R*elationship continuation has a positive effect on supplier satisfaction*

2.6 Adapted supplier satisfaction model from literature with the added hypothesised model of supplier relation specific interorganisational systems investments

Based on the, in the previous section, established hypotheses the conceptual research model visualised in Figure 4 has been established. Excluded are the antecedents: communication and trust of supplier's willingness to make relation specific investments. The reason for this is that, as argued above, the communication antecedent could partially explain the trust antecedent, where the communication antecedent for supplier's willingness to make relation specific interorganisational systems investments could be substituted by the operative excellence and relational behaviour antecedent of supplier satisfaction. Hence, due to the high congruence within the antecedents, the original supplier satisfaction antecedents are decided to be included in the testing of the model to be able to keep the base model intact and not make the survey too long. Therefore, in the proposed conceptual model below, communication and trust are not included as standalone antecedents. In the next section the selected method of data collection and the measurement operationalisation will be explained.

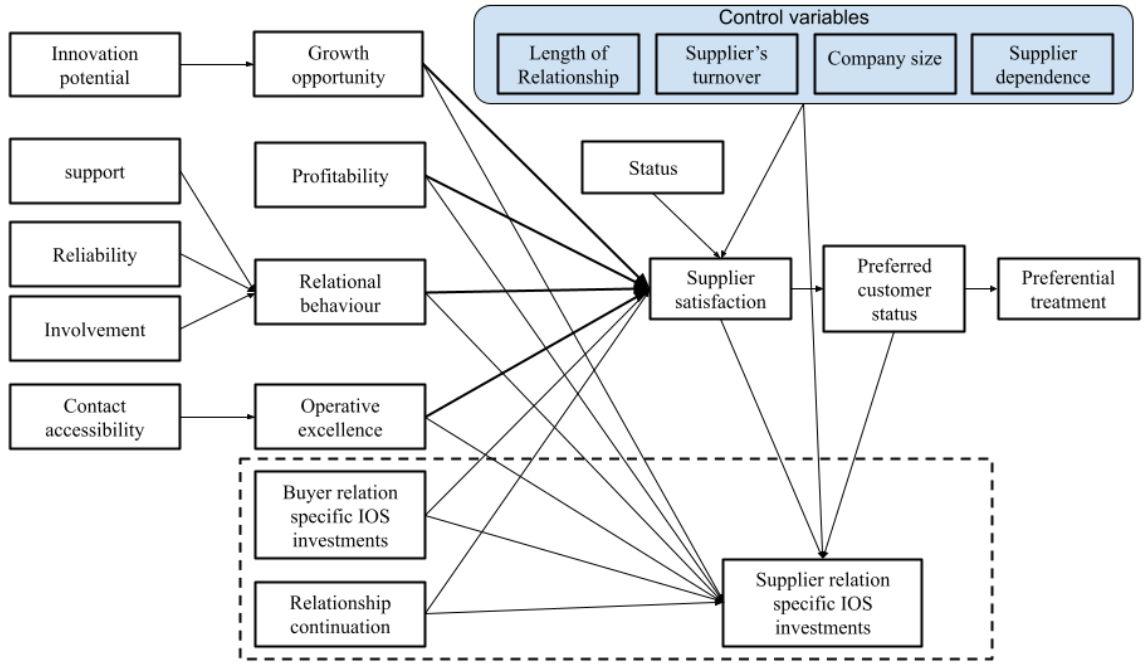

Figure 4: Proposed research model of supplier satisfaction with the introduction of buyer and supplier relation specific interorganisational systems investments (Vos et al., 2016, p. 4620). Source: own elaboration

3. Methodology: Quantitative hypothesis testing with a questionnaire and structural equation modelling

3.1 Quantitative questionnaire with suppliers of VDL ETG Almelo

3.1.1 Case company description: VDL Enabling Technology Group Almelo

VDL Enabling Technologies Group (ETG) Almelo, is a tier-one design and contract manufacturer with global operations and has around seven hundred employees.[1] VDL ETG Almelo is a leading contract manufacturer, with bleeding edge technology to create the latest possible products for their main customers [redacted due to confidentiality]. VDL only produces products in house which are on the brink of being technologically possible and outsource nearly everything else. That means that the most suppliers of VDL are high tech and deliver high quality with extreme precision.

VDL ETG Almelo is part of the larger VDL Group. The VDL Group was founded as a family run business and the business name originates from the family name 'Van Der Leegte'. Currently, the group is run by the third generation of the van der Leegte family and has grown to 15.000 employees divided over 105 companies active in 19 different countries. Each company has its own specialism and works closely together to gain mutual benefits. This resulted in a revenue of 4.7 billion euros [4.686 miljard euro] in the 2020 financial year for the entire VDL group.

In order to maintain the market position and improve the supply chain VDL has recently expanded and created a new warehouse. With the new storage machinery and the data these machines generate, VDL has added a layer of traceability, automation, and flexibility. With this VDL has set the first steps of adopting smart technologies belonging to industry 4.0 front-end technologies. (Frank et al., 2019, pp. 16-17)

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1 Retrieved from: https://www.vdletg.com/nl/het-bedrijf/locaties/almelo

To obtain market specific knowledge a case study can help to get a large number of respondents relatively easily. Moreover, doing a survey with a case study company will not only result in results that can be generalised for the market but also provide specific insights.

3.1.2 Questionnaire design: an addition to a state-of-the-art research model

In this paper it is chosen to use a questionnaire to collect data aiming to test and determine if the hypotheses are statistically significant. A quantitative over qualitative research methodology is chosen as this methodology will provide structured data to determine the significance and impact of each variable and thus the result could be more easily generalised. (Polit & Beck, 2010, p. 1452) Moreover, a questionnaire would more easily allow a higher number of respondents, thus adding to the generalisability of the results.

A limitation of the chosen research methods is that, unlike qualitative methods, a questionnaire does not allow the researcher to gain deeper insights than the predefined questions by means of follow up questions or allow broader answer possibilities. (Phellas, Bloch, & Seale, 2011, p. 182) Likewise, it is not possible for the researcher to explain questions to the respondents when using a questionnaire. (Phellas et al., 2011, p. 184) Thus, incomplete results could be gathered making analysis more difficult and less reliable. Lastly, using a questionnaire does not grant the researcher any control over who fills in the survey and respond rates tend to be low. These drawbacks make it difficult to understand the characteristics of those who have not filled in the survey and how their non-response could influence the findings. (Phellas et al., 2011, pp. 184-185) Moreover, ‘many social scientists use response rates to assess the quality of survey data because higher response rates tend to contain less nonresponse bias and thus produce more accurate estimates.’ (Fulton, 2018, p. 243)

The questionnaire used in this paper is based on multiple studies but mainly has two parts. The first main part is a replication of the studies of Hüttinger et al. (2014) and Vos et al. (2016) and contain the measurements of the antecedents support, reliability, contact accessibility, involvement, profitability, growth opportunity, relational behaviour, operative excellence, supplier satisfaction and preferred customer status. The second main part of the survey includes the model testing the willingness of suppliers to make relation specific

interorganisational systems investments. The measurement of the buyer relation specific interorganisational systems investment antecedent originates from the study of Teryokhin and Hannås (2018). In the study of Teryokhin and Hannås (2018) the survey was sent out to the buyers with questions about the suppliers. Thus, the reverse could be applied as well, and supplier specific investments could in this study be translated to buyer specific investments. According to Teryokhin and Hannås (2018, p. 13), 'the items of this construct attempt to cover the most important dimensions of the IT investments, such as personnel training, investments in software and hardware, the efforts undertaken by the [buyer] to integrate the IT systems of the buyer and the supplier.' For the supplier specific interorganisational systems investments the operationalisation of Hannås et al. (2015, p. 440) will be used. For this measurement the similar reasoning is used to change the questions from asking the buyer regarding the supplier and to ask the supplier directly. To measure the expectation of relationship continuity, the measurement of Glavee-Geo (2019, p. 6) is used in this survey. Furthermore, as found from recent supplier satisfaction research, it is seen that buyer status has a significant positive influence on supplier satisfaction. (Vos et al., 2021, p. 8) Therefore, the antecedent is incorporated in the survey as well using the exact measures as in the study of Vos et al. (2021).

All previously described dependent and independent variables are measured on a standard 5-point Likert scale ranging from 'strongly disagree' to 'strongly agree'. Multi-item scales were used for all concepts named above to increase information reliability and ensure an appropriate level of measurement validity. (Grapentine, 2001, p. 155) Furthermore, the last part of the survey will contain the control variables. The control variables included are the length of the relationship, the size of the company and the annual turnover, which were also controlled for in the study of Vos et al. (2016). Moreover, in the literature review of this paper it has been noted that dependence in a relationship could also influence supplier satisfaction in ways that would not be expected. Therefore, the supplier dependence is also controlled for in this study. For the control variables a slider or open question format is used. A complete overview of the operationalisation of the questions and their relative sources are given in annexure A.

3.1.3 Data sample description and data collection description

For the data collection the online survey tool Qualtrics[2] is used. The reason for the use of this software is that Qualtrics is ISO 27001 certified and has ease in use for the respondent and researcher. To gather data necessary to answer the research question, the questionnaire was sent to 396 product related suppliers of VDL. In annexure B a full overview of the respondent's and respondent's firm characteristics is provided. To ensure that the suppliers have sufficient knowledge about VDL to fill in the survey, a spending of at least 10.000 Euro in the last financial year with the approached suppliers was set as a selection of the sample group and thus resulted in a sample group size of 396. The largest portion of the sample group is located in the Netherlands, followed by Germany with thereafter a mix of a lot of other nationalities. For this reason, the survey was trilingual, namely English, Dutch and German.

In order to mitigate the nonresponse bias as much as possible and obtain the highest possible response rate, the questionnaires were all sent early in the morning, as research indicates that most respondents answer surveys between 8:00 and 11:00 o'clock in the morning. (A. Flynn, 2018, p. 19) To further increase the response rate it is recommended by the study of Saleh and Bista (2017, p. 71) to, among other things, sent multiple reminders, elicit the aid of authority, inform the respondents of the assumed time consumption and personalise the invitations. Therefore, based on the recommendations, firstly one reminder was sent during the two weeks the online questionnaire was open for responses. The reminder was sent after 7 days on a Monday morning. Secondly, the mail to the suppliers with the link to the Qualtrics questionnaire was sent from a VDL work mail address and in the text a reference was made to the involvement of the purchasing director to address the elicit aid of authority. Thirdly, a personalised invitation was made for all respondents with an indication of the time needed to complete the survey. Lastly, to avoid suppliers influencing the data negatively, by filling in incorrect data in an attempt to make a positive impression on the focal firm, all data is gathered anonymously, and this was communicated clearly in the invitation email and the survey itself.

[2] For more information see: https://www.qualtrics.com/

The questionnaire was open for responses for 2 weeks in which 113 responses were collected, resulting in a response rate of 28.5%. In Figure 5 an overview of the number of responses per day can be found. Noticeably is that most responses were filled in in the morning with a mean of 10:38 in the morning, thus confirming the findings of A. Flynn (2018, p. 19) When looked at the responses, the first day already resulted in a response rate of 7.3% (N=29). This might be a good indicator of the importance of VDL for the suppliers. The days after resulted in less new responses each day. After exactly one week, and shortly before sending out the reminder, a response rate of 15.9% (N=63) was obtained. After the reminder a sharp increase in responses was noted again with the day after the reminder resulting in even more responses. Afterwards a downwards trend of responses each day was noted similar to the first invitation. From the sharp increase after the reminder, it could be concluded that a reminder is an effective and easy way to increase the response rate of an online survey. From the total 113 responses, 28 contained missing values, did not have enough knowledge to fill in the questions (Knowledge <= 2) or did not consent to partake in the survey. Thus, leading to a final dataset consisting of 85 responses.

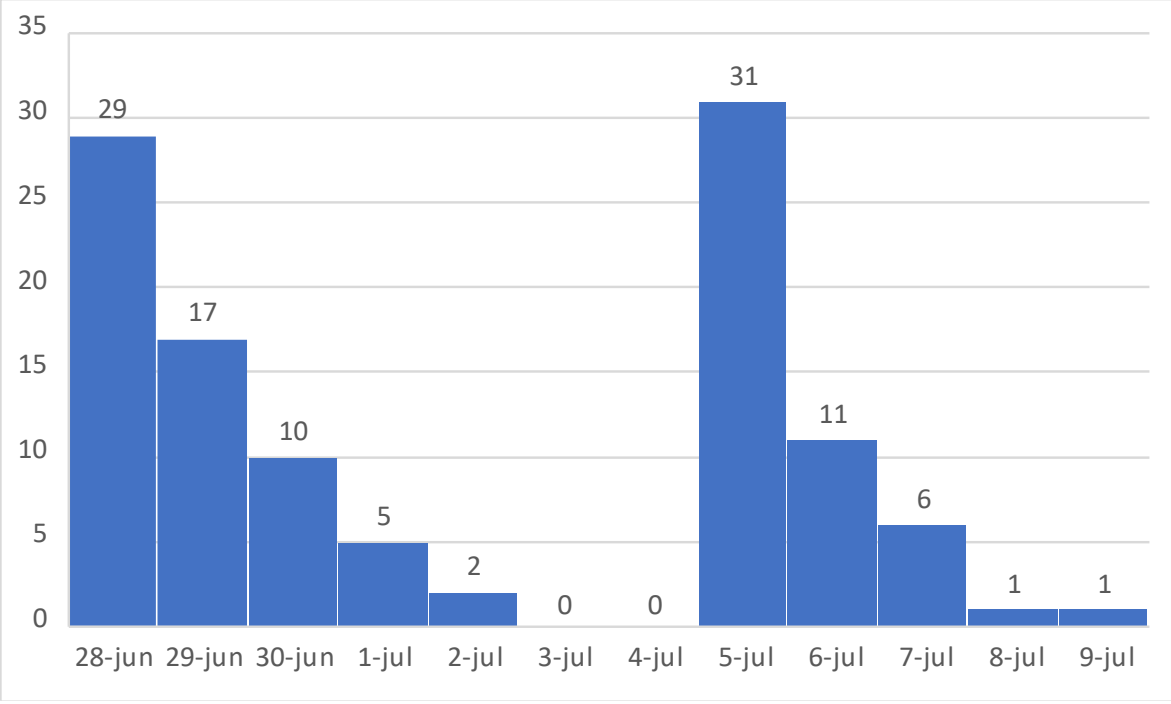

Figure 5: Histogram of survey responses per day

3.2 Partial least squares modelling with Smart PLS 3.0 to analyse the gathered data and IBM SPSS 24 for descriptive data analysis

In previously conducted empirical purchasing research the partial least squares (PLS) method has often been the method of choice to estimate the parameters of a model. 'PLS is a regression-based structural equation modelling technique that does not make assumptions about data distributions.' (Pulles et al., 2016, p. 136) Among others, Vos et al. (2016, p. 4616), Pulles et al. (2016, p. 136) and Hüttinger et al. (2014, p. 706) used the PLS method for their supplier satisfaction research. The reason to follow in their footsteps is that PLS can be used '(…) for predictive applications and theory building (exploratory analysis), although PLS can be also used for theory confirmation (…)'. (Barroso, Carrión, & Roldán, 2010, p. 430) Moreover, other methods such as covariance based structural equation modelling (CBSEM) would be more suited for confirmatory tested, however also requiring much stronger theory than PLS. (Barroso et al., 2010, p. 430) Furthermore, 'PLS-SEM achieves high levels of statistical power—in comparison to its covariance-based counterpart—even if the sample size is relatively small (i.e., 100 observations).' (Hair, Sarstedt, Ringle, & Mena, 2012, p. 420) Therefore, PLS would require a less developed theory, has the possibility to do prediction and theory development and does not require a large sample set for statistically significant results.

In order to generalise the sample results to the population, the path coefficients should be evaluated for significance from the inference statistics. (Henseler, Hubona, & Ray, 2016, p. 11) According to Henseler et al. (2016, p. 11), it would be recommended to use empirical bootstrap confidence intervals, with a recommended 4999 bootstrap samples, along with the one- and two-sided p-values. Thus, in this paper the software Smart PLS 3.0[3] (Ringle, Wende, & Becker, 2015) is used to analyse the data using partial least squares structural equation modelling. As Smart PLS 3.0 only offers limited possibilities regarding descriptive statistics, IBM SPSS 24 will be used for the descriptive statistics of the data gathered in this paper.

[3] For more information see: https://www.smartpls.com/

3.3 Assessment of the quality of the gathered data by checking the reliability, validity and model fit seem acceptable

The first assessment of the obtained data is done by doing a principal component analysis, which is executed using IBM SPSS 24. To extract the principal components and retain the unique variance of each measure (Petter, Straub, & Rai, 2007, p. 641), principal component analysis should be used first to access the factor loadings and control 'if all the indicators refer to a single latent concept (…)'(Trinchera & Russolillo, 2010, p. 4). First, in order to access if factor analysis is suitable, the Kaiser-Meyer-Olkin measure of sampling adequacy and the Bartlett's test of sphericity are carried out. In annexure C the results of the two tests can be found. The Kaiser-Meyer-Olkin test is higher than .7, where .5 is considered barely acceptable for data adequacy to use factor analysis. (Field, 2013, p. 957) Moreover, the Bartlett's test is significant with a P-value of lower than 0,001. Thus, it could be concluded that the dataset in this research is suitable for factor analysis and '(…) factor analysis should yield distinct and reliable factors.' (Field, 2013, p. 957)

In this study the default options for varimax rotations of principal component analysis are applied. Based on the study of Tabachnick and Fidell (2013, p. 654), the loadings of each indicator should be above .55 for 'good loadings' regardless of the sample size. After multiple iterations of removing indicators, a final result is obtained with nearly all indicators having a unique loading. After the removal of 14 indicators, except for 2 indicators of preferential treatment, all remaining indicators have an individual loading of .5 or higher. These findings can be seen in the rotated factor matrix in annexure D. From the rotated factor matrix, it can be seen however that not all indicators load to their own expected latent variables. For example, all indicators of growth possibility and innovation potential load high on the same latent variable. From the proposed model this could already have been expected as innovation potential is modelled as a sole explanatory variable of Growth Opportunity. In addition, the similarity in the operationalisation of both variables make that the effect of the indicators loading on the same latent variable could have been expected. Further, the indicators PC_PrefTreat_120_4 and PC_PrefTreat_120_5 do not have a unique loading on any of the extracted components. However, it was decided to not remove any of the two indicators as it led to the removal of multiple other indicators and would mean that

preferential treatment would only be measured using a sole indicator. Next, the communalities are investigated as they provide another factor for deciding to keep or remove an indicator. It is recommended to design '(…) studies in which variables are selected to provide as high a level of communalities as possible (a mean level of at least .7) with a small range of variation (…).' (MacCallum, Widaman, Preacher, & Hong, 2001, p. 620; Tabachnick & Fidell, 2013, p. 618) In annexure E the table with the communalities is illustrated. All communalities are above .7 and on average the communalities are .836. Thus, all the high communalities indicate that the extracted components represent the variables well.

Next, partial least squares structural equation modelling in Smart PLS 3.0 with 4999-sample bootstrap was conducted to further test the quality, reliability and validity of the data. First, validation of the measurement model is a requirement before assessing the structural model. For assessing the reflective measurement model there will be looked at the; indicator reliability, construct reliability, convergent and discriminant validity. In Table 2 an overview is given of all reliability and validity measures for each latent variable and the highest variance inflation factor (VIF) of the inner model is reported. First, 'the size of the outer loading is also commonly called indicator reliability. At a minimum, the outer loadings of all indicators should be statistically significant. Because a significant outer loading could still be fairly weak, a common rule of thumb is that the standardised outer loadings should be 0.708 or higher.' (Hair Jr, Hult, Ringle, & Sarstedt, 2017, p. 137) From Table 2 it can be seen that except for SIOSINV_Buyer_Investments_101_1 and S_OperativeExc_40_4 all indicators have an outer loading higher than .708 and therefore can be seen as reliable. Because the two deviant indicators have an outer loading near the threshold and further reliability and validity measures are fulfilled, the outer loadings of these indicators will be ignored.

To test internal consistency reliability, also called construct reliability, Cronbach's α and composite reliability measures are used. Due to Cronbach's alpha's limitations, it is technically more appropriate to apply a different measure of internal consistency reliability, which is referred to as composite reliability. (Hair Jr et al., 2017, p. 136) While values between than .6 and .7 are regarded as acceptable for construct reliability values between .7

and .9 are considered satisfactory. (Hair Jr et al., 2017, p. 136; Henseler et al., 2016, p. 12) As seen in Table 2, all values of the composite reliability and Cronbach's α measure are above .7.

To evaluate the validity of the constructs, convergent validity will be tested using the average variance extracted (AVE) measure and discriminant validity will be tested with the Hetrotrait-Monotrait ratio (HTMT). For the constructs to be convergent valid the AVE should be higher than .5, as this would be a clear sign of unidimensionality. (Henseler et al., 2016, p. 12) When looking at Table 2 it can be seen that all values are higher than .5 and thus convergent validity is acquired. Regarding the HTMT ratio, in order to have discriminant validity the HTMT should be significantly lower than 1. (Henseler et al., 2016, p. 11) Thus, the bootstrapped confidence interval should not contain 1. In annexure F the table with the HTMT ratio's is displayed. As all upper confidence interval are lower than 1, it can be concluded that all HTMT values are significantly different then 1. Therefore, discriminant validity has been established. In annexure G the bivariate correlation matrix can be found. All variables included in the study are significantly different from 1. After assessment of the measurement model, the structural model should be assessed. In the last column of Table 2 the highest variance inflation factors connected to the relative variable are reported. For the determination that no multicollinearity exists the recommended threshold is that the VIF should be lower than 5. (Hair, Ringle, & Sarstedt, 2011, p. 145; Hair Jr et al., 2017, p. 217) The highest value is 2,050 and thus no multicollinearity issues exist.

As a final step of the quality assessment, a look needs to be taken at the model fit. With the model fit it is assessed if the difference between estimated and empirical correlation matrix is so small that it can be purely attributed to sampling error. The standardised root mean square residual (SRMR) is used to determine if this is the case. The found SRMR of this research is .074 and lower than the recommended threshold of .08. (Henseler et al., 2016, p. 12) Thus, model fit is established.

In the next section the structural model will be further assessed and the full results of the 4999-bootstrapped model are reported with the relevant path coefficients and R-squared values.

Table 2: Validity and reliability numbers of the measurement model

	Indicator	Outer Loading	Composite reliability	Cronbach's α	AVE	Highest VIF
Status	ADD_Status_156_1	0,840	0,947	0,926	0,819	1,697
	ADD_Status_156_2	0,882				
	ADD_Status_156_3	0,946				
	ADD_Status_156_4	0,945				
Buyer Relation Specific IOS Investments	BIOSINV_Buyer_Investments_101_1	0,884	0,892	0,843	0,686	1,588
	BIOSINV_Buyer_Investments_101_2	0,850				
	BIOSINV_Buyer_Investments_101_3	0,798				
	BIOSINV_Buyer_Investments_101_4	0,757				
Dependence	MDU_Dependence_200_4	0,878	0,919	0,884	0,743	1,470
	MDU_Dependence_200_5	0,819				
	MDU_Dependence_200_8	0,906				
	MDU_Dependence_200_9	0,837				
Preferred Customer Status	PC_PC_110_1	0,870	0,944	0,926	0,773	1,921
	PC_PC_110_2	0,893				
	PC_PC_110_3	0,915				
	PC_PC_110_4	0,866				
	PC_PC_110_5	0,848				
Preferential treatment	PC_PrefTreat_120_4	0,936	0,932	0,855	0,874	1,000
	PC_PrefTreat_120_5	0,933				
Relationship continuation	RC_Relation_continuation_102_1	0,908	0,946	0,914	0,855	1,757
	RC_Relation_continuation_102_3	0,951				
	RC_Relation_continuation_102_4	0,912				
Supplier Relation Specific IOS Investments	SIOSINV_Buyer_Investments_101_1	0,665	0,925	0,889	0,763	2,050
	SIOSINV_Buyer_Investments_101_2	0,864				
	SIOSINV_Buyer_Investments_101_3	0,960				
	SIOSINV_Buyer_Investments_101_4	0,960				
Contact accessibility	S_Available_10_1	0,931	0,926	0,841	0,863	1,000
	S_Available_10_2	0,925				
Reliability	S_Collaboration_50_3	0,946	0,948	0,891	0,902	1,042
	S_Collaboration_50_4	0,953				
Growth opportunity	S_Growth_20_2	0,805	0,913	0,856	0,781	1,601
	S_Growth_20_3	0,916				
	S_Growth_20_4	0,923				
	S_InnovationPot_30_1	0,947	0,950	0,920	0,864	1,000

Innovation potential	S_InnovationPot_30_2	0,944				
	S_InnovationPot_30_3	0,895				
Involvement	S_Involvement_70_2	0,936	0,918	0,838	0,852	1,298
	S_Involvement_70_3	0,901				
Operative excellence	S_OperativeExc_40_1	0,856	0,886	0,826	0,666	1,357
	S_OperativeExc_40_2	0,860				
	S_OperativeExc_40_3	0,865				
	S_OperativeExc_40_4	0,655				
Profitability	S_Profitability_90_3	0,836	0,905	0,864	0,708	1,459
	S_Profitability_90_4	0,821				
	S_Profitability_90_5	0,826				
	S_Profitability_90_6	0,874				
Relational Behaviour	S_RelBehavior_80_1	0,857	0,871	0,777	0,696	1,697
	S_RelBehavior_80_5	0,874				
	S_RelBehavior_80_6	0,762				
Supplier Satisfaction	S_Satisfaction_100_3	0,867	0,901	0,835	0,754	2,050
	S_Satisfaction_100_4	0,873				
	S_Satisfaction_100_5	0,862				
Support	S_Support_60_2	0,967	0,965	0,928	0,933	1,346
	S_Support_60_3	0,965				

4. Results: Testing the hypotheses with partial least squares structural equation modelling

4.1 Descriptive statistics of dependent variables supplier satisfaction and supplier relation specific interorganisational systems investments.

Using IBM SPSS 24 the descriptive statistics of the indicators of the dependent variables of this research are reported in Table 3 and Table 4. Noticeable is that the mean of supplier satisfaction is around 4 of all 85 valid responses and that it only has a relatively small standard deviation. Moreover, the minimum filled in for the supplier satisfaction questions is either 2 or 3. Thus, no one of the respondents is fully dissatisfied in the relationship with VDL. For the dependent variable of supplier relation specific interorganisational systems investments, the mean is more centred and a more preferrable wider spread in the answers is observed, as the full range is used, and a larger standard deviation is observed. A full overview of the mean, median and range of each indicator is given in annexure H.

Table 3: Descriptive statistics of dependent variable supplier satisfaction

	S_Satisfaction _100_1	S_Satisfaction _100_2	S_Satisfaction _100_3	S_Satisfaction _100_4	S_Satisfaction _100_5
Mean	4,07	4,02	4,15	4,33	4,40
Median	4,00	4,00	4,00	4,00	4,00
Std. Deviation	0,686	0,672	0,681	0,625	0,561
Range	3	3	3	2	2
Minimum	2	2	2	3	3
Maximum	5	5	5	5	5
N = 85 (0 missing)					

Table 4: Descriptive statistics of dependent variable Supplier relation specific interorganisational systems investments

	SIOSINV_101_1	SIOSINV_101_2	SIOSINV_101_3	SIOSINV_101_4
Mean	2,48	2,56	2,36	2,40
Median	3,00	3,00	2,00	2,00
Std. Deviation	0,908	0,993	0,924	0,978
Range	4	4	4	4
Minimum	1	1	1	1
Maximum	5	5	5	5
N = 85 (0 missing)				

4.2 Relational behaviour and relationship continuation largest effect on the dependent variables and rejection of most proposed hypothesis

As mentioned above in the methodology, Smart PLS 3.0 is used to conduct partial least squares structural equation modelling to test the proposed model of this research. As all hypothesis of this research indicate only a positive effect, in the calculation a one-tailed test with a significance level of .05 was used. To test the stability of the of the results, the model was calculated multiple times. The model was tested with all control variables, limited number of control variables, no control variables, with all indicators included, with only indicators from the factor analysis included and multiple possible moderation and quadratic effects were tested. In annexure I the final model created with SmartPLS 3 can be found. What must be noted is that multiple control variables that were included in the survey were not included in the model. First, the control variable turnover had a large number of missing data. This meant that with mean replacement the data would differ too much, whereas with listwise deletion too many cases would be deleted to have a representative sample. Secondly, the control variable length of the relationship had a high mean with most values, except for a few outliers, close to the mean. Therefore, the model did not control for length of relationship. Lastly, the control variable organisational size was not significant when added to the model but influenced the model drastically in an unexpected and unexplainable manner. Therefore, the choice was made to not control for this variable as well. The main results of the model come in three-fold, namely; the R-squared of the endogenous latent variables, the effect size or Cohen's F-squared and the significance and size of the path coefficients. A total overview is visualised in a model in Figure 6.

Firstly, R-squared is 'the coefficient of determination (i.e., the proportion of data explained by the model).' (Field, 2013, p. 46) Even though R-squared is typically used as a criterion of predictive power, the R-squared should only be used as an informative value with regard to in-sample prediction. (Sarstedt, Ringle, Henseler, & Hair, 2014, p. 156) For the model created in this paper all endogenous variables have a significant R-squared, meaning that they are significantly different from 0 and have P-values smaller than .05. In Table 5 the R-squared statistics are reported. When interpreting the values, it can be said that 51% of the variance of supplier satisfaction is explained by the independent variables used

to explain it. According to Hair et al. (2011, p. 145), a R-squared of .511 would be described as a moderate to substantial coefficient of determination. Following the reasoning of Hair et al. (2011, p. 145), this would mean that operative excellence, preferred customer status and relationship continuation would be weak and Growth Opportunity preferential treatment, relational behaviour and supplier relation specific interorganisational systems investments would be weak to moderate.

Table 5: R-squared statistics of the endogenous latent variables

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	P Values
Growth Opportunity	0,364	0,371	0,081	0,000
Operative Excellence	0,250	0,264	0,094	0,004
Preferential Treatment	0,366	0,374	0,093	0,000
Preferred customer status	0,240	0,251	0,082	0,002
Relational Behaviour	0,353	0,380	0,090	0,000
Relationship Continuation	0,118	0,136	0,050	0,009
Supplier Relation Specific Interorganisational Systems Investments	0,437	0,516	0,080	0,000
Supplier Satisfaction	0,511	0,563	0,064	0,000

Next, the path coefficients are investigated for their value and significance. In Table 6 the specific path with their respective standardised beta coefficients, p-value, effect size (f^2) and linked hypothesis are given. As significance level of 5% (one-sided) is used in this paper, all p-values should be smaller than .05 for their path coefficients and attached hypothesis to be significantly different from zero. Meaning that when a p-value is larger than .05 there is not enough evidence to accept the null-hypothesis and these results cannot be generalised to the whole population. Moreover, the effect size is reported as well, 'guidelines for assessing $f2$ are that values of 0.02, 0.15, and 0.35, respectively, represent small, medium, and large effects.' (Cohen, 1988, p. na; Hair Jr et al., 2017, p. 211)

Regarding the first set of hypotheses for confirming the paths of the model presented in the study of Vos et al. (2016), 8 of the 12 hypothesis (H1a – H1l) are statistically significant. With profitability (H1b: $\beta = .166$; $p = .049$; $f^2 = .040$) and relational behaviour (H1c: $\beta = .223$; $p = .005$; $f^2 = .074$) the only statistically significant direct antecedents on supplier satisfaction. Where growth opportunity (H1a: $\beta = .013$; $p = .453$; $f^2 = .000$),

operative excellence (H1d: β = .079; p = .204; f^2 = .010) and status (H1j: β = .110; p = .164; f^2 = .015) are found not to be significant in this sample. The 2nd tier antecedent reliability (H1f: β = .405; p < .001; f^2 = .243) and support (H1g: β = .255; p = .010; f^2 = .075) explaining relational behaviour are found significant, with no empirical evidence for involvement (H1e: β = .176; p = .072; f^2 = .038). Further, contact accessibility (H1h: β = .500; p < .001; f^2 = .333), has been found to have a significant effect on operative excellence and innovation potential (H1k: β = .603; p < .001; f^2 = .572) significant on growth opportunity. Lastly, supplier satisfaction (H1i: β = .490; p < .001; f^2 = .316) has found to have a significant influence on the preferred customer status (H1l: β = .605; p < .001; f^2 = .577) which in turn has a significant positive effect on preferential treatment. Thus, the results of Vos et al. (2016) can partially be confirmed with the findings of this research and will be further discussed in the next section.

Regarding the second hypotheses set of the dependent variables of the supplier satisfaction model used as independent variables for explaining supplier relation specific interorganisational systems investments, both supplier satisfaction (H2a: β = -0.234; p = .072; f^2 = .033) and the preferred customer status (H2b: β = .054; p = .351; f^2 = .002) have been found insignificant. Interestingly supplier satisfaction has a negative beta coefficient and is almost significant and would be acceptable if a 10% significance level was assumed.

The third set of hypotheses was investigating the antecedents explaining supplier relation specific interorganisational systems investments and testing if the antecedents of the supplier satisfaction model would have a positive effect as well. Against expectations only growth opportunity (H3a: β = .263; p = .013; f^2 = .079) and buyer relation specific interorganisational systems investments (H3e: β = .226; p = .021; f^2 = .057) were found to have a significant effect and thus these hypotheses are supported. Meaning that not enough evidence was found for the positive significant effect of profitability (H3b: β = .017; p = .425; f^2 = .001), relational behaviour (H3c: β = -0.101; p = .192; f^2 = .012), operative excellence (H3d: β = .135; p = .075; f^2 = .031), relationship continuation (H3f: β = .158; p = .118; f^2 = .022) and status (H3g: β = .036; p = .357; f^2 = .002) on supplier relation specific interorganisational systems investments. With noticeably the control variable supplier dependence (CV1: β = .248; p = .014; f^2 = .078) found significant on influencing supplier

relation specific interorganisational systems investments, with no significant impact on supplier satisfaction. (CV2: β = -0.112; p = .129*; f^2 = .020)

The last two hypothesis were set up to test the influence of the new variables for explaining supplier relation specific interorganisational systems investments on supplier satisfaction. Remarkably, relationship continuation (H4b: β = .497; p < .001; f^2 = .402) has the largest beta coefficient explaining supplier satisfaction in this model. With buyer relation specific interorganisational systems investments (H4a: β = -0.034; p = .357; f^2 = .002) having no significant effect.

Lastly, as mentioned before to extract the most significant effects and have stable results multiple iterations of the model were tested. This led to the finding of the significant positive effect of relational behaviour on relationship continuation (β = .336; p < .001; f^2 = .112) and the quadratic function between them (β = .130; p = .007; f^2 = .066). Further, no significant mediating, quadratic or interaction among variables has been found.

To further investigate the variables influencing supplier relation specific interorganisational systems investments a reduced model will be analysed and tested as well in the next section.

Table 6: Structural model path coefficients (standardised beta coefficients), p-values and effect size

Hypothesis	Path	Path Coefficients	P Values	f^2
H1a	Growth Opportunity -> Supplier Satisfaction	0,013	0,453	0,000
H1b	Profitability -> Supplier Satisfaction	0,166	0,049	0,040
H1c	Relational Behaviour -> Supplier Satisfaction	0,223	0,005	0,074
H1d	Operative Excellence -> Supplier Satisfaction	0,079	0,204	0,010
H1e	Involvement -> Relational Behaviour	0,176	0,072	0,038
H1f	Reliability -> Relational Behaviour	0,405	0,000	0,243
H1g	Support -> Relational Behaviour	0,255	0,010	0,075
H1h	Contact Accessibility -> Operative Excellence	0,500	0,000	0,333
H1i	Supplier Satisfaction -> Preferred customer status	0,490	0,000	0,316
H1j	Status -> Supplier Satisfaction	0,110	0,164	0,015
H1k	Innovation potential -> Growth Opportunity	0,603	0,000	0,572
H1l	Preferred customer status -> Preferential Treatment	0,605	0,000	0,577
H2a	Supplier Satisfaction -> SIOSINV	-0,234	0,072	0,033
H2b	Preferred customer status -> SIOSINV	0,054	0,351	0,002

H3a	**Growth Opportunity -> SIOSINV**	0,263	0,013	0,079
H3b	**Profitability -> SIOSINV**	0,017	0,425	0,001
H3c	**Relational Behaviour -> SIOSINV**	-0,101	0,192	0,012
H3d	**Operative Excellence -> SIOSINV**	0,135	0,075	0,031
H3e	**BIOSINV -> SIOSINV**	0,226	0,021	0,057
H3f	**Relationship Continuation -> SIOSINV**	0,158	0,118	0,022
H3g	**Status -> SIOSINV**	0,036	0,357	0,002
H4a	**BIOSINV -> Supplier Satisfaction**	-0,034	0,357	0,002
H4b	**Relationship Continuation -> Supplier Satisfaction**	0,497	0,000	0,402
CV1	**CV_Supplier Dependence -> SIOSINV**	0,248	0,014	0,078
CV2	**CV_Supplier Dependence -> Supplier Satisfaction**	-0,112	0,129	0,020
	Relational Behaviour -> Relationship Continuation	0,336	0,000	0,112
	Quadratic effect Relational Behaviour | Relationship Continuation -> Relationship Continuation	0,130	0,007	0,066

Notes: CV = Control Variable, BIOSINV = Buyer relation specific interorganisational systems investments, SIOSINV = Supplier relation specific interorganisational systems investments

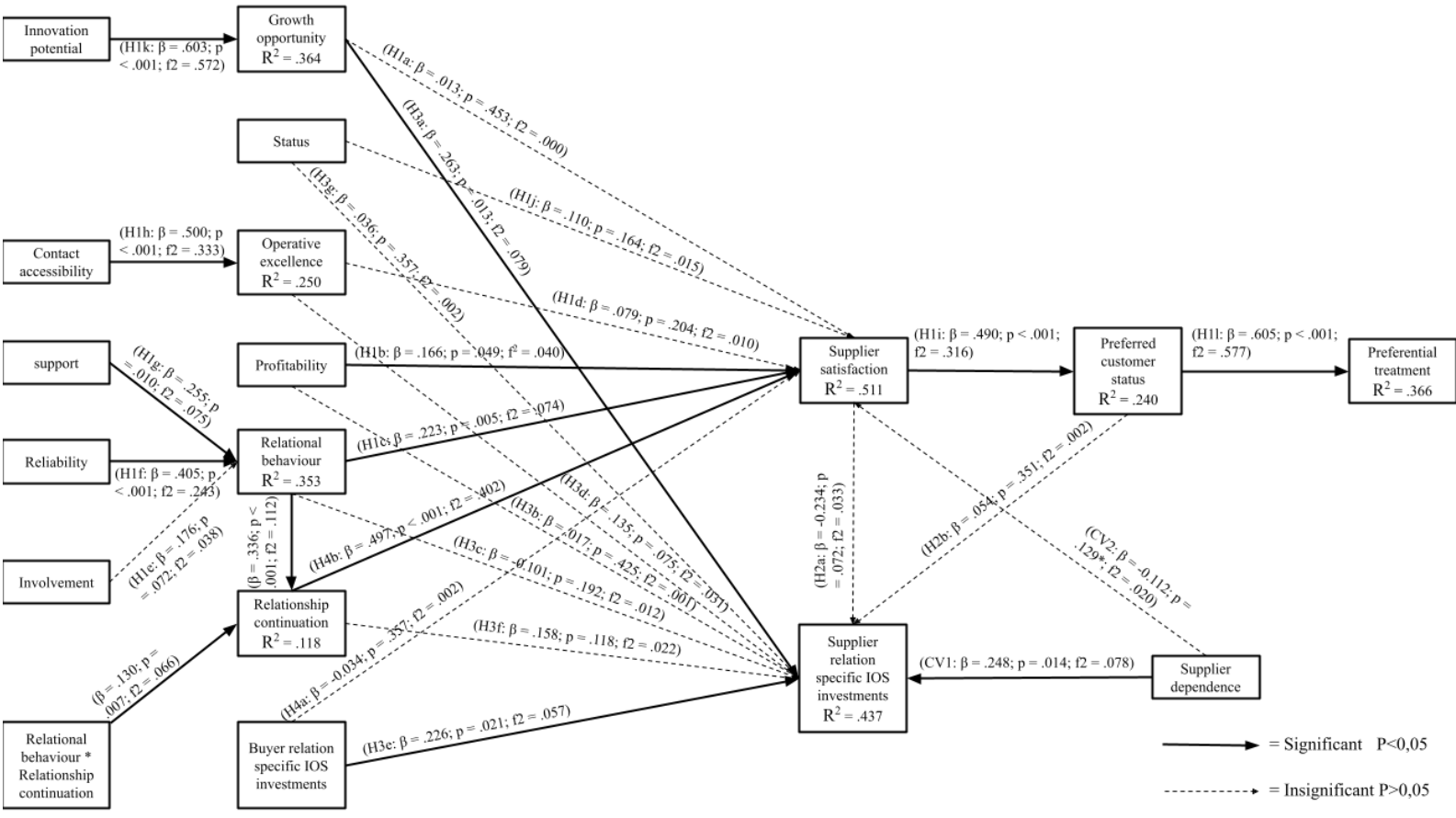

Figure 6:Calculated main model using structural equation modelling (N=85)

4.3 Same significant variables hold in reduced additional model explaining supplier relation specific interorganisational systems investments

To further affirm the reliability of the findings in the main model a reduced model is created as in the larger model suppression effects could be at play and influence the effect sizes. For the calculation of the reduced model the larger dataset is used, in which respondents who indicated to have not enough knowledge included to increase the generalisability. The reduced model contains the variables growth opportunity, relationship continuation, relational behaviour, buyer relation specific interorganisational systems investments and supplier dependence as independent variables. As these were the main factors found in literature influencing supplier relation specific investments. Therefore, logically supplier relation specific interorganisational systems investments is used as the dependent variable. In Figure 7 this model is visualised with the relative path coefficients, p-values, f-squared values, and the coefficient of determination of the dependent variable. It can be seen that the same variables supplier dependence ($\beta = .333$; $p < .001$; $f2 = .151$), growth opportunity (H3a: $\beta = .282$; $p = .002$; $f2 = .096$) and buyer relation specific interorganisational systems investments (H3e: $\beta = .242$; $p = .007$; $f2 = .074$) are found to be significantly and positively influencing suppliers' willingness to make relation specific interorganisational systems investments. Thus, there is enough evidence to reject the null hypothesis of hypotheses H3a and H3e and say that in the population there is a positive effect of growth opportunity, buyer relation specific interorganisational systems investments and supplier dependence on supplier relation specific interorganisational systems investments. Relationship continuation (H3f: $\beta = .036$; $p = .344$; $f2 = .002$) and relational behaviour (H3c: $\beta = -0.058$; $p = .341$; $f2 = .005$) are not found to be significantly influencing the dependent variable. When looking at the R-squared (0,399), it can be seen that it is relatively similar to the R-squared found in the larger model and thus the removal of the insignificant variables did not have a large influence on the explained variance. Lastly, due to the operationalisation of the multi-item scales of buyer and supplier relation specific interorganisational systems investments it is also important to determine if there is a significant difference between the in-sample groups of respondents who are using some sort of interorganisational systems at this moment and the respondents who do not. After Multi-Group Analysis (MGA) in Smart PLS no significant differences between the path coefficients has been found.

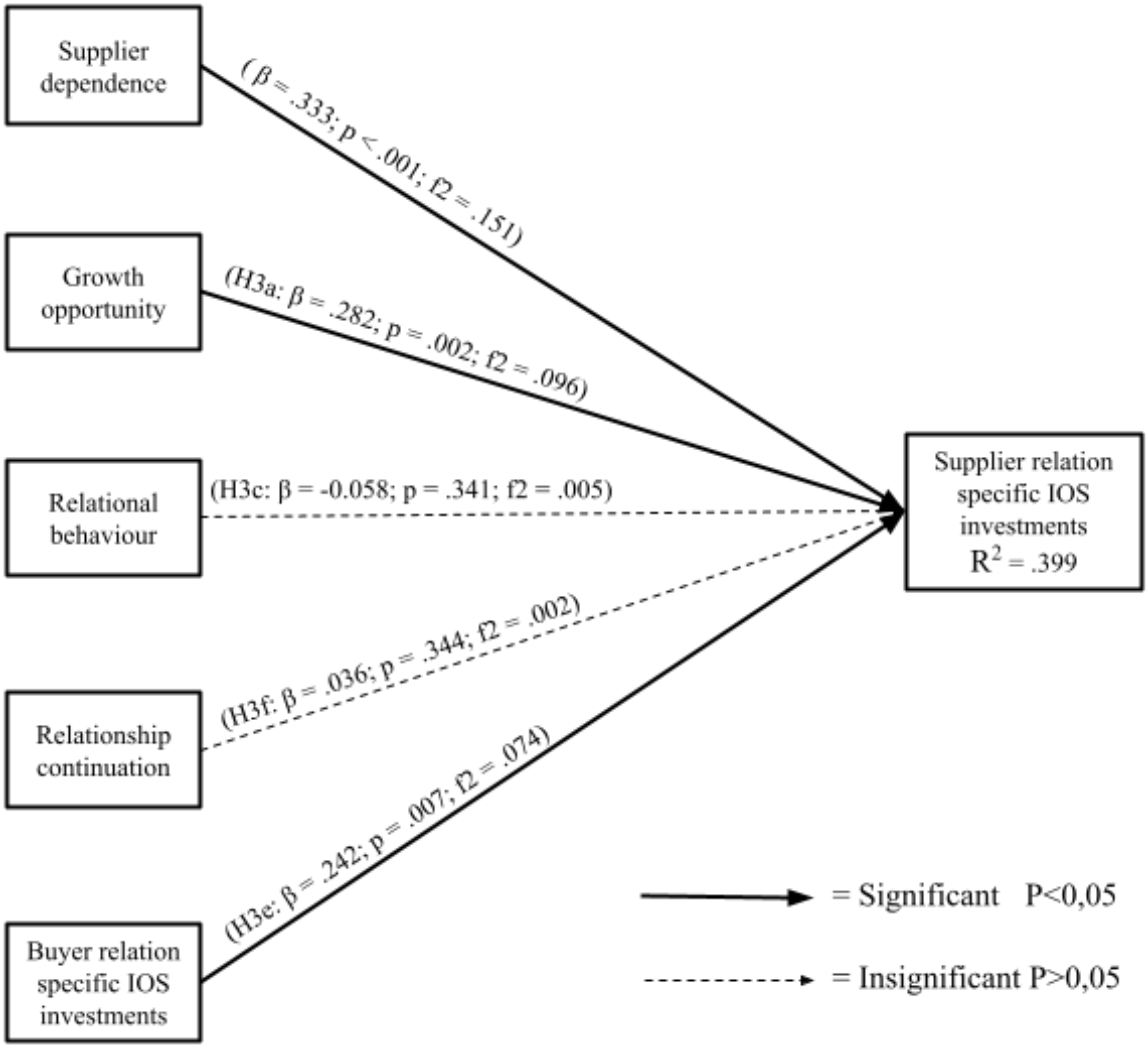

Figure 7: Supplier relation specific interorganisational systems investments reduced model (N=96)

5. Discussion of the obtained results, conclusion with theoretical and practical attributions, the limitations and ending with suggestions for future research

5.1 Discussion of the results by answering the research questions

5.1.1 Partial confirmation of the current supplier satisfaction model and answering the first research question

The first research question was as follows: '*To what extent can the findings of this case study affirm the existing antecedents of supplier satisfaction?*'. From the literature review the state of the art model was set up with the model of Vos et al. (2016) as a basis and extended with the status antecedent and the control variable supplier dependence. When comparing the results of Vos et al. (2016) and this research, only profitability and relational behaviour significantly influence supplier satisfaction. Further, the significant positive effects of supplier satisfaction on the preferred customer status and preferred customer status on preferential treatment are in congruence with the study of Vos et al. (2016) as well. When looking at this sample however, growth opportunity, operative excellence and status, do not seem to satisfy or dissatisfy suppliers as no significant effect was found. An explanation for this finding might be that profitability, relationship continuation and relational behaviour are the essence of supplier satisfaction and for the suppliers these antecedents overshadow the other antecedents.

Moreover, in congruence with the model of Vos et al. (2016) as well is that, except for involvement, all second tier antecedents explaining growth opportunity, relational behaviour and operative excellence respectively have a significant positive effect. No significant effect of involvement is surprising as VDL is high technology contract manufacturer producing products with the latest technology. Thus, a positive significant effect would have been expected. A possible justification for why involvement is not significant is for a similar reason. The variable was measured by asking questions related to new product development. As VDL is a contract manufacturer[4] and not an OEM, new product development could be not applicable. Furthermore, no significant effect was found

[4] VDL could be considered an OEM for the projects it has. However, this part is estimated less than [redacted] of the total turnover.

between status and supplier satisfaction. This could be due to the confidentiality requirements of some trade partners making status less of a transferrable asset to suppliers. Therefore, the argument of Vos et al. (2021, p. 5) that 'in relation to this notion of status being a transferable asset, it can be expected that being in a relationship with a high-status firm could have a positive impact on the status of the supplier over time' is not applicable. Moreover, could this mean that lower status firms do not necessarily have more difficulty with obtaining a preferred customer status. Subsequently, dependence did not have a significant influence as well. A possible explanation could be that, in the cases where a supplier is dependent on VDL, VDL in turn is dependent on that supplier.

Lastly, the coefficient of determination, or the R-squared, of the latent endogenous variable supplier satisfaction is relatively low in comparison to the study of Vos et al. (2016). While more independent variables are introduced in this study a higher explained variance would be expected. A possible explanation would be the difference in business environment in which the data was collected, as an underlying factor might be unknown specific to this business environment and explaining supplier satisfaction.

5.1.2 The influence of the added antecedents, relationship continuation and buyer relation specific interorganisational systems investments, on the current supplier satisfaction model and pointing towards an increased importance of relational behaviour

Besides testing the current antecedents on supplier satisfaction to answer the first research question, the effects of the added antecedents were tested on supplier satisfaction. As based on social exchange theory reasoning and some academic articles a positive relationship would have been expected. This significant positive influence was found for relationship continuation. However, relationship continuation has the largest beta coefficient and would be the largest determinant in this industry for supplier satisfaction. Due to the high speciality of the products created by VDL, the relationship continuation would be understandable to be the most important for suppliers as the items cannot easily be sold to other buyers and in this business high dependence on each other is found. Next, buyer relation specific interorganisational systems investments was also investigated for a significant effect on supplier satisfaction. While specific investments from the buyer side

would be expected to lead to supplier satisfaction (Yen & Hung, 2017, p. 286), this was not found. As supplier satisfaction is described as meeting or exceeding the expectations (Pulles et al., 2016, p. 131; Schiele et al., 2012, p. 1181), an investment from the buyer side may be expected and would not necessarily lead to supplier satisfaction.

Lastly, a significant positive quadratic effect and relationship between relational behaviour and relationship continuation was found. This means that the higher the relational behaviour of VDL the increasingly higher the relationship continuation is which in turn increases supplier satisfaction.

5.1.3 Growth opportunity, buyer relation specific interorganisational systems investments and supplier dependence as positive antecedents for supplier relation specific interorganisational systems investments

The second research question was as follows: '*What are the antecedents to motivating a supplier to make relation specific interorganisational systems investments and what is the effect of supplier satisfaction?'*. The results show that growth opportunity, buyer relation specific interorganisational systems investments and supplier dependence have a positive significant effect on supplier relation specific interorganisational systems investments. Moreover, when looking at the reduced model in Figure 7, the same variables are found to be significant as the variables in the main model in Figure 6. Thus, further confirming the positive effects of growth opportunity, buyer relation specific interorganisational systems investments and dependency on motivating suppliers to make relation specific interorganisational systems investments. However, no other significant relationships have been found influencing supplier relation specific interorganisational systems investments. In the literature review multiple factors had been identified to theoretically influence suppliers to make relation specific investments. A possible explanation for the insignificance might be the low variance in the indicators measuring the variables relationship continuation and relational behaviour, as they both have a high median and low variance. Possibly meaning that suppliers are already expecting to continue the relationship and are already content with the relational behaviour, thus not influencing the decision to make relation specific interorganisational systems investments. Therefore, with

the findings of this paper do not support the conclusions made by Hannås et al. (2015, p. 432), who found that interorganisational systems investments go '(…) far beyond the transactional and requires more comprehensive relational governance.' As relational behaviour was not found significant in this research. However, it has to be noted that buyer relation specific interorganisational systems investments can be considered relational governance as the investments are specific to the relationship with the supplier and thus not fully refute the findings of Hannås et al. (2015, p. 432). While this paper does partially confirm the research of Kang et al. (2009, p. 132) and their conclusion that '(…) unilateral relationship specific investments can be understood not simply as acts of myopia on the part of managers taking such actions, but rather as rational strategic moves for maximising their economic value', as growth opportunity is found significant. However, on the contrary to the findings of Kang et al. (2009, p. 132), profitability is not significant on explaining the dependent variable. An explanation could be that as suppliers see investments as a possibility to grow in the future and not to maintain the current relationship or increase the current profitability, growth potential is significant and profitability not.

To answer the second part of the second research question hypotheses H2a and H2b were set up. From the results it was found that no significant effect exists. However, noticeably is that the relation of supplier satisfaction on supplier relation specific investments is almost significant with a p-value of .072 and a negative beta coefficient. As the measurement of supplier relation specific interorganisational systems investments was measured using questions related to the current or past investments, the results might point towards dissatisfaction within the current interorganisational systems in use with suppliers.

5.2 Implications for theory: relationship continuation possible crucial for obtaining supplier satisfaction and the insights into motivating supplier to make relation specific interorganisational systems investments

As a conclusion to this study, multiple theoretical implications can be extracted. Firstly, it is the first time that supplier satisfaction theory is connected with the supplier relation specific interorganisational systems investments concept. Even though no evidence was found for supplier satisfaction or the preferred customer status to have a significant

influence on the willingness of suppliers to make relation specific interorganisational systems investments, it was found that relationship continuation has a large effect on supplier satisfaction contributing to the understanding of the supplier satisfaction model. In comparison to other studies, the beta coefficient of the significant variables is relatively small, whereas relationship continuation has a large beta coefficient. Thus, contributing that relationship continuation might be crucial for satisfying suppliers and obtaining a preferred customer status. Further, in the paper of Vos et al. (2016, p. 4621) the notion is given that relational factors explain similar or even greater variance than economic factors. The model found in this study supports this notion and brings an increased attendance to relational behaviour as it quadratically influences relationship continuation which has a large effect explaining supplier satisfaction. Moreover, this study extended the state-of-the-art supplier satisfaction model and gave insights into a new business environment, which could be used in future studies as comparison. Further, where previous studies confirmed the positive significant addition of status as an antecedent to supplier satisfaction (Avci, 2021, p. 68; Vos et al., 2021, p. 9), the results of this study do not confirm these previous findings. Furthermore, this paper highlights the increasing importance of interorganisational systems in supply systems and that there might be a competitive advantage to be found, especially in the near future with the increasing presence of new information created with industry 4.0. Lastly, this study gives insight into the importance of growth opportunity, buyer relation specific interorganisational systems investments and supplier dependence for motivating suppliers to make relation specific interorganisational systems investments and it could be concluded that organisations that do not have a high growth might find it harder to implement interorganisational systems together with suppliers that are also not dependent, even though a supplier might be satisfied, and a preferred customer status might even have been obtained.

5.3 Practical recommendations for VDL and implications for practice

From the results multiple actionable recommendations can be extracted. Firstly, the results of supplier satisfaction survey can be compared with previously conducted supplier satisfaction research, which give a good indication of where VDL excels and lacks behind. Additionally, the relatively high response rate of 28.5% and the fact that the mean supplier satisfaction is a 4 from a maximum of 5 give a good indication that in general suppliers are

already very satisfied. Therefore, it is not necessarily important to know what to improve but to know that relationship continuation, profitability and relational behaviour should be kept high in order to keep the satisfaction level of suppliers this high. Thus, as the largest effects on supplier satisfaction are relationship continuation and relational behaviour it would therefore be recommended to receive the most attention of the buying firm to achieve satisfied suppliers which in turn leads to a preferred customer status and preferential treatment. For example, it would be advisable to ensure suppliers with automatic relationship continuation to increase relationship continuation expectancy of suppliers, which in turn increases their satisfaction with all benefits connected.

Moreover, besides questions related to the model created and presented in the results, in the survey included was a question to obtain the frequencies of the currently used interorganisational systems, the results are reported in Table 7 below. Noticeably, 43% of the respondents indicate that no interorganisational information systems are currently used. Thus, unstructured data via phone or mail contact is shared with these suppliers. This insight may be used to fortify the argument of better interorganisational information systems implementation and would also lead to supplier's willingness to make relational specific interorganisational systems investments.

Table 7: Frequency table of interorganisational systems currently in use with suppliers

Web EDI (Electronic Data Exchange)	API (Application) EDI	Open standard EDI (XML or JSON)	Supply relationship management (SRM)	Electronic procurement systems	ERP software with portal login	We do not use interorganisational information systems and use **email** or the **phone** to transfer data with our supply partner	Other
14	4	5	8	22	34	42	7
13%	4%	5%	7%	20%	31%	43%	6%
N = 96 (17 missing)							
Note: Multiple answers were allowed							

Furthermore, for suppliers to make relation specific interorganisational systems investments dependence, growth opportunity and buyer relation specific interorganisational systems investments were the identified positive effects. Thus, it is recommended for VDL to make the commitment and make relation specific investments in interorganisational

systems first which would lead to a higher change of suppliers to follow. Moreover, as argued by Steinfield (2014, p. 14), investment from the supplier should not be mandated as this could generate resistance and negatively impact the strategic benefits by limiting the possible efficiencies.

Lastly, based on these results, in order to maximise the willingness of suppliers to make relation specific interorganisational systems investments, it would be recommended for VDL to provide and signal growth opportunities and own investments towards suppliers and create/signal dependency of the supplier. Regarding creating and signalling growth opportunity, the buying firm can signal growth from specific investment projects which will lead to growth or signal growth which is perpetuating from the customers and the market in general. Thus, suppliers should be made aware how the market is progressing and possibly growing or how the company will be growing due to investment projects at hand. Moreover, own relation specific investments should be made in order to mobilise suppliers' investments. Further, it is also important that these investments do not go unnoticed and are signalled towards the selected suppliers, as the suppliers should be aware that relation specific investments are made from the buyer's side. Lastly, a dependency of the supplier should be created and signalled. To conclude, VDL could use the survey questions of these variables as a checklist or for a brainstorming session to design targeted communication tactic towards selected suppliers. In annexure J such suggested checklist is created as take-off point in order to create improvement points. Thus, by filling in the questions for selected suppliers they want to have an interorganisational system with, action points to improve growth opportunity for the supplier and provide own investment can be created to maximise the willingness of suppliers to make investments. Thus, this suggestion could especially help buyers that have difficulty with convincing suppliers to invest together in interorganisational systems to improve the actual variables and the perception of the supplier.

5.4 Limitations and future research recommendations: generalisability issues due to sample size and methodology used, with future research opportunities in the extension of the model

As with every paper there are some limitations that should be kept in mind when interpreting the conclusions made from this paper. However, some of the limitations also offer opportunities for future research.

Firstly, while a response rate of 28.5% is very respectable of an online survey with an email invitation, a sample size of 85 is relatively small especially for the calculation of the complicated model used in this paper. Therefore, results may be less reliable, not be fully generalisable to the market and only used as an indication. Additionally, an important limitation of this study can be seen in annexure H, in the descriptive statistics of the indicators. Most noticeably, the median of the indicators that measure the latent variable relationship continuation are all 5 or 4 and the indicators measuring the indicators of status and relational behaviour all have a median of 4. Paired with a low standard deviation, this indicates that most respondents filled in the same value and due to the lack of variance possible effects that might exist were not highlighted by the SmartPLS programme. Thus, future research should test if the results of this study will hold and possibly use a larger sample size which could lead to a higher variance in the data and thus possible discovering more significant effects.

Moreover, added to the lesser generalisability is the chosen research method. Due to the choice of a case study all respondents were suppliers of the case firm VDL. Therefore, the results may only apply to the business environment of VDL. Additionally, the business environment in which the data was collected is highly specialised and from the respondents' characteristics it can be seen that long term relationships are common, thus possibly explaining the insignificance of relational factors in this sample and adding to the lesser generalisability. Moreover, another limitation due to the choice of methods is that the data is prone to the common method bias (MacKenzie & Podsakoff, 2012, p. 542) and the non-response bias. (Armstrong & Overton, 1977, p. 396) Meaning some of the variance in the data can be attributed to the method used and the data may be not representative if the '(…)

persons who respond differ substantially from those who do not (…)'(Armstrong & Overton, 1977, p. 396). Especially the nonresponse bias could have a significant effect on the results of this paper, as none of the respondents were fully dissatisfied with the relationship. The reason for the lower response could have been attributed to the time of data collection as the data was gathered in a period just before the summer holidays. This resulted in the first invitation getting 12 automatic out-of-office replies and the reminder getting 19. Moreover, the time required to fill in the complete survey was most likely another attributing factor for the lower response rate. (Hair Jr et al., 2017, p. 162; Saleh & Bista, 2017, p. 65)

Secondly, an important to highlight limitation is that 42 of the respondents do not use interorganisational information systems. Due to the operationalisation of the variables of buyer and supplier relation specific interorganisational systems investments the high number of respondents not using interorganisational information systems currently could have negatively impacted both variables. Therefore, it would be recommended for future researchers to find or create a new operationalisation of the variables to measure the willingness instead of the current and past usage. Additionally, the information systems at the case company still belong to the third industrial revolution and therefore it would be nice for future research to look at technologies of the fourth industrial revolution that are boundary spanning, if the effects proposed of this model will still hold up.

Further, in the remarks of respondents it was mentioned twice that the respondent did not have enough knowledge to answer the question regarding buyer relation specific interorganisational systems investments. This could mean other would not have enough knowledge either and made estimated guesses. Thus, the results of this variable may not represent the truth. Therefore, for further research it would be recommended to either obtain this data from the case company, with its own limitations of being biased, or measured more extensively with more indicators and possible examples.

Furthermore, in the exploratory studies of Woolderink (2020) and (Moonen, 2020) to name a few, it was found that the antecedents of supplier satisfaction may be influenced by the external factor of the global Covid-19 pandemic. During the time of data collection of this study the world was still coping with, the Covid-19 pandemic and thus results found

in this study may differ from future studies as this study did not control for this possible interaction. Moreover, the control variable turnover was not usable due to high number of missing values and was therefore not controlled for as well.

Another limitation that should be mentioned is that all latent endogenous variables in the model introduced in this paper have a relatively low R-squared. This means there is still variance in the dependent variables that is not explained by the independent variables in this study. Therefore, as recommended by earlier research of Vos et al. (2016, p. 4621), it would be recommended for future researchers to find new independent variables for both supplier satisfaction and supplier relation specific investments. Added to this argument is that future research could look into the reason why the R-squared of supplier satisfaction in this study is lower than other studies and if the business environment is the missing factor is business environment dependent.

Next, it was found that relationship continuation has a relatively high beta coefficient in comparison to variables explaining supplier satisfaction in other studies, with a decreased beta coefficient for previously tested variables. Therefore, more research into the precise impact of this variable on supplier satisfaction would be recommended and to test if this factor is business environment specific.

Further, a standard 5-point Likert scale was used for the measurement of the multi scale items as this was used in previous literature as well and allows to compare reliability coefficients. However, it might have been a limiting factor as can be seen with the dependent variable supplier satisfaction. For most items measuring this variable only 3 or 4 of the 5 answer possibilities were used. Thus, for example a 7-point Likert scale could have increased the range and possible increased significance levels. Moreover, a 7-point Likert scale is recommended with the use of multipoint scales. (Lewis, 1993, p. 391) Further, the limited range use of the supplier satisfaction variable could also be attributed to suppliers trying to make a good impression even though the results are anonymous. Thus, negatively impacting the data and generalisability of the results. Thus, for future research it might be advisable to use a 7-point scale.

Lastly, as suggested by the literature and from practice is that more data is generated, used and shared. Thus, the importance of interorganisational systems and how to convince suppliers to make relation specific investments will grow. This paper has set grounds for variables that motivate suppliers to make relational specific interorganisational systems investments however, how to signal suppliers your intentions to invest in the relationship, that a growth opportunity is existent or how to create dependency is not explained. Therefore, more research in the topic of would be needed and the suggested practical checklist should be tested or an improve programme would be beneficial to be made.

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7. Appendix

Annexure A: Variable codebook

Contact accessibility*		
There is a contact person within VDL ETG Almelo who…		
(Vos et al., 2016)	S_Available_10_1	…coordinates the relevant relationship activities within and outside of VDL ETG Almelo.
	S_Available_10_2	…is, for the employees of our company, the one to contact in regard to partner-specific questions.
	S_Available_10_3	…informs employees within VDL ETG Almelo firm about the needs of our company.
Growth Opportunity for your company*		
The relationship with VDL ETG Almelo …		
(Vos et al., 2016)	S_Growth_20_1	... provides us with a dominant market position in our sales area.
	S_Growth_20_2	... is very important for us with respect to growth rates.
	S_Growth_20_3	... enables us to attract other customers.
	S_Growth_20_4	... enables us to exploit new market opportunities.
Innovation potential *		
(Vos et al., 2016)	S_InnovationPot_30_1	In collaborating with VDL ETG Almelo, our firm developed a very high number of new products/services.
	S_InnovationPot_30_2	In collaborating with VDL ETG Almelo, our firm was able to bring to market a very high number of new products/services.
	S_InnovationPot_30_3	The speed with which new products/services are developed and brought to market with VDL ETG Almelo is very high.
Customer's operative excellence*		
VDL ETG Almelo…		
(Vos et al., 2016)	S_OperativeExc_40_1	... has always exact and in time forecasts about future demand.
	S_OperativeExc_40_2	... provides us with forecasts our firm can rely and plan on.
	S_OperativeExc_40_3	... has for our firm simple and transparent internal processes.
	S_OperativeExc_40_4	... supports short decision-making processes.
Customer's reliability*		
In working with our company, VDL ETG Almelo…		
(Vos et al., 2016)	S_Collaboration_50_1	... provided a completely truthful picture when negotiating.
	S_Collaboration_50_2	... always negotiated from a good faith bargaining perspective.

	S_Collaboration_50_3	... never breached formal or informal agreements to benefit themselves.
	S_Collaboration_50_4	... never altered facts in order to meet its own goals and objectives.
Support*		
VDL ETG Almelo …		
(Vos et al., 2016)	S_Support_60_1	... collaborates with us to improve our manufacturing processes or services.
	S_Support_60_2	... gives us (technological) advice (e.g. on materials, software, way of working).
	S_Support_60_3	... gives us quality related advice (e.g. on the use of inspection equipment, quality assurance procedures, service evaluation).
Involvement*		
(Vos et al., 2016)	S_Involvement_70_2	We are early involved in the new product/service development process of VDL ETG Almelo.
	S_Involvement_70_3	We are very active in the new product development process of VDL ETG Almelo.
	S_Involvement_70_4	Communication with our firm about quality considerations and design changes is very close.
Customer's relational behaviour*		
(Vos et al., 2016)	S_RelBehavior_80_1	Problems that arise in the course of the relationship are treated by VDL ETG Almelo as joint rather than individual responsibilities.
	S_RelBehavior_80_2	VDL ETG Almelo is committed to improvements that may benefit our relationship as a whole and not only themselves.
	S_RelBehavior_80_3	We each benefit and earn in proportion to the efforts we put in.
	S_RelBehavior_80_4	Our firm usually gets at least a fair share of the rewards and cost savings from our relationship with VDL ETG Almelo.
	S_RelBehavior_80_5	VDL ETG Almelo would willingly make adjustments to help us out if special problems/needs arise.
	S_RelBehavior_80_6	VDL ETG Almelo is flexible when dealing with our firm.
Profitability*		
The relationship with VDL ETG Almelo …		
(Vos et al., 2016)	S_Profitability_90_2	... provides us with large sales volumes.
	S_Profitability_90_3	... helps us to achieve good profits.
	S_Profitability_90_4	... allows us to gain high margins.
	S_Profitability_90_5	... has a positive influence on the profitability of our firm.

	S_Profitability_90_6	... enables us to raise our profitability together.
Customer Satisfaction*		
(Vos et al., 2016)	S_Satisfaction_100_1	Our firm is very satisfied with the overall relationship to VDL ETG Almelo.
	S_Satisfaction_100_2	On the whole, our firm is completely happy with VDL ETG Almelo.
	S_Satisfaction_100_3	Generally, our firm is very pleased to have VDL ETG Almelo as our business partner.
	S_Satisfaction_100_4	If we had to do it all over again, we would still choose to use VDL ETG Almelo.
	S_Satisfaction_100_5	Our firm does not regret the decision to do business with VDL ETG Almelo.
Preferred Customer Status*		
Compared to other customers in our firm´s customer base…		
(Vos et al., 2016)	PC_PC_110_1	… VDL ETG Almelo is our preferred customer.
	PC_PC_110_2	... we care more for VDL ETG Almelo.
	PC_PC_110_3	... VDL ETG Almelo receives preferential treatment.
	PC_PC_110_4	… we go out on a limb for VDL ETG Almelo.
	PC_PC_110_5	... our firm's employees prefer collaborating with VDL ETG Almelo to collaborating with other customers.
Preferential treatment*		
Our firm…		
(Vos et al., 2016)	PC_PrefTreat_120_1	... allocates our best employees (e.g. most experienced, trained, intelligent) to the relationship with VDL ETG Almelo.
	PC_PrefTreat_120_3	… allocates more financial resources (e.g. capital, cash) to the relationship with VDL ETG Almelo.
	PC_PrefTreat_120_4	… grants VDL ETG Almelo the best utilisation of our physical resources (e.g. equipment capacity, scarce materials).
	PC_PrefTreat_120_5	… shares more of our capabilities (e.g. skills, know-how, expertise) with VDL ETG Almelo.
Status*		
According to us …		
(Torelli, Leslie, Stoner, & Puente, 2014; Vos et al., 2021)	ADD_Status_156_1	… VDL ETG Almelo has a high-status
	ADD_Status_156_2	… VDL ETG Almelo is admired by others
	ADD_Status_156_3	… VDL ETG Almelo has a high prestige
	ADD_Status_156_4	… VDL ETG Almelo is highly regarded by others

Dependence*		
(Caniëls et al., 2018; Frazier, 1983; Hibbard, Kumar, & Stern, 2001; Kaiser, Widjaja, & Buxmann, 2013; Kumar, Scheer, & Steenkamp, 1998)	MDU_Dependence_200_4	In this relationship, our company is very dependent on VDL ETG Almelo.
	MDU_Dependence_200_5	To achieve our business goals, our company has to maintain this relationship to the customer.
	MDU_Dependence_200_7	If the relationship were to end earlier than contracted, our business goals would be negatively affected.
	MDU_Dependence_200_8	Our company would face great challenges if the customer did not continue the contractual relationship.
	MDU_Dependence_200_9	We have no good alternatives to VDL ETG Almelo.
Supplier relation specific IOS investments*		
(Teryokhin & Hannås, 2018)	SIOSINV_Supplier_Investments_100_1	Our personnel undergo extensive training on the IT system in use with VDL ETG Almelo
	SIOSINV_Supplier_Investments_100_2	We made extensive adjustments to our IT system
	SIOSINV_Supplier_Investments_100_3	We made extensive investments to integrate our IT system with the IT systems of VDL ETG Almelo
	SIOSINV_Supplier_Investments_100_4	We invested in extensive technical know-how in order to service and operate the IT system in use with VDL ETG Almelo
Buyer relation specific IOS investments*		
(Hannås et al., 2015	BIOSINV_Buyer_Investments_101_1	VDL ETG Almelo extensively invests in their own IT competence.
	BIOSINV_Buyer_Investments_101_2	VDL ETG Almelo invests extensively in IT systems by our standards and requirements.
	BIOSINV_Buyer_Investments_101_3	VDL ETG Almelo invests substantially in training of their employers.
	BIOSINV_Buyer_Investments_101_4	VDL ETG Almelo made extensive investments to integrate their IT systems with our IT systems.
Relationship continuation*		
(Glavee-Geo, 2019)	RC_Relation_continuation_102_1	My relationship with VDL ETG Almelo will continue in the future
	RC_Relation_continuation_102_2	A renewal of relationship with VDL ETG Almelo is automatic.
	RC_Relation_continuation_102_3	It is very likely that my firm will still be dealing with VDL ETG Almelo in 2 years
	RC_Relation_continuation_102_4	My firm and VDL ETG Almelo will continue to do business with each other for a long time

Length of relationship (in years) * **		
(Vos et al., 2016)	LNGTH_Relationship_236_1	How long has your company been a supplier of VDL ETG Almelo?
	LNGTH_SupplierOfB_236_2	How long have you already been working as an employee of your firm?
	LNGTH_EmployeeSupplier_236_3	How long have you already been acting as a sales representative for your company?
	LNGTH_SalesRepresent_236_4	How long have you, as a representative of your firm, already been cooperating with VDL ETG Almelo?
	LNGTH_Collaboration_236_5	The other party expects us to be working with them for a long period of time
General information on company		
(Vos et al., 2016)	ORG_Turnover_240_1	Annual Turnover (in €). (When you belong to a firm-group, please provide the details of your firm branch!) **
	ORG_DepTurnover_240_2	Please indicate the annual turnover with VDL ETG Almelo as % of your total annual turnover (in %, 0=lowest, 100=highest, e.g. if your Company is having half of its turnover at VDL ETG Almelo, fill-in "50")***
	ORG_Size_240_3	Number of employees**
	ORG_CountryOfOrigin_255	Where is your company located**

* Standard Likert scale (1. Fully disagree – 5. Fully agree)

** Open question

*** Slider (0 – 100)

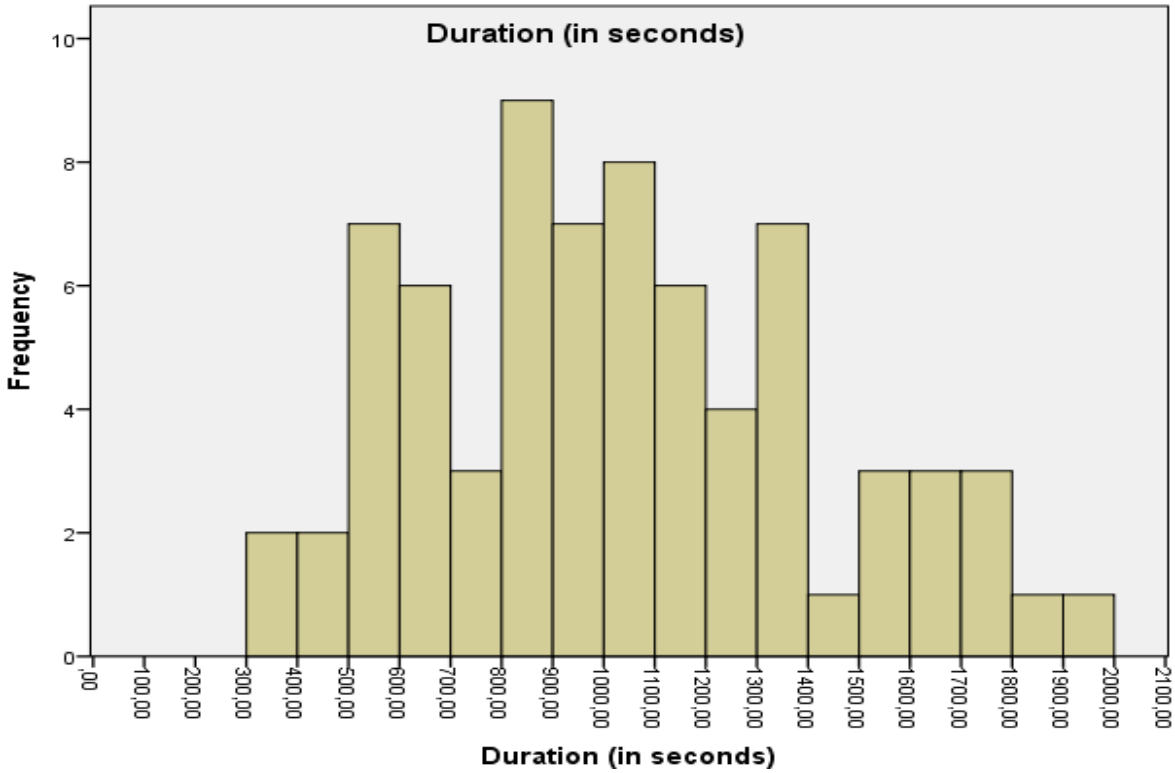
Annexure B: Sample characteristics

Country of respondents			Most common E-classification			Organisational sector		
Netherlands	53	64%	35 Semi-finished product, material	24	29%	Primary sector	7	8%
Germany	13	16%	27 Electrical engineering, automation, process control technology	14	17%	Secondary sector	66	78%
Other	17	20%	23 Machine element, fastening attachment	12	15%	Tertiary sector	12	14%
			Other	32	39%			
N= 83 (2 missing)			N= 82 (3 missing)			N= 85		

Length of relationship of representative with VDL ETG Almelo			Ownership Type			Organisational position		
<5 years	*	*	Private firm	70	82%	Sales department employee	38	44%
5-10 years	*	*	Public listed firm	13	15%	Head of sales department	15	18%
11-20 years	*	*	Other	2	3%	Director/Owner	15	18%
>20 years	*	*				Other	17	20%
N= 85			N= 85			N= 85		

Organisational size (Number of employees)			Percentage turnover with VDL ETG Almelo			Length of relationship with VDL ETG Almelo		
<= 50	*	*	< 5%	*	*	<5 years	*	*
51 - 100	*	*	5 - 10%	*	*	5 - 10 years	*	*
101 - 200	*	*	11 - 30%	*	*	11 - 20 years	*	*
201 - 500	*	*	> 30%	*	*	> 20 years	*	*
> 500	*	*						
N= 82 (3 missing)			N= 70 (15 missing)			N= 85		

* Numbers omitted due to confidential information



Annexure C: KMO and Bartlett's test

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0,734
Bartlett's Test of Sphericity	Approx. Chi-Square	4248,321
	df	1540
	Sig.	0,000

Annexure D: Rotated component matrix

Rotated Component Matrix[a]

	Component															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
S_Available_10_1	0,108	0,111	0,178	0,029	-0,089	0,070	0,003	0,124	0,278	0,057	0,187	-0,018	0,822	0,120	0,101	0,012
S_Available_10_2	-0,032	-0,011	0,015	0,072	0,043	0,083	0,193	0,083	0,257	0,083	0,113	0,168	0,791	0,147	0,063	-0,008
S_Growth_20_1	0,158	0,024	0,556	0,251	0,053	0,047	0,196	0,213	0,176	0,166	0,127	0,175	0,284	0,106	0,055	-0,315
S_Growth_20_2	0,296	0,068	0,560	0,133	0,198	0,278	0,217	-0,029	0,062	0,409	-0,104	0,025	-0,016	0,069	0,043	-0,041
S_Growth_20_3	0,245	0,194	0,822	0,119	0,035	0,170	0,075	0,037	-0,006	0,003	0,101	0,121	0,004	-0,019	0,030	0,008
S_Growth_20_4	0,215	0,200	0,843	0,089	-0,019	0,201	0,051	0,048	-0,059	0,025	0,103	0,070	0,048	0,048	0,035	0,031
S_InnovationPot_30_1	0,028	0,055	0,503	0,338	0,228	0,078	0,211	0,160	-0,093	0,018	0,388	0,293	0,103	0,085	-0,123	0,231
S_InnovationPot_30_2	0,013	0,042	0,507	0,346	0,243	0,152	0,164	0,077	-0,063	-0,022	0,416	0,224	0,073	0,091	-0,182	0,258
S_InnovationPot_30_3	0,088	0,058	0,531	0,400	0,185	-0,010	0,209	0,144	0,042	-0,161	0,237	0,229	0,279	0,014	-0,133	0,092
S_OperativeExc_40_1	0,147	-0,073	-0,142	0,089	-0,023	0,081	0,124	0,197	0,804	0,095	-0,056	0,100	0,208	-0,017	0,104	0,053
S_OperativeExc_40_2	0,014	-0,021	0,022	0,110	0,139	0,203	0,114	0,101	0,823	0,068	0,000	0,187	0,104	0,100	0,039	0,175
S_OperativeExc_40_3	0,112	-0,052	0,027	-0,002	0,106	0,016	0,027	0,071	0,795	0,068	0,131	-0,033	0,194	0,125	0,143	-0,169
S_OperativeExc_40_4	0,144	0,015	0,372	0,049	0,016	0,077	0,087	0,092	0,540	-0,094	0,288	-0,292	0,033	0,202	0,049	-0,379
S_Collaboration_50_3	0,167	0,137	-0,055	-0,081	0,091	0,148	0,021	-0,010	0,112	0,169	0,002	0,005	0,020	0,169	0,856	-0,045
S_Collaboration_50_4	0,269	0,192	0,023	0,018	0,132	0,120	0,145	0,011	0,174	0,165	-0,133	0,042	0,125	0,163	0,745	0,031
S_Support_60_2	0,122	0,202	0,227	0,123	0,007	0,069	0,180	0,081	0,135	0,021	0,196	0,800	0,075	0,145	0,055	-0,017
S_Support_60_3	0,056	0,200	0,214	0,132	0,076	0,214	0,169	0,083	0,071	-0,030	0,182	0,770	0,121	0,167	0,031	-0,002
S_Involvement_70_2	0,097	0,146	0,243	0,111	-0,154	0,090	0,201	0,090	0,089	0,166	0,757	0,108	0,146	0,096	0,002	-0,037
S_Involvement_70_3	0,136	0,143	0,113	0,236	-0,062	0,117	0,084	-0,113	0,104	0,076	0,753	0,245	0,211	0,013	-0,048	0,016
S_RelBehavior_80_1	0,053	-0,034	0,186	0,038	0,054	-0,044	0,053	0,085	0,194	0,059	0,125	0,128	0,329	0,562	0,463	-0,015
S_RelBehavior_80_2	0,180	0,134	0,023	0,021	0,069	0,118	0,220	0,242	0,016	0,003	0,153	0,226	0,262	0,701	0,138	0,041
S_RelBehavior_80_3	-0,006	0,108	0,040	0,078	0,050	-0,107	0,030	0,098	0,153	0,226	-0,020	0,061	0,013	0,785	0,134	-0,018
S_Profitability_90_3	0,097	0,111	0,172	0,049	0,105	0,044	0,786	0,058	0,001	0,066	0,145	0,153	0,309	-0,052	-0,075	-0,159
S_Profitability_90_4	0,195	0,307	0,120	-0,040	-0,056	0,027	0,792	-0,035	0,123	0,035	0,044	0,014	0,082	0,123	0,050	-0,176
S_Profitability_90_5	0,104	0,082	0,047	0,297	0,126	0,085	0,718	-0,055	0,133	0,043	0,055	0,185	-0,104	0,098	0,246	0,131
S_Profitability_90_6	0,131	0,044	0,097	0,127	0,069	0,068	0,785	0,099	0,090	0,241	0,097	0,044	0,000	0,079	0,016	0,227
S_Satisfaction_100_3	0,204	0,080	0,069	0,005	0,316	-0,094	0,103	0,110	0,193	0,641	0,166	0,019	0,174	0,196	0,144	-0,110
S_Satisfaction_100_4	0,279	0,109	-0,083	-0,040	0,427	0,097	0,152	0,105	0,039	0,629	0,031	0,023	0,059	0,248	0,057	0,036
S_Satisfaction_100_5	0,214	0,176	0,078	0,008	0,169	-0,107	0,180	0,060	0,047	0,769	0,126	-0,033	0,020	0,022	0,225	0,074
PC_PC_110_1	0,747	0,051	0,169	0,243	0,195	0,145	0,112	-0,052	0,085	0,153	-0,018	0,209	0,006	-0,024	0,188	-0,017
PC_PC_110_2	0,818	0,025	0,167	0,190	0,126	0,128	0,147	0,108	0,116	0,082	0,013	0,035	-0,038	0,029	0,035	-0,098
PC_PC_110_3	0,847	0,168	0,152	0,106	0,145	0,063	0,057	0,035	-0,001	0,147	0,034	0,126	0,103	-0,032	0,084	-0,025
PC_PC_110_4	0,798	0,103	0,154	0,091	0,017	0,015	0,103	0,054	0,075	0,202	0,095	-0,015	0,052	0,017	0,130	0,272
PC_PC_110_5	0,760	0,198	0,044	0,192	0,134	0,079	0,082	0,120	0,110	0,018	0,104	-0,059	0,007	0,195	0,097	-0,095
PC_PrefTreat_120_4	0,463	0,291	0,132	0,249	0,307	0,060	0,158	0,269	0,088	0,000	0,189	-0,148	0,105	0,015	-0,106	0,348
PC_PrefTreat_120_5	0,441	0,399	0,203	0,139	0,294	0,172	0,063	0,085	-0,052	0,056	0,243	-0,182	-0,060	0,083	-0,051	0,430
BIOSINV_Buyer_Investments_101_1	0,040	0,288	0,222	0,035	0,035	0,040	0,020	0,729	0,218	0,073	0,040	0,148	0,138	0,072	0,060	0,243
BIOSINV_Buyer_Investments_101_2	0,122	0,285	0,048	0,030	0,057	0,121	-0,008	0,783	0,128	0,161	0,041	0,007	0,183	0,091	0,019	-0,070
BIOSINV_Buyer_Investments_101_3	0,113	0,239	0,342	0,086	0,127	0,186	-0,045	0,569	0,031	0,029	-0,043	0,241	0,013	-0,037	0,237	0,313
BIOSINV_Buyer_Investments_101_4	0,078	0,078	-0,074	0,027	0,073	0,244	0,065	0,829	0,114	-0,010	-0,031	-0,034	-0,041	0,203	-0,129	-0,162
SIOSINV_Supplier_Investments_101_1	-0,051	0,012	0,092	-0,089	-0,050	0,737	0,126	0,245	0,201	-0,065	-0,106	-0,070	0,107	0,215	0,118	0,138
SIOSINV_Supplier_Investments_101_2	0,139	0,118	0,179	0,306	0,145	0,741	-0,071	-0,049	0,005	0,101	0,155	0,171	0,108	-0,250	0,029	-0,011
SIOSINV_Supplier_Investments_101_3	0,216	0,095	0,164	0,263	0,104	0,819	0,093	0,153	0,058	-0,031	0,129	0,121	-0,025	-0,047	0,115	-0,017
SIOSINV_Supplier_Investments_101_4	0,171	0,161	0,207	0,240	0,120	0,802	0,065	0,195	0,121	-0,047	0,115	0,110	0,027	-0,023	0,039	-0,038
RC_Relation_continuation_102_1	0,168	0,082	0,075	0,104	0,710	0,152	-0,027	0,120	0,117	0,389	-0,169	0,035	0,043	0,095	0,105	0,113
RC_Relation_continuation_102_2	-0,066	-0,109	0,005	0,343	0,590	-0,188	0,099	0,297	-0,021	-0,174	0,066	-0,111	0,047	-0,255	0,174	-0,262
RC_Relation_continuation_102_3	0,182	0,197	0,070	0,023	0,830	0,114	0,114	0,028	0,127	0,207	-0,063	0,078	-0,048	0,081	0,066	0,084
RC_Relation_continuation_102_4	0,264	0,158	0,103	0,018	0,854	0,085	0,032	-0,016	0,024	0,147	0,005	0,043	-0,031	0,032	0,030	-0,014
MDU_Dependence_200_4	0,256	-0,049	0,157	0,744	-0,014	0,236	0,078	0,170	-0,022	0,067	0,154	0,164	-0,033	-0,049	0,085	0,057
MDU_Dependence_200_7	0,200	0,281	0,170	0,715	0,109	0,125	0,154	-0,087	0,172	0,014	-0,026	0,009	-0,053	0,045	-0,150	0,162
MDU_Dependence_200_8	0,217	0,150	0,229	0,842	0,079	0,033	0,133	0,045	0,037	0,008	0,035	0,056	0,083	0,017	-0,057	-0,028
MDU_Dependence_200_9	0,146	-0,024	0,006	0,829	0,020	0,197	-0,018	-0,012	0,062	-0,015	0,158	0,024	0,074	0,096	0,049	-0,086
ADD_Status_156_1	0,277	0,747	0,230	0,074	0,150	-0,007	0,112	-0,018	-0,048	0,130	-0,109	0,217	0,159	-0,014	0,096	-0,067
ADD_Status_156_2	0,087	0,825	0,140	0,089	0,085	0,124	0,129	0,268	-0,100	-0,074	0,088	0,039	-0,054	0,022	0,023	-0,023
ADD_Status_156_3	0,099	0,844	0,094	0,123	0,093	0,103	0,107	0,178	-0,026	0,182	0,165	0,092	0,040	0,053	0,085	0,108
ADD_Status_156_4	0,121	0,866	0,038	-0,008	0,095	0,074	0,126	0,200	0,009	0,107	0,093	0,102	0,013	0,144	0,139	0,043

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 14 iterations.

Annexure E: Communalities

Communalities	Initial	Extraction
S_Available_10_1	1,000	0,901
S_Available_10_2	1,000	0,824
S_Growth_20_1	1,000	0,786
S_Growth_20_2	1,000	0,778
S_Growth_20_3	1,000	0,852
S_Growth_20_4	1,000	0,876
S_InnovationPot_30_1	1,000	0,831
S_InnovationPot_30_2	1,000	0,834
S_InnovationPot_30_3	1,000	0,793
S_OperativeExc_40_1	1,000	0,843
S_OperativeExc_40_2	1,000	0,867
S_OperativeExc_40_3	1,000	0,791
S_OperativeExc_40_4	1,000	0,841
S_Collaboration_50_3	1,000	0,891
S_Collaboration_50_4	1,000	0,838
S_Support_60_2	1,000	0,894
S_Support_60_3	1,000	0,869
S_Involvement_70_2	1,000	0,834
S_Involvement_70_3	1,000	0,837
S_RelBehavior_80_1	1,000	0,767
S_RelBehavior_80_2	1,000	0,832
S_RelBehavior_80_3	1,000	0,757
S_Profitability_90_3	1,000	0,866
S_Profitability_90_4	1,000	0,855
S_Profitability_90_5	1,000	0,805
S_Profitability_90_6	1,000	0,816
S_Satisfaction_100_3	1,000	0,761
S_Satisfaction_100_4	1,000	0,792
S_Satisfaction_100_5	1,000	0,826
PC_PC_110_1	1,000	0,834
PC_PC_110_2	1,000	0,834
PC_PC_110_3	1,000	0,867
PC_PC_110_4	1,000	0,843
PC_PC_110_5	1,000	0,784
PC_PrefTreat_120_4	1,000	0,783
PC_PrefTreat_120_5	1,000	0,837
BIOSINV_Buyer_Investments_101_1	1,000	0,832
BIOSINV_Buyer_Investments_101_2	1,000	0,821
BIOSINV_Buyer_Investments_101_3	1,000	0,789
BIOSINV_Buyer_Investments_101_4	1,000	0,876
SIOSINV_Supplier_Investments_101_1	1,000	0,792
SIOSINV_Supplier_Investments_101_2	1,000	0,876
SIOSINV_Supplier_Investments_101_3	1,000	0,918

SIOSINV_Supplier_Investments_101_4	1,000	0,901
RC_Relation_continuation_102_1	1,000	0,822
RC_Relation_continuation_102_2	1,000	0,829
RC_Relation_continuation_102_3	1,000	0,882
RC_Relation_continuation_102_4	1,000	0,871
MDU_Dependence_200_4	1,000	0,807
MDU_Dependence_200_7	1,000	0,801
MDU_Dependence_200_8	1,000	0,875
MDU_Dependence_200_9	1,000	0,802
ADD_Status_156_1	1,000	0,846
ADD_Status_156_2	1,000	0,855
ADD_Status_156_3	1,000	0,901
ADD_Status_156_4	1,000	0,909

Extraction Method: Principal Component Analysis.

Average: 0,836

Annexure F: Hetro Trait Mono Trait ratio

HTMT	Original Sample (O)	Sample Mean (M)	5.0%	95.0%
CV_Supplier Dependence -> Buyer Relation Specific Interorganisational Systems Investments	0,262	0,293	0,151	0,491
Contact Accessibility -> Buyer Relation Specific Interorganisational Systems Investments	0,353	0,365	0,228	0,507
Contact Accessibility -> CV_Supplier Dependence	0,191	0,219	0,080	0,402
Growth Opportunity -> Buyer Relation Specific Interorganisational Systems Investments	0,372	0,390	0,240	0,557
Growth Opportunity -> CV_Supplier Dependence	0,475	0,477	0,296	0,642
Growth Opportunity -> Contact Accessibility	0,238	0,275	0,093	0,518
Innovation potential -> Buyer Relation Specific Interorganisational Systems Investments	0,364	0,374	0,195	0,558
Innovation potential -> CV_Supplier Dependence	0,616	0,616	0,465	0,747
Innovation potential -> Contact Accessibility	0,360	0,360	0,181	0,523
Innovation potential -> Growth Opportunity	0,678	0,678	0,543	0,799
Involvement -> Buyer Relation Specific Interorganisational Systems Investments	0,235	0,261	0,126	0,415
Involvement -> CV_Supplier Dependence	0,455	0,451	0,253	0,622
Involvement -> Contact Accessibility	0,497	0,493	0,280	0,672
Involvement -> Growth Opportunity	0,444	0,442	0,232	0,625
Involvement -> Innovation potential	0,630	0,626	0,473	0,762
Operative Excellence -> Buyer Relation Specific Interorganisational Systems Investments	0,385	0,397	0,243	0,552
Operative Excellence -> CV_Supplier Dependence	0,263	0,287	0,142	0,476
Operative Excellence -> Contact Accessibility	0,596	0,594	0,401	0,765
Operative Excellence -> Growth Opportunity	0,244	0,307	0,198	0,469
Operative Excellence -> Innovation potential	0,188	0,239	0,118	0,421
Operative Excellence -> Involvement	0,326	0,346	0,150	0,575
Preferential Treatment -> Buyer Relation Specific Interorganisational Systems Investments	0,500	0,506	0,303	0,688
Preferential Treatment -> CV_Supplier Dependence	0,512	0,513	0,342	0,660

Preferential Treatment -> Contact Accessibility	0,187	0,234	0,102	0,414
Preferential Treatment -> Growth Opportunity	0,541	0,544	0,374	0,694
Preferential Treatment -> Innovation potential	0,514	0,514	0,357	0,654
Preferential Treatment -> Involvement	0,381	0,380	0,158	0,583
Preferential Treatment -> Operative Excellence	0,214	0,253	0,136	0,408
Preferred customer status -> Buyer Relation Specific Interorganisational Systems Investments	0,323	0,334	0,184	0,496
Preferred customer status -> CV_Supplier Dependence	0,520	0,516	0,340	0,670
Preferred customer status -> Contact Accessibility	0,214	0,243	0,087	0,469
Preferred customer status -> Growth Opportunity	0,578	0,577	0,420	0,721
Preferred customer status -> Innovation potential	0,338	0,336	0,165	0,502
Preferred customer status -> Involvement	0,333	0,333	0,137	0,523
Preferred customer status -> Operative Excellence	0,330	0,338	0,166	0,525
Preferred customer status -> Preferential Treatment	0,677	0,677	0,526	0,809
Profitability -> Buyer Relation Specific Interorganisational Systems Investments	0,227	0,263	0,098	0,498
Profitability -> CV_Supplier Dependence	0,377	0,391	0,225	0,577
Profitability -> Contact Accessibility	0,338	0,352	0,174	0,562
Profitability -> Growth Opportunity	0,438	0,441	0,232	0,639
Profitability -> Innovation potential	0,452	0,449	0,259	0,624
Profitability -> Involvement	0,447	0,444	0,263	0,613
Profitability -> Operative Excellence	0,333	0,347	0,172	0,545
Profitability -> Preferential Treatment	0,390	0,395	0,203	0,591
Profitability -> Preferred customer status	0,420	0,418	0,248	0,576
Quadratic effect Relational Behaviour | Relationship Continuation -> Buyer Relation Specific Interorganisational Systems Investments	0,190	0,208	0,069	0,403
Quadratic effect Relational Behaviour | Relationship Continuation -> CV_Supplier Dependence	0,145	0,170	0,050	0,341
Quadratic effect Relational Behaviour | Relationship Continuation -> Contact Accessibility	0,168	0,192	0,035	0,430
Quadratic effect Relational Behaviour | Relationship Continuation -> Growth Opportunity	0,151	0,177	0,046	0,341
Quadratic effect Relational Behaviour | Relationship Continuation -> Innovation potential	0,104	0,128	0,029	0,267
Quadratic effect Relational Behaviour | Relationship Continuation -> Involvement	0,206	0,213	0,036	0,412
Quadratic effect Relational Behaviour | Relationship Continuation -> Operative Excellence	0,091	0,141	0,065	0,244
Quadratic effect Relational Behaviour | Relationship Continuation -> Preferential Treatment	0,017	0,092	0,017	0,221
Quadratic effect Relational Behaviour | Relationship Continuation -> Preferred customer status	0,092	0,129	0,051	0,254
Quadratic effect Relational Behaviour | Relationship Continuation -> Profitability	0,393	0,384	0,118	0,628
Relational Behaviour -> Buyer Relation Specific Interorganisational Systems Investments	0,454	0,462	0,283	0,637
Relational Behaviour -> CV_Supplier Dependence	0,206	0,244	0,112	0,416
Relational Behaviour -> Contact Accessibility	0,574	0,578	0,366	0,774
Relational Behaviour -> Growth Opportunity	0,292	0,322	0,128	0,537
Relational Behaviour -> Innovation potential	0,286	0,304	0,141	0,480
Relational Behaviour -> Involvement	0,374	0,396	0,187	0,628
Relational Behaviour -> Operative Excellence	0,473	0,484	0,320	0,649
Relational Behaviour -> Preferential Treatment	0,237	0,273	0,125	0,456

Relational Behaviour -> Preferred customer status	0,317	0,332	0,182	0,493
Relational Behaviour -> Profitability	0,397	0,412	0,187	0,638
Relational Behaviour -> Quadratic effect Relational Behaviour | Relationship Continuation	0,396	0,380	0,098	0,659
Relationship Continuation -> Buyer Relation Specific Interorganisational Systems Investments	0,334	0,337	0,208	0,466
Relationship Continuation -> CV_Supplier Dependence	0,262	0,271	0,123	0,433
Relationship Continuation -> Contact Accessibility	0,087	0,149	0,050	0,327
Relationship Continuation -> Growth Opportunity	0,375	0,383	0,209	0,565
Relationship Continuation -> Innovation potential	0,284	0,286	0,113	0,458
Relationship Continuation -> Involvement	0,047	0,121	0,044	0,248
Relationship Continuation -> Operative Excellence	0,244	0,271	0,117	0,466
Relationship Continuation -> Preferential Treatment	0,547	0,547	0,412	0,666
Relationship Continuation -> Preferred customer status	0,475	0,472	0,319	0,610
Relationship Continuation -> Profitability	0,279	0,292	0,130	0,473
Relationship Continuation -> Quadratic effect Relational Behaviour | Relationship Continuation	0,143	0,158	0,024	0,327
Relationship Continuation -> Relational Behaviour	0,285	0,294	0,110	0,487
Reliability -> Buyer Relation Specific Interorganisational Systems Investments	0,240	0,262	0,135	0,414
Reliability -> CV_Supplier Dependence	0,132	0,176	0,087	0,309
Reliability -> Contact Accessibility	0,287	0,300	0,077	0,557
Reliability -> Growth Opportunity	0,228	0,250	0,112	0,422
Reliability -> Innovation potential	0,106	0,153	0,065	0,284
Reliability -> Involvement	0,063	0,148	0,047	0,316
Reliability -> Operative Excellence	0,363	0,371	0,159	0,595
Reliability -> Preferential Treatment	0,193	0,214	0,078	0,399
Reliability -> Preferred customer status	0,439	0,438	0,274	0,588
Reliability -> Profitability	0,293	0,317	0,168	0,483
Reliability -> Quadratic effect Relational Behaviour | Relationship Continuation	0,071	0,137	0,035	0,299
Reliability -> Relational Behaviour	0,549	0,551	0,349	0,737
Reliability -> Relationship Continuation	0,367	0,366	0,178	0,547
Supplier Relation Specific Interorganisational Systems Investments -> Buyer Relation Specific Interorganisational Systems Investments	0,479	0,483	0,289	0,665
Supplier Relation Specific Interorganisational Systems Investments -> CV_Supplier Dependence	0,501	0,514	0,359	0,658
Supplier Relation Specific Interorganisational Systems Investments -> Contact Accessibility	0,278	0,291	0,096	0,516
Supplier Relation Specific Interorganisational Systems Investments -> Growth Opportunity	0,546	0,545	0,392	0,688
Supplier Relation Specific Interorganisational Systems Investments -> Innovation potential	0,419	0,424	0,258	0,582
Supplier Relation Specific Interorganisational Systems Investments -> Involvement	0,347	0,369	0,185	0,547
Supplier Relation Specific Interorganisational Systems Investments -> Operative Excellence	0,350	0,367	0,219	0,535
Supplier Relation Specific Interorganisational Systems Investments -> Preferential Treatment	0,405	0,417	0,232	0,595
Supplier Relation Specific Interorganisational Systems Investments -> Preferred customer status	0,396	0,410	0,242	0,577

Supplier Relation Specific Interorganisational Systems Investments -> Profitability	0,289	0,311	0,132	0,525
Supplier Relation Specific Interorganisational Systems Investments -> Quadratic effect Relational Behaviour | Relationship Continuation	0,063	0,147	0,047	0,300
Supplier Relation Specific Interorganisational Systems Investments -> Relational Behaviour	0,216	0,276	0,158	0,422
Supplier Relation Specific Interorganisational Systems Investments -> Relationship Continuation	0,310	0,322	0,152	0,500
Supplier Relation Specific Interorganisational Systems Investments -> Reliability	0,282	0,284	0,112	0,463
Status -> Buyer Relation Specific Interorganisational Systems Investments	0,538	0,541	0,411	0,660
Status -> CV_Supplier Dependence	0,300	0,317	0,179	0,480
Status -> Contact Accessibility	0,200	0,237	0,087	0,437
Status -> Growth Opportunity	0,464	0,466	0,275	0,641
Status -> Innovation potential	0,349	0,350	0,143	0,544
Status -> Involvement	0,341	0,343	0,116	0,569
Status -> Operative Excellence	0,088	0,179	0,084	0,333
Status -> Preferential Treatment	0,594	0,596	0,450	0,736
Status -> Preferred customer status	0,415	0,415	0,241	0,575
Status -> Profitability	0,413	0,415	0,240	0,574
Status -> Quadratic effect Relational Behaviour | Relationship Continuation	0,039	0,110	0,026	0,259
Status -> Relational Behaviour	0,325	0,356	0,200	0,542
Status -> Relationship Continuation	0,376	0,375	0,223	0,525
Status -> Reliability	0,356	0,364	0,168	0,557
Status -> Supplier Relation Specific Interorganisational Systems Investments	0,335	0,344	0,167	0,513
Supplier Satisfaction -> Buyer Relation Specific Interorganisational Systems Investments	0,339	0,348	0,217	0,486
Supplier Satisfaction -> CV_Supplier Dependence	0,170	0,204	0,088	0,363
Supplier Satisfaction -> Contact Accessibility	0,311	0,324	0,111	0,552
Supplier Satisfaction -> Growth Opportunity	0,354	0,375	0,227	0,544
Supplier Satisfaction -> Innovation potential	0,199	0,224	0,095	0,392
Supplier Satisfaction -> Involvement	0,301	0,309	0,137	0,491
Supplier Satisfaction -> Operative Excellence	0,346	0,364	0,185	0,562
Supplier Satisfaction -> Preferential Treatment	0,437	0,439	0,292	0,580
Supplier Satisfaction -> Preferred customer status	0,555	0,555	0,393	0,702
Supplier Satisfaction -> Profitability	0,448	0,451	0,273	0,617
Supplier Satisfaction -> Quadratic effect Relational Behaviour | Relationship Continuation	0,058	0,098	0,035	0,192
Supplier Satisfaction -> Relational Behaviour	0,533	0,534	0,357	0,696
Supplier Satisfaction -> Relationship Continuation	0,692	0,693	0,571	0,806
Supplier Satisfaction -> Reliability	0,524	0,525	0,365	0,672
Supplier Satisfaction -> Supplier Relation Specific Interorganisational Systems Investments	0,143	0,188	0,083	0,329
Supplier Satisfaction -> Status	0,410	0,419	0,230	0,611
Support -> Buyer Relation Specific Interorganisational Systems Investments	0,377	0,379	0,218	0,530
Support -> CV_Supplier Dependence	0,380	0,382	0,179	0,571
Support -> Contact Accessibility	0,385	0,383	0,174	0,573
Support -> Growth Opportunity	0,473	0,476	0,302	0,638

Support -> Innovation potential	0,582	0,579	0,416	0,731
Support -> Involvement	0,541	0,540	0,360	0,695
Support -> Operative Excellence	0,266	0,287	0,120	0,487
Support -> Preferential Treatment	0,246	0,250	0,069	0,440
Support -> Preferred customer status	0,318	0,319	0,154	0,479
Support -> Profitability	0,468	0,464	0,276	0,628
Support -> Quadratic effect Relational Behaviour | Relationship Continuation	0,194	0,193	0,026	0,370
Support -> Relational Behaviour	0,480	0,481	0,307	0,638
Support -> Relationship Continuation	0,205	0,214	0,070	0,387
Support -> Reliability	0,213	0,229	0,059	0,446
Support -> Supplier Relation Specific Interorganisational Systems Investments	0,411	0,415	0,239	0,584
Support -> Status	0,443	0,442	0,246	0,616
Support -> Supplier Satisfaction	0,217	0,230	0,071	0,420
* CV = Control Variable				

Annexure G: Bivariate correlation table

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
2	Supplier Dependence	,24*	1,00															
3	Contact Accessibility	,30**	0,16	1,00														
4	Growth Opportunity	,34**	,42**	0,21	1,00													
5	Innovation potential	,33**	,56**	,32**	,60**	1,00												
6	Involvement	0,20	,39**	,42**	,38**	,55**	1,00											
7	Operative Excellence	,32**	,22*	,50**	0,17	0,15	,26*	1,00										
8	Preferential Treatment	,44**	,45**	0,16	,46**	,46**	,32**	0,16	1,00									
9	Preferred customer status	,30**	,47**	0,19	,51**	,31**	,29**	,28**	,60**	1,00								
10	Profitability	0,20	,34**	,28**	,38**	,41**	,38**	,28**	,35**	,38**	1,00							
11	Quadratic effect Relational Behaviour | Relationship Continuation	0,17	-0,14	-0,16	-0,14	-0,10	-0,19	-0,04	0,00	-0,09	-,37**	1,00						
12	Relational Behaviour	,38**	0,18	,48**	,25*	,25*	,32**	,38**	0,20	,28*	,33**	-,36**	1,00					
13	Relationship Continuation	,31**	,24*	0,08	,33**	,26*	0,02	,22*	,48**	,44**	,25*	0,14	,24*	1,00				
14	Reliability	,22*	0,09	,25*	0,20	-0,05	0,05	,32**	0,17	,40**	,26*	-0,07	,46**	,34**	1,00			
15	Status	,49**	,27*	0,19	,41**	,32**	,31**	0,06	,53**	,39**	,36**	0,04	,29**	,35**	,33**	1,00		
16	Supplier Relation Specific Interorganisational Systems Investments	,42**	,49**	,23*	,49**	,40**	,32**	,29**	,38**	,38**	,26*	-0,06	0,14	,30**	,24*	,32**	1,00	
17	Supplier Satisfaction	,29**	0,15	,26*	,30**	0,18	,25*	,30**	,37**	,49**	,39**	-0,04	,43**	,62**	,45**	,37**	0,13	1,00
18	Support	,35**	,35**	,34**	,42**	,54**	,48**	,24*	,22*	,30**	,42**	-0,19	,42**	0,19	0,20	,42**	,39**	0,19

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

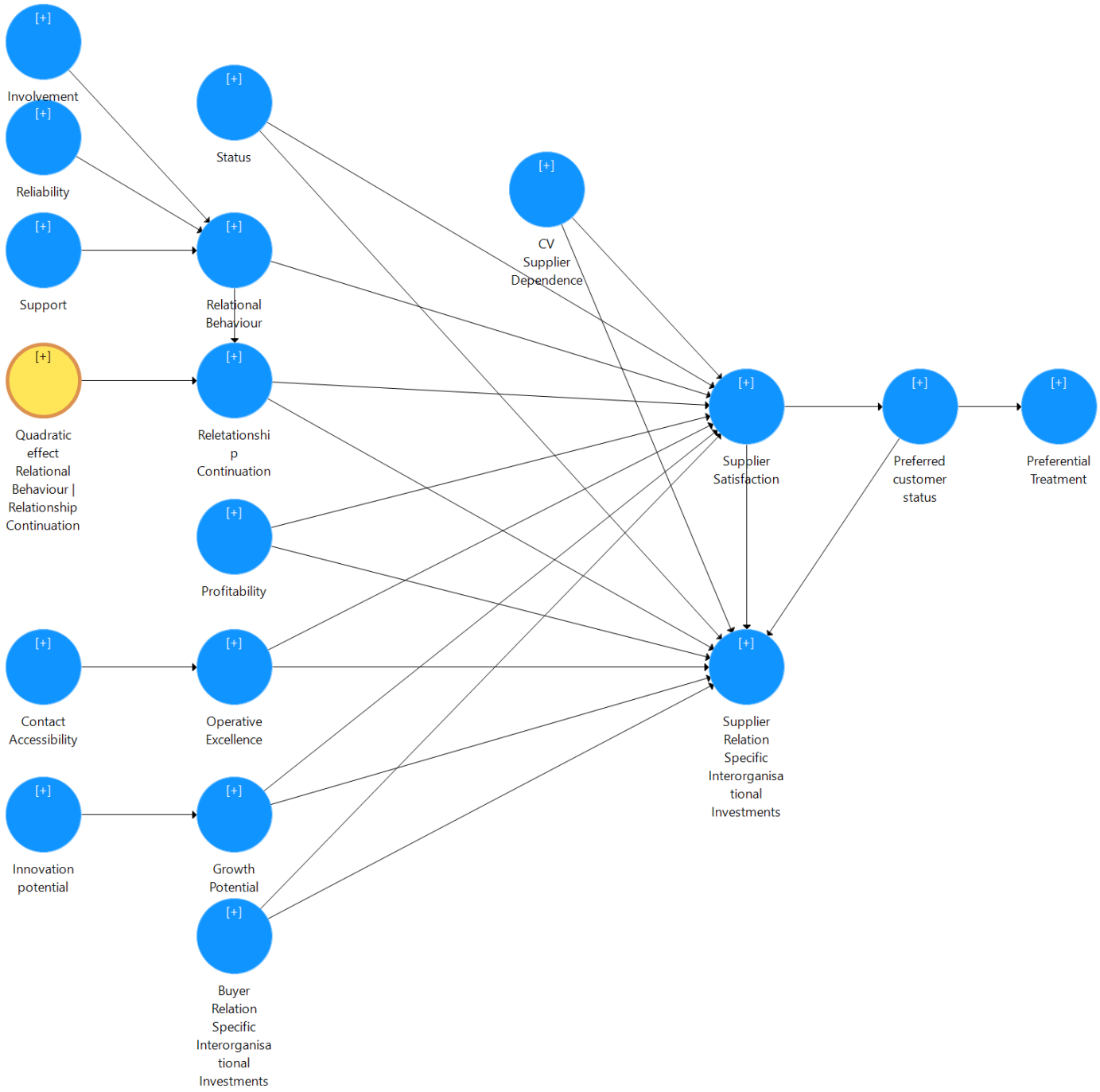
N = 85 (0 missing)

Annexure H: Indicator descriptive statistics

Indicator	Mean	Median	Std. Deviation	Range	Minimum	Maximum
S_Available_10_1	3,72	4	1,031	4	1	5
S_Available_10_2	3,89	4	0,951	4	1	5
S_Available_10_3	3,55	4	0,919	4	1	5
S_Growth_20_1	2,78	3	1,028	4	1	5
S_Growth_20_2	3,40	4	0,941	4	1	5
S_Growth_20_3	3,26	3	1,014	4	1	5
S_Growth_20_4	3,15	3	0,945	4	1	5
S_InnovationPot_30_1	2,66	3	1,129	4	1	5
S_InnovationPot_30_2	2,55	2	1,041	4	1	5
S_InnovationPot_30_3	2,60	3	0,990	4	1	5
S_OperativeExc_40_1	3,24	3	1,098	4	1	5
S_OperativeExc_40_2	3,08	3	1,227	4	1	5
S_OperativeExc_40_3	3,28	3	1,007	4	1	5
S_OperativeExc_40_4	3,27	3	0,864	4	1	5
S_Collaboration_50_1	3,78	4	0,746	3	2	5
S_Collaboration_50_2	4,01	4	0,732	4	1	5
S_Collaboration_50_3	4,13	4	0,686	2	3	5
S_Collaboration_50_4	4,14	4	0,742	3	2	5
S_Support_60_1	3,51	4	0,971	4	1	5
S_Support_60_2	3,08	3	0,991	4	1	5
S_Support_60_3	3,13	3	1,009	4	1	5
S_Involvement_70_2	2,98	3	1,046	4	1	5
S_Involvement_70_3	2,68	3	0,978	4	1	5
S_Involvement_70_4	3,19	3	1,052	4	1	5
S_RelBehavior_80_1	3,79	4	0,725	3	2	5
S_RelBehavior_80_2	3,79	4	0,674	4	1	5
S_RelBehavior_80_3	3,95	4	0,596	3	2	5
S_RelBehavior_80_4	3,31	3	0,772	4	1	5
S_RelBehavior_80_5	3,66	4	0,765	4	1	5
S_RelBehavior_80_6	3,93	4	0,686	3	2	5
S_Profitability_90_2	2,99	3	0,994	4	1	5
S_Profitability_90_3	2,81	3	0,748	4	1	5
S_Profitability_90_4	2,67	3	0,662	4	1	5
S_Profitability_90_5	3,21	3	0,818	4	1	5
S_Profitability_90_6	3,14	3	0,758	4	1	5
S_Satisfaction_100_1	4,07	4	0,686	3	2	5
S_Satisfaction_100_2	4,02	4	0,672	3	2	5
S_Satisfaction_100_3	4,15	4	0,681	3	2	5
S_Satisfaction_100_4	4,33	4	0,625	2	3	5
S_Satisfaction_100_5	4,40	4	0,561	2	3	5
PC_PC_110_1	3,36	3	0,974	4	1	5
PC_PC_110_2	3,19	3	0,794	3	2	5
PC_PC_110_3	3,28	3	0,934	3	2	5
PC_PC_110_4	3,64	4	0,911	3	2	5
PC_PC_110_5	2,95	3	0,785	4	1	5
PC_PrefTreat_120_1	3,47	3	0,796	3	2	5
PC_PrefTreat_120_3	3,12	3	0,822	4	1	5
PC_PrefTreat_120_4	3,34	3	0,853	4	1	5

PC_PrefTreat_120_5	3,49	3	0,881	4	1	5
BIOSINV_Buyer_Investments_101_1	3,18	3	0,621	3	2	5
BIOSINV_Buyer_Investments_101_2	3,07	3	0,669	4	1	5
BIOSINV_Buyer_Investments_101_3	3,32	3	0,602	3	2	5
BIOSINV_Buyer_Investments_101_4	2,92	3	0,790	4	1	5
SIOSINV_Supplier_Investments_101_1	2,48	3	0,908	4	1	5
SIOSINV_Supplier_Investments_101_2	2,56	3	0,993	4	1	5
SIOSINV_Supplier_Investments_101_3	2,36	2	0,924	4	1	5
SIOSINV_Supplier_Investments_101_4	2,40	2	0,978	4	1	5
RC_Relation_continuation_102_1	4,51	5	0,503	1	4	5
RC_Relation_continuation_102_2	3,92	4	0,848	3	2	5
RC_Relation_continuation_102_3	4,52	5	0,503	1	4	5
RC_Relation_continuation_102_4	4,48	5	0,548	2	3	5
MDU_Dependence_200_4	2,22	2	0,931	4	1	5
MDU_Dependence_200_5	3,00	3	1,091	4	1	5
MDU_Dependence_200_7	2,96	3	1,190	4	1	5
MDU_Dependence_200_8	2,21	2	0,989	4	1	5
MDU_Dependence_200_9	2,25	2	0,872	4	1	5
ADD_Status_156_1	4,04	4	0,763	4	1	5
ADD_Status_156_2	3,76	4	0,750	4	1	5
ADD_Status_156_3	3,92	4	0,676	3	2	5
ADD_Status_156_4	3,91	4	0,666	3	2	5
Valid N = 85 (0 missing)						

Annexure I: SmartPLS graphical final model



Annexure J: As-is / To-be checklist interorganisational information systems

Document:	As-is / To-be
Supplier:	Supplier X

				As-is	To-be	Action point
Growth Opportunity	1	Does the relationship with us provide the supplier with a dominant market position in their sales area?	Establish			
			Signal			
	2	Is the suppliers' relationship with us very important for with respect to growth rates?	Establish			
			Signal			
	3	Does the relationship with us enable the supplier to attract other customers?	Establish			
			Signal			
	4	Does the suppliers' relationship with us enable them to exploit new market opportunities?	Establish			
			Signal			
Supplier Dependence	1	Is the supplier very dependent on VDL ETG Almelo?	Establish			
			Signal			
	2	Does the supplier have to maintian this relationship with us in order to achieve their business goals?	Establish			
			Signal			
	3	If the relationship were to end earlier than contracted, would the suppliers' business goals be negatively affected?	Establish			
			Signal			
	4	Does the supplier face great challenges if we did not continue the contractual relationship?	Establish			
			Signal			
	5	Does the supplier have good alternatives to VDL ETG Almelo?	Establish			
			Signal			
Buyer Relation Specific Interorganisational Systems Investments	1	Have we extensively invested in our own IT competence?	Establish			
			Signal			
	2	Have we invested extensively in IT systems by the standards and requirements of our supplier?	Establish			
			Signal			
	3	Have we invested substantially in training of our employees regarding IT system intergration?	Establish			
			Signal			
	4	Did we make extensive investments to integrate our IT systems with our suppliers' IT systems?	Establish			
			Signal			

Annexure K: Initial literature review approach

Keywords	Initial hits	Limit to 2011- 2021	Hits only in relevant subject area	Usable assessed papers	Search key
Supplier satisfaction	4089	1220	530	15	TITLE-ABS-KEY (supplier AND satisfaction) AND PUBYEAR > 2010 AND (LIMIT-TO (SUBJAREA , "BUSI"))
Preferred customer status	73	53	27	12	TITLE-ABS-KEY (preferred AND customer AND status) AND PUBYEAR > 2010 AND (LIMIT-TO (SUBJAREA , "BUSI"))
Interorganisational information systems	1054	354	110	2	TITLE-ABS-KEY (interorganizational AND information AND systems) AND PUBYEAR > 2010 AND (LIMIT-TO (SUBJAREA , "BUSI"))
Antecedents supplier satisfaction	91	44	37	4	TITLE-ABS-KEY (antecedents AND supplier AND satisfaction) AND PUBYEAR > 2010 AND (LIMIT-TO (SUBJAREA , "BUSI"))
Relation specific investments	2006	1253	311	3	TITLE-ABS-KEY (relation AND specific AND investments) AND PUBYEAR > 2010 AND (LIMIT-TO (SUBJAREA , "BUSI"))
Inter organisational systems supplier satisfaction	11	*	7	1	TITLE-ABS-KEY (inter AND organisational AND systems AND supplier AND satisfaction) AND (LIMIT-TO (SUBJAREA , "BUSI"))
Relation specific IOS investment	5	*	*	4	TITLE-ABS-KEY (relation AND specific AND ios AND investment)
Relation specific investments buyer-supplier	20	13	11	5	TITLE-ABS-KEY (relation AND specific AND investments AND buyer-supplier) AND PUBYEAR > 2010 AND (LIMIT-TO (SUBJAREA , "BUSI"))
Interorganisational systems	198	84	38	1	TITLE-ABS-KEY (interorganisational AND systems) AND PUBYEAR > 2010 AND (LIMIT-TO (SUBJAREA , "BUSI"))
Interorganisational industry 4.0 systems	0	0	0	0	TITLE-ABS-KEY (interorganisational AND industry 4.0 AND systems)
IOS integration	1456	776	36	3	TITLE-ABS-KEY (ios AND integration) AND PUBYEAR > 2010 AND (LIMIT-TO (SUBJAREA , "BUSI"))
Inter-organisational information systems	2144	1074	315	2	TITLE-ABS-KEY (inter-organisational AND information AND systems) AND PUBYEAR > 2010 AND (LIMIT-TO (SUBJAREA , "BUSI"))
* Not applied filter					

Annexure L: Research paper extract: The increasing importance of data connection in buyer-supplier relationships and the factors to motivate suppliers to make relation specific interorganisational systems investments.

See attached document