

The influence of internal integration and supplier value on supplier resource allocation

Author: Maeva de Graaff

University of Twente
P.O. Box 217, 7500AE Enschede
The Netherlands

ABSTRACT

Supplier resources are essential to a buying firm's competitive advantage. However, supplier resources are scarce and buying firms are not treated equally in the resource allocation process. Based on SET, this research examines how supplier resource allocation is influenced by the different dimensions of internal integration, interaction and collaboration, and whether the different dimensions of supplier value, financial and non-financial, play a mediating role in this relationship. Partial least squares structural equation modeling is used to analyze the data from 54 suppliers, 16 purchasers and 33 employees with internal other functions at the two buying firms. The results show that the dimensions of internal integration affect supplier resource allocation differently. Whereas collaboration positively influences physical resource allocation and innovation resource allocation, interaction negatively affects innovation resource allocation. Internal integration seems to affect supplier resource allocation directly, without supplier value mediating these relationships. However, collaboration seems to negatively affect non-financial supplier value. The practical contributions of this study are twofold. First, when investing in internal integration, buying firms should focus on collaboration first. Second, buying firms should be aware that collaboration can be very time consuming and should try to keep the right balance between investing time in collaboration and in being of strategic importance to the supplier.

Graduation Committee members: Dr. ir. N.J. Pulles

Dr. F.G.S. Vos

Keywords

Internal integration; supplier value; supplier resource allocation.

1. INTRODUCTION

Supplier resources are essential to firms for achieving competitive advantage (Hitt, 2011). A supplier's knowledge, latest technology, or supply network, for example, can be important for a buyer's product innovation (Li et al., 2021; Petersen et al., 2005). However, supplier resources are scarce, since there are limits to the amounts suppliers can allocate (Pulles et al., 2019). In some markets, only two or three suppliers can provide the necessary resources, making customers even more dependent (Schiele et al., 2012). A consequence of this scarcity is that suppliers have to be selective in the process of allocating their resources. During this process, customers might be treated differently so that they obtain different resource quantities and qualities (Pulles et al., 2016a). Therefore, it is crucial for buying firms to understand how suppliers allocate their resources and what can be done to influence this process.

Previous research has shown that internal integration influences supplier resource mobilization, which is closely linked to supplier resource allocation (Ellegaard & Koch, 2012). Internal integration refers to the process of interaction and collaboration between different functions within a firm (Foerstl et al., 2013; Kahn & Mentzer, 1996). Based on social exchange theory (SET), it can be argued that internal integration does not only affect supplier resource allocation directly, but also indirectly through supplier value. According to SET, suppliers take actions, such as resource allocation, based on the expected return of a relationship with a customer (Emerson, 1976). When determining which resources to allocate to a specific customer, the supplier not only evaluates the outcome of that exchange relationship but also compares the outcomes available from its best alternative relationships with other customers (Lambe et al., 2001; Thibaut & Kelley, 1959). SET predicts that the supplier will assign its resources to the customer that is expected to provide the highest returns (Blau, 1964; Emerson, 1976). Thus, a supplier takes into account the difference between the perceived benefits and the perceived costs of supplying a customer, which is referred to as supplier value (Blois, 2004; Ramsay & Wagner, 2009).

In this paper it is argued that supplier value is influenced by internal integration. Internal integration enables purchasing and other functions responsible for supply management activities to act in a coordinated manner towards their suppliers (Ellegaard & Koch, 2012). Within integrated firms, different functions communicate the same information and vision towards the supplier and agreements made by one function are honored and complied with by other functions. This coordinated behavior is likely to increase supplier value, as it can affect the benefits and costs associated with the relationship through more efficient processes and communication between the supplying and buying firm (Songailiene et al., 2011; Walter et al., 2001). On the other hand, low integration leads to uncoordinated behavior (Ellegaard & Koch, 2012). Uncoordinated behavior of the buying firm might result in the supplier having to invest more resources than initially planned (i.e., higher costs) without receiving more benefits, which decreases supplier value. Therefore, internal integration is expected to affect both dimensions of supplier value (Songailiene et al., 2011; Toth et al., 2014). Financial supplier value is affected through supplier resource mobilization, and non-financial supplier value through the buying firm's efficient processes and communication mechanisms. However, the possible mediating effect of supplier value has not been researched.

Within the stream of literature on internal integration, only a few researchers have made a distinction between the different dimensions of internal integration (Ferreira et al., 2019; Franz et al., 2016; Hsieh & Chen, 2007). These dimensions are often based on the definition of Kahn and Mentzer (1996) and consist of interaction and collaboration. Researchers have not looked into the effects of these different dimensions in a purchasing context. Therefore, it

is unknown if and how interaction and collaboration influence resource allocation and supplier value differently. Relationships between the constructs could be different, depending on the situation. For example, research has shown that integrated teams positively influence project delivery performance (Franz et al., 2016). Whereas interaction reduced the delay of a project and increased the project intensity, collaboration reduced project cost growth and increased project quality. The example shows that treating internal integration as a construct without considering the influence of the different dimensions could lead to identifying relationships between constructs that could be incorrect in specific situations.

Therefore, even though research has shown that low internal integration negatively affects supplier resource allocation (Ellegaard & Koch, 2012), this paper will examine, based on SET, whether the different dimensions of internal integration, interaction and collaboration, influence supplier resource allocation differently and whether the relationship is mediated by financial and non-financial supplier value. The objective of this research is to empirically examine the influence of the different dimensions of internal purchasing integration on the dimensions of supplier value and supplier resource allocation. This research objective leads to the following research question: *How do the dimensions of internal purchasing integration, interaction and collaboration, influence financial and non-financial supplier value and supplier resource allocation?*

This research aims to contribute to the literature on purchasing integration (Ellegaard & Koch, 2012; Foerstl et al., 2013; Horn et al., 2014; Jääskeläinen & Heikkilä, 2019), supplier value (Ramsay & Wagner, 2009; Songailiene et al., 2011; Toth et al., 2014), and supplier resource allocation (Baxter, 2012; Pulles et al., 2016a; Pulles et al., 2014) by differentiating between the dimensions of internal integration, interaction and collaboration, and by examining the influence of these dimensions on the dimensions of supplier value and supplier resource allocation. Specifically, a key contribution is the identification of the different effects of interaction and collaboration on supplier resource allocation. Whereas collaboration has a positive effect on both physical and innovation resource allocation, interaction negatively affects innovation resource allocation. This study also contributes by recognizing that these are direct effects, without supplier value mediating these relationships.

The paper is structured as follows: in the following chapter the literature regarding supplier resource allocation, internal integration, and supplier value is reviewed, based on which hypotheses are formed in the third chapter. In the fourth chapter, the research method is discussed. Then, the results of the quantitative data analysis are summarized and discussed based on existing literature in the fifth and sixth chapter, respectively. Finally, a conclusion is drawn and the limitations and directions for future research are given.

2. LITERATURE REVIEW

2.1 SET in relation to supplier resource allocation

Social exchanges refer to “voluntary actions of individuals that are motivated by the returns they are expected to bring and typically do in fact bring from others” according to Blau (1964, p. 91). Next to tangible goods, social exchanges can also involve intangible value (Homans, 1961). Central to SET are norms of reciprocity, which regulate the behavior of individuals and groups. According to SET, a party tends to provide another party a favor because of the expectation that this behavior will be reciprocated by the other party (Qiu, 2018). In both social exchanges and economic exchanges, there is a general expectation of return. The difference is that in the latter, the obligation is stipulated in a verbal or non-verbal contract, while in the former, the obligation is unspecified (Blau, 1964).

If both parties value what they receive from each other, SET predicts that parties will increase the voluntary behaviors and services as an incentive for the other party to increase its positive behaviors and to avoid being in debt to the other party (Blau, 1964). A series of successful exchanges may lead to a high-quality social exchange relationship, which increases commitment and trust (Cropanzano et al., 2017). Each party in the exchange relationship also compares the outcomes of the interaction to the outcomes available in other exchange relationships to determine its actions (Lambe et al., 2001; Thibaut & Kelley, 1959).

When applying SET in a buyer-supplier relationship context, a supplier's motivation to maintain, intensify or end a relationship is determined by the reward or the expected reward resulting from the relationship with the buying firm and by comparing the benefits available from the best alternative relationship with another customer. Thus, SET has provided a theoretical basis to explain why suppliers serve a few customers better than others (Schiele et al., 2012). Besides, SET predicts that suppliers take actions that maximize their rewards and minimize their costs, thereby maximizing supplier value (Emerson, 1976). Due to the explanatory power of SET regarding supplier resource allocation and supplier value, this paper draws on SET to theorize how internal integration and supplier value influence supplier resource allocation.

Resources refer to the tangible and intangible entities available to the organization that enable it to increase its efficiency and effectiveness (Barney, 1997; Hunt & Davis, 2008). Resource allocation is a term that is often used in the literature regarding preferred customer status (Baxter, 2012; Schiele et al., 2011; Steinle & Schiele, 2008). These studies argue that firms with a preferred customer status receive preferential resource allocation (Pulles et al., 2019). Supplier satisfaction and customer attractiveness play an important role within this process, as they affect preferential resource allocation directly and indirectly, respectively (Pulles et al., 2016a). In addition, empirical evidence has been found for the positive influence of relational capabilities and the supplier's perception of a customer's financial attractiveness on preferential resource allocation (Baxter, 2012; Pulles et al., 2016b). In line with SET, suppliers that are satisfied with a relationship reciprocate the relational benefits by allocating its scarce resources to the customer (Pulles et al., 2016a). When a customer is able to constantly bring the supplier higher levels of supplier satisfaction than other customers, it is likely that the supplier will expect higher benefits from working with that customer. As a consequence, the supplier will allocate its best resources to the customer.

Furthermore, Ellegaard and Koch (2012) found that low internal integration negatively affects supplier resource allocation because of the uncoordinated behavior that is the result of low internal integration. However, this uncoordinated behavior can also influence supplier value, as the buyer's behavior affects the supplier's costs and rewards associated with the exchange relationship. Taking into account previous research on this topic, it remains unclear whether the relationship between internal integration and resource allocation is mediated by supplier value and whether the different dimensions of internal integration affect the relationship differently.

2.2 Internal integration

2.2.1 Definition and effects of internal integration

Since the 1980s, consensus can be found in the literature regarding the importance of internally integrating the purchasing function (Burt & Soukup, 1985) but the definitions and operationalizations of internal integration are manifold (Pagell & Wu, 2006). Integration between purchasing and other functions within a firm has been referred to in a number of different ways; internal integration (Germain & Iyer, 2006), functional integration (Gonzalez-Zapatero et al., 2017), cross-functional integration (Foerstl et al., 2013), purchasing

integration (Cousins et al., 2006), lateral purchasing integration (Kaufmann & Gaeckler, 2015) and internal supply chain integration (SCI) (Kumar et al., 2017). Based on the definitions in Table 1, the following definition for internal integration is used in this research: *a process of interaction and collaboration between functions that brings functions together into a cohesive organization*. Appendix A displays an overview of the definitions for internal integration found in the reviewed literature.

Table 1 Definitions internal integration

Concept	Definition	Reference
Cross-functional integration	“The <i>interaction and collaboration</i> of the PSM function with other functions, such as product development, production and manufacturing, and marketing”	Foerstl et al. (2013, p. 694)
Interdepartmental integration	“a process of interdepartmental <i>interaction</i> and interdepartmental <i>collaboration</i> that brings departments together into a cohesive organization”	Kahn and Mentzer (1996, p. 9)
Internal integration	“A process of <i>interaction and collaboration</i> in which manufacturing, purchasing, and logistics work together in a cooperative manner to arrive at mutually acceptable outcomes for their organization”	Ellegaard and Koch (2012, p. 150)
Internal integration	“...the magnitude of <i>interaction and communication</i> , the level of <i>information sharing</i> , the degree of <i>coordination</i> , and the extent of <i>joint involvement</i> across functions”	Horn et al. (2014, pp. 56-57)
Internal integration	“a process of <i>interaction and collaboration</i> in which manufacturing, purchasing and logistics work together in a cooperative manner to arrive at mutually acceptable outcomes for their organization”	Pagell (2004, p. 460)
Internal integration	“...a process of <i>interaction and collaboration</i> in which manufacturing, purchasing and logistics work together in a cooperative manner to arrive at mutually acceptable outcomes for their organization”	Pagell and Wu (2006, p. 297)

Internal integration has been argued to increase the performance of a firm in multiple ways. Since the focus of this paper is on the influence of internal purchasing integration on supplier value and supplier resource allocation, this section will concentrate on the findings regarding the effects on suppliers. The studies referred to in Table 2 show how internal integration can influence the behavior of suppliers. These findings can be used to explain the mechanisms behind the influence of internal integration on supplier value and supplier resource allocation and will form the base of the hypotheses. Appendix B shows all the effects regarding internal integration within a purchasing context that were found in the reviewed literature beyond the mere effects on suppliers.

Internal integration has been found to positively influence purchasing performance and external integration (Foerstl et al., 2013; Horn et al., 2014; Zhao et al., 2011). Both effects can be explained by the information-processing capabilities that are inherent to internally integrated firms. Firms with internally integrated purchasing functions have established internal systems and capabilities for integrating and sharing data and involve purchasing in all stages of the sourcing process (Zhao et al., 2011). These factors enable fast processing of information and increase purchasing decision-making speed and problem solving (Kaufmann

& Gaeckler, 2015). Hence, internal integration puts purchasing into a position to efficiently use the knowledge or information gained by one of the firm's functions (Schütz et al., 2020; Williams et al., 2013). If internal integration mechanisms are not present, the fragmented processes make it harder to share information between departments. Consequently, optimal decision-making is prevented and the decision-making process and problem-solving is slowed down (Schütz et al., 2020). The information-processing capabilities also increase absorptive capacity (Lane et al., 2006). This capability makes it more likely that a company is able to learn from suppliers and understand the supplier's business (Zhao et al., 2011). The ability to acquire and exploit knowledge regarding the supplier enables external integration with the supplier (Kanter, 1994).

Furthermore, low internal integration affects supplier resource allocation negatively (Ellegaard & Koch, 2012). Low internal integration through a lack of information sharing can cause a department to take different actions than another department agreed upon with a supplier. This inconsistency of behavior negatively influences supplier resource allocation because a supplier has to use more resources than initially agreed upon, without receiving more benefits. Ultimately, this decreases supplier satisfaction and may damage the exchange relationship.

Table 2. Effects of internal integration

Reference	Focus of study	Effect on
Cousins et al. (2006)	Integration purchasing and all other functions	<i>Supplier relationship outcomes</i> <i>Supplier integration</i> <i>Financial performance</i>
Ellegaard and Koch (2012)	Purchasing-operations integration	<i>Supplier resource mobilization</i>
Foerstl et al. (2013)	Integration purchasing and all other functions	<i>Purchasing performance</i>
Horn et al. (2014)	Integration purchasing and all other functions	Precondition for <i>external integration</i>
Kaufmann and Gaeckler (2015)	Integration purchasing and all other functions	<i>Purchasing decision-making speed</i>
Schütz et al. (2020)	Integration purchasing and all other functions	Moderates effect of purchasing knowledge on savings performance
Williams et al. (2013)	Internal SCI	Moderates effect of supply and demand visibility on responsiveness
Zhao et al. (2011)	Internal SCI	<i>Supplier integration</i>

2.2.2 Internal integration dimensions: collaboration and interaction

As can be seen in Table 1, internal integration has mostly been described as a process that consists of two separate processes: interaction and collaboration. Interaction comprises the communication aspects that belong to cross-functional activities (Kahn & Mentzer, 1996). The interactive process consists of verbal and documented information exchange between functions, for example meetings, emails, phone calls, informal conversations and written reports (Bals et al., 2009; Lambert et al., 2005). Information sharing is a crucial part of internal integration (Flynn et al., 2010, p. 60). The other element that makes up the definition of internal integration is collaboration, which refers to the willingness of departments to work together (Kahn & Mentzer, 1996). As Kahn and Mentzer (1998) stated, the concept distinguishes itself from interaction in that “collaboration focuses on working together, having mutual understanding, having a common vision, sharing resources, and achieving collective goals” (p. 55). Collaboration focusses more on the attitudinal aspect, where employees work together informally and share ideas because they want to work together and join forces voluntarily (Bals et al., 2009). Thus, collaboration is a more informal process that depends on the ability to trust each other, to build meaningful relationships and to value one another’s expertise (Ellinger et al., 2006). It could be argued that collaboration is linked to interaction because information exchange needs to be high in order for functions to collaborate well. However, Hsieh and Chen (2007) found that interaction does not significantly influence collaboration.

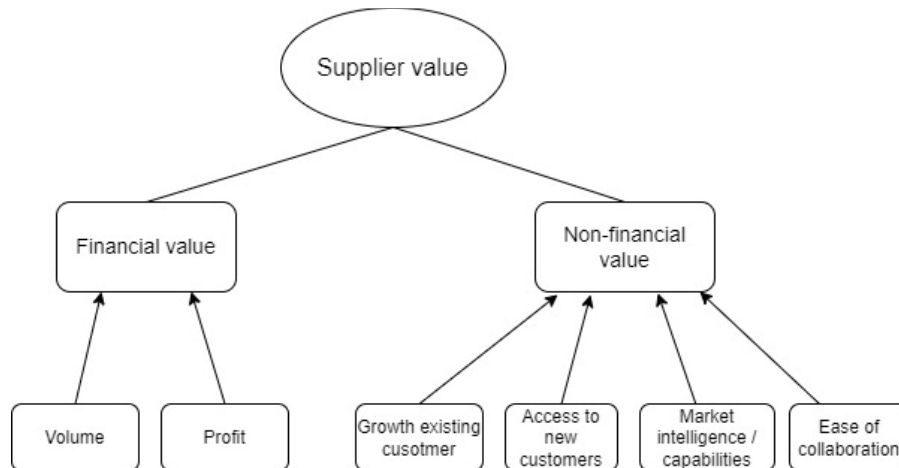
Only a few researchers have made a distinction between interaction and collaboration within their empirical research regarding internal integration, even though most definitions describe internal integration as consisting of these two dimensions. Ferreira et al. (2019) found that the collaboration, versus interaction, dimension has a stronger influence on the integration between functions. The informal behavioral mechanisms behind the collaboration dimension have a stronger influence on the activities between the functions and on organizational results (Ellinger et al., 2006). Therefore, collaboration seems to have a stronger influence on a firm’s activities than interaction.

However, no research has been conducted on the different effects of interaction and collaboration within a purchasing context. This paper addresses this gap by differentiating between interaction and collaboration to examine whether these dimensions influence resource allocation and supplier value differently. Knowing whether and how the dimensions influence resource allocation differently can help companies in deciding on whether they should focus on developing interaction or collaboration in specific situations.

2.3 Supplier value

Based on the definitions of Ramsay and Wagner (2009) and Blois (2004), the definition of supplier value in this paper is *the difference between the perceived benefits and the perceived costs arising from supplying a particular customer*. Central in this definition is the perception of the supplier. Supplier value is not about what a firm actually gains but about the perceived gain. Therefore, supplier value can be influenced by changing the supplier’s perception of the benefits and costs stemming from the exchange. Supplier value is a multidimensional construct, consisting of financial and non-financial value (Songailiene et al., 2011; Toth et al., 2014) (See Figure 1). Financial value refers to the expected volume and profit associated with the customer and the risks that are linked to these factors (Songailiene et al., 2011; Walter et al., 2001). Financial value can be determined based on previous exchanges or on expected growth, due to agreements within a contract or the customer’s reputation and size (Hald et al., 2009; Songailiene et al., 2011).

Figure 1. Supplier value dimensions (Songailiene et al., 2011; Toth et al., 2014)



Supplying a customer can also create non-financial value (Songailiene et al., 2011; Toth et al., 2014). A customer might be of strategic value because of its' market intelligence and the growth it is expected to enable through access to new customers or an increase in business within an existing relationship (Songailiene et al., 2011; Werani, 2001). Additionally, strategic value can be influenced by a customer's status and reference value in the industry (Songailiene et al., 2011). Being a supplier of large and prestigious customers can increase a supplier's reputation, making itself more attractive to new customers (Stahl et al., 2003). Additionally, the customer's access to market intelligence can be a source of strategic value because it enables suppliers to identify opportunities which would otherwise be difficult to realize (Songailiene et al., 2011). In well-established relationships, a supplier can learn from the customer's capabilities through information sharing, which can then be used in other exchange relationships as well (Hald et al., 2009).

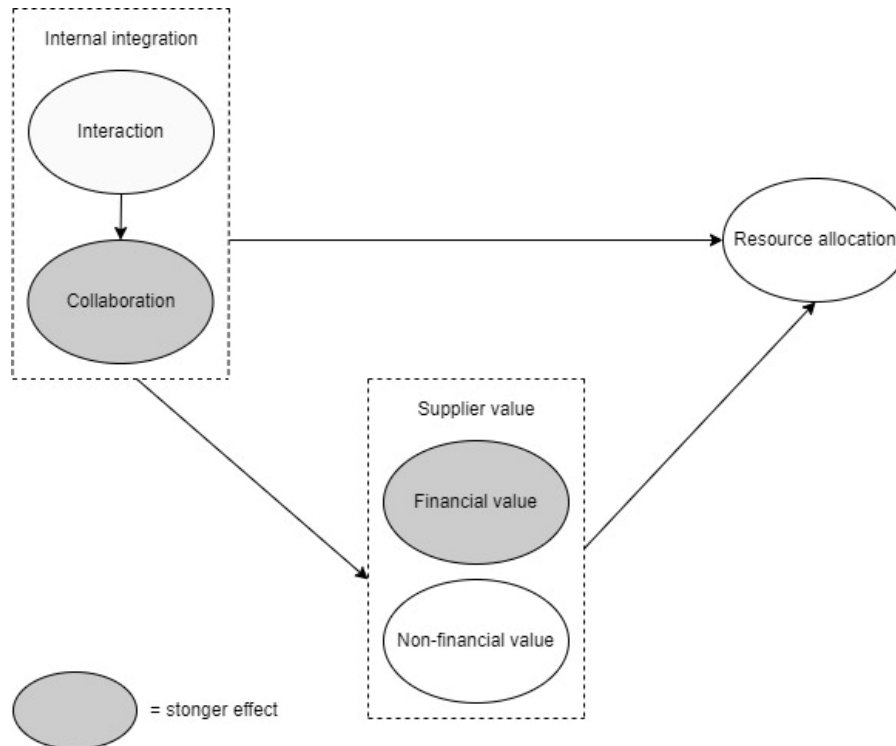
Non-financial value might also be derived through the ease of collaboration with the customer. The interaction of knowledge-related, operational, and social capabilities of the customer can make it easier to work together with the customer and can thereby increase non-financial value (Songailiene et al., 2011). Knowledge-related capabilities, such as a detailed understanding of the product and knowledge about the market, allow for streamlined communication, which facilitates the operating processes between the buyer and supplier. Customers with high operational capabilities are more likely to provide predictable demand. This predictability allows for co-production through the formation of routines. Operational routines may result in reduced operational efforts and costs for the supplier. Lastly, social capabilities help to form trust and commitment within the relationship, which facilitates the co-creation of value.

Research has shown that low internal integration can affect a supplier's costs through supplier resource mobilization (Ellegaard & Koch, 2012). Since supplier value is partially determined by the costs of supplying a customer, the increase in costs likely decreases supplier value. Therefore, taking into account SET, internal integration is likely to influence supplier value. How internal integration exactly influences supplier value and whether the different dimensions of supplier value have a different effect is unknown and will be examined in this paper.

3. HYPOTHESES DEVELOPMENT

In this paragraph hypotheses are built on SET and existing research. First, two baseline hypotheses regarding the direct and indirect effects of internal integration on supplier resource allocation are defined. Then, hypotheses regarding the micro dynamics of internal integration and supplier value are formed. Interaction is linked to collaboration within the conceptual model, as it can be argued that interaction is needed for good collaboration. The hypotheses are visualized in Figure 2. The next chapter will elaborate on the methods used to test the hypotheses.

Figure 2. Research model



3.1 The direct effect of internal integration on supplier resource allocation

It can be argued that suppliers are directly affected by the level of integration of the buying firm. Functions that are internally integrated display high levels of interaction and collaboration (Kahn & Mentzer, 1996). In this situation, functions communicate and exchange information on a regular basis, have a common vision and are willing to work together towards the same goal (Bals et al., 2009; Lambert et al., 2005). Thus, the functions are likely to display coordinated behavior towards the supplier (Ellegaard & Koch, 2012). As a result, the supplier will not have to spend time on explaining matters to both purchasers and other internal functions, and promises made by one function are likely to be upheld by other functions. Besides, internal integration positively influences the level of information exchange between the buying firm and the supplier (Kanter, 1994; Zhao et al., 2011).

On the other hand, low integration can result in lack of shared interpretation of information between functions (Williams et al., 2013). As a consequence, purchasing employees and other employees with boundary-spanning roles can give mixed signals to suppliers. For example, one function can make an agreement with the supplier that the other function does not know about or does not approve of because the supporting arguments are not communicated. This inconsistency of behavior and noncompliance to an agreement by one department can have multiple negative effects for the supplier. For instance, a supplier might be forced to schedule

extra meetings in order to understand the requirements of the customer. The supplier may also need to engage in rework because it is expected to make changes to an already designed or produced product. Another negative consequence might be that the supplier is forced to engage in conflict resolutions to solve disputes caused by the buying firm's inconsistent behavior.

Thus, communication and collaboration with an internally integrated firm is more efficient than with a firm which functions are not internally integrated (Kanter, 1994; Zhao et al., 2011). Consequently, SET predicts that a supplier will allocate its resources to the buying firm that is internally integrated, as the supplier expects this relationship to be the most rewarding (Qiu, 2018). Based on SET, the supplier creates an incentive for the buying firm to increase its positive behavior by allocating its scarce resource to the internally integrated buying firm (Blau, 1964)

H1: Internal integration positively affects supplier resource allocation

3.2 Supplier value as a mediating variable between internal integration and supplier resource allocation

Besides a direct effect of internal integration on supplier resource allocation, an indirect effect of internal integration that is mediated by supplier value is expected. As previously discussed, low internal integration leads to uncoordinated behavior (Ellegaard & Koch, 2012) and lack of shared interpretation of information (Williams et al., 2013), which could require the supplier to mobilize more resources in order to serve the customer effectively. When the different functions within the buying company, for example purchasing and engineering, provide contradictory information and do not comply to agreements made by the other function, the supplier might have to engage in extra meetings, rework and conflict resolution. Thus, low internal integration might result in a supplier having to invest more resources than initially planned (i.e. higher costs) without receiving more benefits (Ellegaard & Koch, 2012). The supplier could, therefore, get the perception that the exchange relationship with the customer leads to high costs. As these cost elements and the communication between parties are sources of supplier value (Ramsay & Wagner, 2009), low internal integration is expected to lower supplier value. When allocating resources, SET predicts that a buying firm with low internal integration, and therefore low perceived supplier value, will not obtain preferential resource allocation because the supplier will allocate its resources to the customer with the highest supplier value (Emerson, 1976; Lambe et al., 2001; Thibaut & Kelley, 1959).

On the other hand, a high level of internal integration implies that communication and collaboration between functions are efficient (Kahn & Mentzer, 1996; Pagell, 2004). The buying firm's efficient processes keep the costs of the exchange relationship low, increase the efficiency of the supplier's processes and increase the quality of communication between the buying firm and supplier. As all of these aspects are sources of supplier value (Ramsay & Wagner, 2009), internal integration is expected to positively influence supplier value. According to SET, the customer's positive behavior is expected to be reciprocated by the supplier to create an incentive for the customer to increase its positive behaviors (Blau, 1964). In addition, SET predicts that when the supplier perceives supplier value to be higher in the relationship with this customer than in the relationships with other customers, the supplier will allocate its scarce resources to the former (Lambe et al., 2001; Thibaut & Kelley, 1959). Because internal integration is related to preferential resource allocation, and because internal integration positively affects supplier value, a mediating effect of supplier value is expected.

H2: The relationship between internal integration and supplier resource allocation is mediated by supplier value.

3.3 The effects of the internal integration dimensions: collaboration versus interaction

Internal integration consists of interaction and collaboration (Kahn & Mentzer, 1996; Pagell, 2004). Whereas interaction refers to the communication aspects, collaboration focusses on the attitudinal aspects related to working as a team (Bals et al., 2009; Kahn & Mentzer, 1996). To work as a team, members should be willing to work together towards a common goal with a shared vision (Bals et al., 2009). It can be argued that the dimensions are related so that interaction can positively influence collaboration, as is reflected in the conceptual model. However, it is hypothesized that the dimensions of internal integration have a different effect on supplier resource allocation.

When interaction is low and collaboration high, the different functions will not meet on a regular basis and only limited information is shared (Flynn et al., 2010; Kahn & Mentzer, 1996). However, since collaboration is high, the functions will have a common vision, shared goals and a higher willingness to work together and share resources. High collaboration also means that employees will work together informally and share ideas because they want to work together and join forces (Bals et al., 2009). It is expected that this cross-functional willingness to work together will have a greater influence than interaction on the collaboration and communication with a buying firm. When functions are willing to work together and have a shared vision, it is more likely that the functions display coordinated behavior. Coordinated behavior is less likely to occur if information is shared between functions in, for example, the form of meetings and emails without these functions wanting to join forces and work together. In the latter situation, the different departments will follow their own vision, resulting in uncoordinated behavior and unstable processes. Ultimately, this will make it less efficient to work with a buying firm (Dyer & Chu, 2000; Ellegaard & Koch, 2012; Sako & Helper, 1998). Since collaboration, versus interaction, is expected to influence the ease of collaborating with the buying firm the most, and since SET predicts that that a supplier will allocate its resources to the buying firm which is expected to provide the supplier with the highest rewards (Qiu, 2018), it is expected that collaboration has a stronger effect on supplier resource allocation than interaction.

Only a limited number of researchers have made a distinction between interaction and collaboration within the internal integration literature. Most researchers that have differentiated between these dimensions seem to agree that collaboration has a stronger effect than interaction. Ferreira et al. (2019) found that collaboration has a stronger influence on internal integration than interaction. Furthermore, Hsieh and Chen (2007) concluded that whereas collaboration positively influences NDP performance, no correlation with interaction could be found. These studies seem to imply that collaboration has a stronger effect than interaction.

H3: The collaboration dimension of internal integration has a stronger positive effect on supplier resource allocation than the interaction dimension of internal integration.

In the next paragraphs and hypotheses, we will revisit and combine the previous hypotheses and dive deeper into the micro dynamics. It is expected that collaboration not only has a stronger effect on resource allocation, but also on both dimensions of supplier value.

When two firms exhibit the same degree of low integration, the firm that has the highest degree of cross-functional collaboration will most likely experience fewer negative effects of low internal integration. The high level of collaboration will make it more likely that the supplier perceives the functions as willing to work together and coherent. Even though low interaction might lead to extra costs for the supplier due to resource mobilization (Ellegaard &

Koch, 2012), the supplier is likely to expect that this is a short-term or sporadic situation, as the supplier perceives the functions as willing to integrate. The supplier is likely to believe that the functions will be more integrated in the future and, therefore, expects the financial and non-financial benefits associated with internal integration to be higher in the long-term. This expectation is in line with Freitas et al. (2020), who found that the willingness to work together can increase trust, which enhances internal integration. According to SET, suppliers also take into account forecasted rewards and costs (Thibaut & Kelley, 1959). Therefore, the supplier will perceive the value of the exchange relationship to be higher when it expects the benefits of the relationships to increase over time (high collaboration), than when the situation would stay the same (low collaboration).

H4a: The collaboration dimension of internal integration has a stronger positive effect on financial value than the interaction dimension of internal integration.

H4b: The collaboration dimension of internal integration has a stronger positive effect on non-financial value than the interaction dimension of internal integration.

3.4 The mediating effects of the supplier value dimensions: financial versus non-financial

The different dimensions of supplier value are also expected to affect the relationship between internal integration and supplier resource allocation differently. Low internal integration leads to mobilization of resources by the supplier, such as extra meetings and rework (Ellegaard & Koch, 2012). The mobilization will always lead to costs for the supplier. These costs lower the profit associated with the buying firm. As a result, the sales objectives of the supplier, such as profit margins, are lowered. As profit is a source of financial value (Songailiene et al., 2011), internal integration is expected to strongly affect the financial value dimension. On the other hand, non-financial value is expected to have a weaker mediating effect. As discussed, non-financial value is influenced by the ease of working with and the strategic value of a customer (Songailiene et al., 2011). Internal integration can make it easier for a supplier to work together with the buying firm because internal integration ensures efficient processes and communication mechanisms within the buying firm (Foerstl et al., 2013; Kaufmann & Gaeckler, 2015). Besides, internal integration enables external integration because of the systems to integrate data and share information that are established within the buying firm (Horn et al., 2014; Zhao et al., 2011). Therefore, internal integration affects the ease of the operating process for the supplier (Lane et al., 2006). It is assumed that internal integration only weakly affects strategic value. The mechanisms to share information within the buying firm make it more likely that a buying firm is able to share its knowledge and capabilities with the supplier (Zhao et al., 2011), which is a source of non-financial value (Hald et al., 2009; Songailiene et al., 2011). However, the possibility to grow through access to new suppliers and customers is not influenced by internal integration. Additionally, the buying firm's reputation and size is likely to stay the same, regardless of the level of internal integration. Since it is expected that internal integration only weakly affects strategic value, it is expected that non-financial value has a weaker mediating effect than financial value.

H5: Financial value has a stronger mediating effect on the relationship between internal integration and supplier resource allocation than non-financial value.

4. RESEARCH METHODOLOGY

4.1 Research design

To test the hypotheses, a quantitative study has been conducted. Quantitative research was chosen because internal integration within a purchasing context has already been explored by other researchers (Cousins et al., 2006; Ellegaard & Koch, 2012). Quantitative methods can be used to test hypotheses that are derived from the knowledge from existing research (Carr, 1994). Quantitative research methods are fitting to answer “how” questions, such as the research question of this study (Rasinger, 2013). Where qualitative methods are suited to explore the mechanisms behind social events, quantitative methods are suited for measuring variables within the social world (Rahman, 2016). Within this research, the objective is to investigate how internal integration affects supplier value and supplier resource allocation. Quantitative research is needed to measure the levels of the different variables, internal integration, supplier value and resource allocation, and to examine the cause and effect relationships (Carr, 1994). Advantages of quantitative research are that the findings are more generalizable than qualitative findings, because a larger sample is involved, and that the results are replicable (Daniel, 2016). Disadvantages are that quantitative methods do not reveal the deeper underlying meanings and mechanisms and that they only take a snapshot, by measuring a variable at a specific moment in time (Rahman, 2016).

PLS analysis was used to assess the conceptual model. This regression-based SEM technique is well suited for testing models with latent variables (Pulles et al., 2016b). PLS also allows for analyzing multiple relationships simultaneously (Ramli et al., 2018). Therefore, PLS is capable of testing an entire model. The software SmartPLS 3 was used to test the proposed model (Ringle et al., 2015).

4.2 Sample and data collection

The quantitative study has been conducted at a technical firm and a CNC machine manufacturer. The first firm is a Dutch division of a multinational company that designs and builds technical solutions. The Dutch division focusses on the defense, cybersecurity, and transportation market. Suppliers of the firm are often in contact with multiple departments. As the firm produces technically complex products, engineers often work together or interact with suppliers to make sure that the products are fitting. Besides, since the company has over 2000 employees in the Netherlands only, suppliers can be in contact with many different people within the purchasing and engineering department. Both factors give rise to the importance of internal integration within the firm. Given the importance of internal integration, this setting is highly suitable for testing the hypotheses. The second firm, the CNC machine manufacturer, is a Dutch company that provides solutions for the steel construction and manufacturing industry with over 500 employees. Next to purchasers, suppliers of this manufacturer are often in contact with engineers from the R&D department to discuss technical aspects of the procured products. As a consequence, internal integration is an important aspect in this manufacturing company, making the setting suitable for this research.

Surveys were sent in the period of May-June 2022 to three different parties: suppliers, purchasers and internal other functions that are in direct contact with suppliers. The host firms provided a list with all suppliers that produce products which are used in the firm's end product (i.e., direct materials). The list with suppliers was checked to see if the firm had recently conducted business with the suppliers. The result was a list with 111 applicable suppliers, with 80 suppliers of the technology firm and 31 of the machine manufacturer. A link to an online survey was sent to all the contacts on the list. To ensure face validity,

multiple people with different functions within the companies have read over the survey. Multiple steps were taken to raise the response rate. Before sending out the surveys, an introductory email was sent to all the suppliers in which the topic of the research was explained and the survey was announced. The purchaser that is in contact with the given supplier the most was put in the carbon copy to not give the appearance of spam. A week later, the survey was sent via email. Another week later, a reminder email was sent with a link to the survey. A total of 54 suppliers completely filled in the survey, which results in a response rate of 48.65%. The majority of the suppliers of this final sample are located in the Netherlands. Comparative t-test revealed no significant differences between the respondents of the Netherlands and respondents from other countries. Nonresponse bias was assessed by conducting comparative tests based on the data that one of the buying firms provided. With an average spend of €969,538.98 for the respondents and €711,022.38 for the nonrespondents, no significant difference was found. Table 3 provides an overview of the respondents' demographic profiles.

Table 3. Profiles respondents

	Firm 1 – Technology company	Firm 2 – Machine manufacturer
Industry	Defense, cybersecurity, transportation	Industrial machinery
Size (employees)	2.500 Dutch division (80.000 worldwide)	500
Supplier surveys	27	27
Response rate	33.75%	87.10%
Profile participating suppliers		
Supplier size ^a	567	610
Relationship length ^b	18.3	14.4
Respondent tenure ^b	15.0	12.4
Industry ^c	Industrial machinery 22.2% Chemicals/Pharmaceuticals 3.7%	Industrial machinery 63% Automotive 3.7%
Location ^c	Netherlands 59.3% Germany 7.4% Belgium 7.4% United Kingdom 7.4%	Netherlands 66.7% Germany 22.2% Belgium 7.4% France 3.7%
Profile purchasers		
Function	92.6% Strategic purchaser 7.4% Team lead strategic purchasers	59.3% Tactical purchaser 40.7% Strategic purchaser
Work experience ^b	18.3	3.6
Organizational tenure ^b	8.9	3.1
Profile internal other function		
Function	Engineering 92.6% Purchasing 3.7% Supply chain management 3.7%	Engineering 74% Work preparation 11.1% After sales 11.1% Purchasing 3.7%
Work experience ^b	26.8	14.2
Organizational tenure ^b	16.2	8.7
Relationship length with purchaser ^b	3.4	4.2

a. Average number of employees of participating suppliers

b. Average number of years

c. Highest percentages

N = 54

In the next step, surveys were sent out to purchasers and internal other functions that are in contact with the given supplier the most. For each supplier, one purchaser and one internal other function filled in a survey to assess each triangular relationship. The internal other functions were mostly engineers, as these are often in contact with suppliers regarding the manufacturability and development of new products. The purchasers that filled in a survey as an internal other function were always from a different department than the other purchaser from the triangular relationship. For example, when a strategic purchaser filled in a survey regarding the purchasing perspective, an R&D purchaser filled in a survey regarding the internal other function. This ensured that the integration between two different departments was measured. Of the 33 employees with internal other functions that filled in the survey, 17 filled in two or more surveys about different suppliers. The purchasers that filled in the survey were strategic and tactical buyers. Of the 16 purchasers that filled in a survey, 10 purchasers filled in two or more surveys about different suppliers. After combining the supplier data with the purchaser and internal other function data, the final sample size was 103. This is in line with Hair et al. (2010) who argued that a minimum sample of 100 is required when testing hypotheses with five or less latent constructs.

Data on the dependent and independent variables were collected from multiple sources in order to reduce common method bias (Podsakoff et al., 2003). To reduce social desirability bias for all for all three surveys, respondents were informed that the data would be anonymized and would not be shared with the host company (Nederhof, 1985). In addition, respondents were notified that there are no good or bad answers and that they should pick the answer that is the most applicable to their situation. Respondents were also notified that they will receive a summary of the results of the survey. A short version of the management report will be distributed to all respondents once the host company has given approval.

4.3 Measures

Table 4 lists the measures that were used to test the hypotheses. All items were measured on a seven-point Likert scale ranging from 1 (“strongly disagree”) to 7 (“strongly agree”). Supplier resource allocation was measured from the supplier’s side by using two different variables: physical resource allocation and innovation resource allocation. Both measures are based on the scales of Pulles et al. (2022) and measure the extent to which the supplier grants the company priority in the use of physical or innovation resources compared to its other customers.

For internal integration, the purchasers and internal other functions were asked to assess the two dimensions interaction and collaboration. Interaction emphasized the extent and quality of communication between the purchasing department and other departments that are in direct contact with suppliers. Collaboration measured the extent to which both functions collaborate and work as a team when dealing with the supplier. Both measures were developed based on the scales of Zhao et al. (2011) and Horn et al. (2014) and were adapted to clearly reflect the separation of the different dimensions of internal integration. Including two items on both interaction and collaboration, made it possible to measure the influence of the different dimensions of internal integration. For both interaction and collaboration, an average was taken for the scores given by the purchasers and internal other functions.

Supplier value was also measured along two dimensions. Suppliers were asked to assess the financial and non-financial value related to the buying company. Whereas financial value assesses the financial return related to the customer, non-financial value measures the strategic benefits. The items used to measure these constructs were based on the work of Toth et al. (2014).

Table 4. Measurement items

Constructs (source)(respondent)	Measurement items	Factor loadings
Physical resource allocation (Pulles et al., 2022) (supplier)	Compared to our other customers...	
	... we grant this customer priority in the utilization of our production facilities/equipment.	0.96
	... we give this customer priority in the allocation of our production capacity.	0.96
	... we allocate our scarce materials to this customer in case of capacity bottlenecks.	0.89
Innovation resource allocation (Pulles et al., 2022) (supplier)	Compared to our other customers...	
	... we are more willing to share key technological information with this customer.	0.87
	... we share our best ideas with this customer first.	0.87
	... we dedicate more innovation resources to the relationship with this customer.	0.86
Interaction (Horn et al., 2014; Zhao et al., 2011) (purchaser and internal other function)	In dealing with this supplier, to what extent is your department interacting and collaborating with other involved departments?	
	My department often interacts with other departments in dealing with this supplier.	0.82
	We have good communication with other departments regarding this supplier.	0.93
Collaboration (Horn et al., 2014; Zhao et al., 2011) (purchaser and internal other function)	In dealing with this supplier, to what extent is your department interacting and collaborating with other involved departments?	
	My department has good collaborations with other departments in dealing with this supplier.	0.94
	My department and other departments work as a team regarding this supplier.	0.92
Supplier financial value (Toth et al., 2014) (supplier)	The financial returns related to this customer are high.	0.62
	The margins related to this customer are high.	Removed
	We reached or even exceeded our sales objectives with this customer.	0.88
Supplier non-financial value (Toth et al., 2014) (supplier)	The strategic benefits related to working with this customer are high.	0.90
	The knowledge/information benefits related to working with this customer are high.	0.90
	The reputation benefits related to this customer are high.	0.85

4.4 Data validity and common method bias

Several tests were conducted to assess the reliability and validity of the model. First, confirmatory factor analysis was conducted to assess the indicator reliability. The factor loadings can be found in Table 4. One indicator for supplier financial value was removed as it was below the threshold of 0.70 and because removing the indicator led to an increase in the convergent validity above the threshold of 0.5 (Hair et al., 2021). Next, the internal consistency reliability was assessed with the measures composite reliability and Cronbach's alpha. Except for supplier financial value (0.29), all constructs had a Cronbach's alpha between 0.70 and 0.93, which is above the threshold of 0.70. All composite reliability scores, also for supplier financial value, ranged between 0.73 and 0.95. Therefore, the levels of internal consistency reliability for these constructs are satisfactory (Nunnally, 1978). Even though the Cronbach's alpha for supplier financial value was not satisfactory, the construct was kept in as to test the hypotheses. All the other measurement model tests that were performed on supplier financial value were satisfactory.

Then, the convergent validity was checked by assessing the average variance extracted (AVE). All constructs showed an AVE above 0.50, which indicated that all constructs explain 50 percent or more of the indicator's variance that makes up the construct (Hair et al., 2021). Furthermore, the square roots of the AVE values were greater than their correlation coefficients with the other constructs (Table 5), except for interaction. The correlation coefficient for collaboration was greater than the square root of the AVE value for interaction. Therefore, all constructs except for interaction fulfill the requirement for discriminant validity (Fornell & Larcker, 1981). The final step in assessing the measurement model was checking for common method bias, as some constructs were measured by asking a single respondent. To do this, a collinearity test was conducted (Kock, 2015). Since all VIF values were below the threshold of 5, no evidence of common method bias has been found (Kline, 1998).

Table 5. Means, standard deviations, reliability, and validity

Construct	M	SD	Cronbach's α	AVE	CR	1	2	3	4	5	6
1. Physical resource allocation	5.30	1.06	0.93	0.87	0.95	0.93					
2. Innovation resource allocation	5.45	0.96	0.84	0.75	0.90	0.51	0.87				
3. Interaction	5.30	1.38	0.70	0.76	0.87	-0.00	-0.10	0.87			
4. Collaboration	5.59	0.60	0.85	0.87	0.93	0.03	-0.03	0.89	0.93		
5. Supplier financial value	5.14	1.43	0.29	0.58	0.73	0.19	0.35	-0.06	-0.03	0.76	
6. Supplier non-financial value	5.43	1.08	0.86	0.79	0.92	0.31	0.41	-0.11	-0.14	0.56	0.89

M, mean; SD, standard deviation. Bold elements on the diagonal represent the square roots of the AVE. Off-diagonal elements are correlations between the constructs. N = 54

4.5 Control variables

Several control variables were included to check if certain supplier-specific attributes affected the relationship. First, the model was controlled for relationship length, as an exchange relationship can change over time (Pulles et al., 2022; Vanneste et al., 2014). As a relationship develops, a supplier's willingness to allocate resources can change as well. Suppliers were asked to indicate the relationship length in years. Next, supplier dependence was controlled for because supplier dependence has shown to influence supplier resource allocation (Pulles et al., 2022). Supplier dependence was measured by asking the supplier how easy they could replace the sales volume with that of other buyers and how dependent they are on the customer. Dependence was measured based on the items used by Terpend and Krause (2015). Lastly, the influence of trust on the supplier side was controlled for. Previous research shows that trust on the supplier's side can influence resource allocation in certain situations (Pulles et al., 2014). Trust was measured on two dimensions, goodwill trust and competence trust. Competence trust measures the supplier's trust in the competences of the buyer. Goodwill trust measures the extent to which the supplier trusts the buyer to be fair and willing to help outside of the contractual agreements. These measures were based on the scales by Pulles et al. (2014).

5. RESULTS

Figure 3 shows the full structural model. As can be seen in the model, interaction is negatively related to physical supplier resource allocation ($\beta = -0.121$, $p = 0.736$) and innovation supplier resource allocation ($\beta = -0.300$, $p = 0.349$). Both relationships are negative, while it was hypothesized earlier that this relationship would be positive. Collaboration on the other hand, is positively related to physical supplier resource allocation ($\beta = 0.175$, $p = 0.587$) and innovation supplier resource allocation ($\beta = 0.281$, $p = 0.361$). The positive relationship corresponds to the hypothesis. As the effects of interaction and collaboration are nonsignificant, H1 is rejected. Table 6 shows the p-values of the indirect effects. All the p-values are above 0.05, and therefore, no empirical support was found for H2. Supplier value does not seem to mediate the relationship between internal integration and supplier resource allocation.

Furthermore, it was expected that collaboration has a stronger effect on supplier resource allocation and supplier value. The results show that collaboration, versus interaction, has a stronger effect on physical ($\beta = 0.175$, $p = 0.587$ vs. $\beta = -0.121$, $p = -0.736$) and innovation resource allocation ($\beta = 0.281$, $p = 0.361$ vs. $\beta = -0.300$, $p = 0.349$). However, these effects are not significant. As a result, H3 is not supported. Collaboration, versus interaction, positively affects financial supplier value stronger ($\beta = 0.100$, $p = 0.802$ vs. $\beta = -0.146$, $p = 0.731$). Interaction, versus collaboration, has a stronger effect on non-financial supplier value ($\beta = 0.043$, $p = 0.905$ vs. $\beta = -0.173$, $p = 0.622$). Since these effects are nonsignificant, H4a and H4b are also not supported. Looking at Table 6, it can also be concluded that financial supplier value has a stronger mediating effect on the relationship between interaction and physical resource allocation and between interaction and innovation resource allocation. The mediating effect of non-financial value is stronger when collaboration, instead of interaction, is the independent variable. However, none of the mediating effects is significant and thus, H5 is rejected.

Due to the limited sample size, none of the effects are significant. Therefore, the beta-values 0.15 and -0.15 were chosen as cut-off values. Values above 0.15 and below -0.15 are seen as a substantial effect. Taking these cut-off values into account, a few substantial effects can be seen within the conceptual model. First, collaboration seems to have a substantial positive and direct effect on physical resource allocation and innovation resource allocation. As interaction

does not substantially affect supplier resource allocation, the finding seems to be in line with H3. Second, interaction has a substantial negative and direct effect on innovation resource allocation. Third, the negative effect of collaboration is above the cut-off value. The effects that are above the cut-off value are displayed with a dashed line in Figure 3.

Figure 3. Results of structural equation model

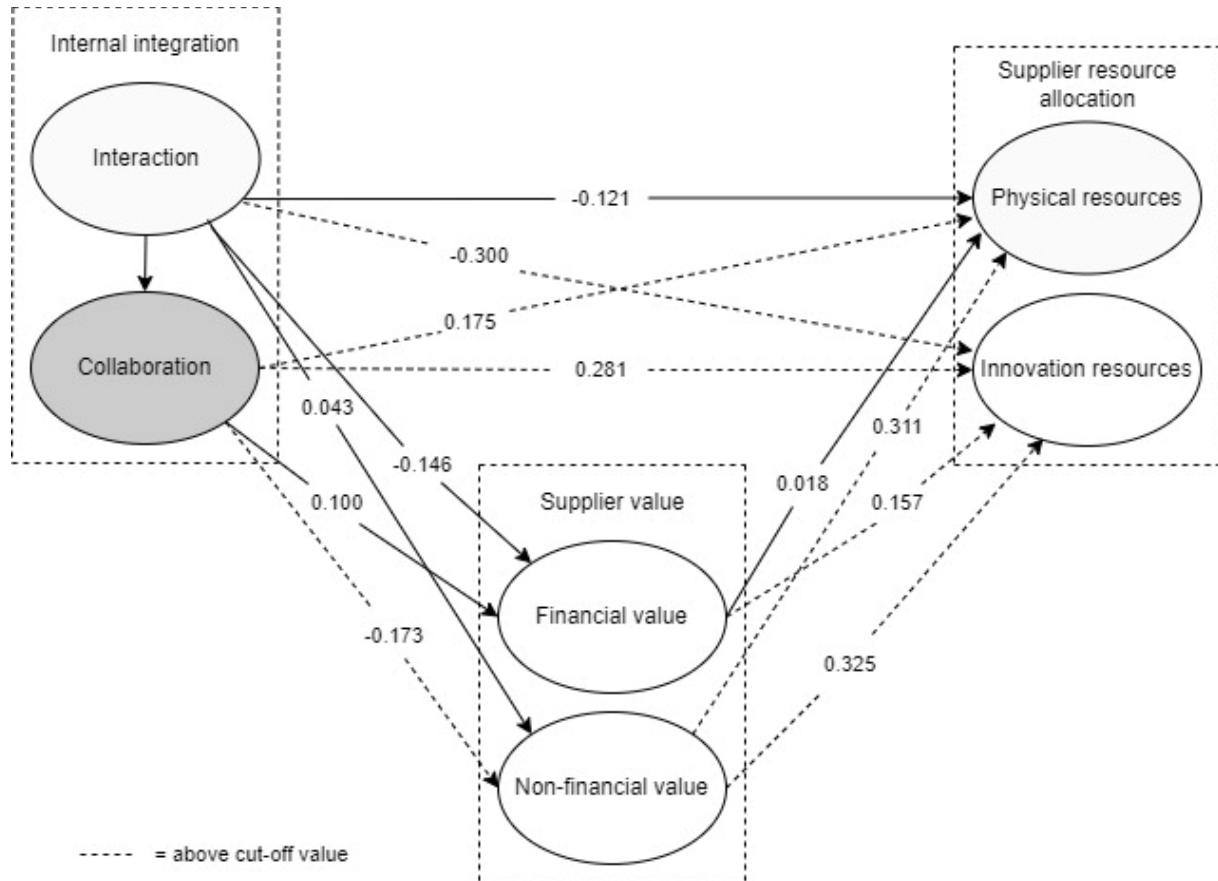


Table 6. Results H2

Mediating effect	β	P-value
Interaction → Non-financial SV → Physical SRA	0.013	0.914
Interaction → Non-financial SV → Innovation SRA	0.014	0.918
Interaction → Financial SV → Physical SRA	-0.003	0.978
Interaction → Financial SV → Innovation SRA	-0.023	0.828
Collaboration → Non-financial SV → Physical SRA	-0.056	0.690
Collaboration → Non-financial SV → Innovation SRA	-0.056	0.690
Collaboration → Financial SV → Physical SRA	0.002	0.983
Collaboration → Financial SV → Innovation SRA	0.016	0.872

6. DISCUSSION

The results of this study show that the different dimensions of internal integration, interaction and collaboration, do not significantly affect supplier resource allocation. Furthermore, supplier financial and non-financial value are not significantly affected by internal integration and do not mediate the relationship between internal integration and supplier resource allocation. However, when taking into account the cut-off value, it was found that the different dimensions of internal integration have a different effect on supplier resource allocation. Collaboration has a substantial positive effect on both dimensions of supplier resource allocation. Interaction, on the other hand, has a negative effect on physical resource allocation and a substantial negative effect on innovation resource allocation. Furthermore, it was found that collaboration has a substantial negative effect on non-financial value.

6.1 Theoretical contributions

The findings contribute to the literature that includes internal integration and supplier value as factors influencing supplier behavior (Ellegaard & Koch, 2012; Foerstl et al., 2013; Hald et al., 2009; Kaufmann & Gaeckler, 2015; Songailiene et al., 2011; Toth et al., 2014) and to the literature regarding supplier resource allocation (Baxter, 2012; Pulles et al., 2016a; Pulles et al., 2016b; Vos et al., 2016). By combining the different dimensions of both internal integration and supplier value, this study allows for several findings. First, as expected based on SET, it was found that the collaboration dimension of internal integration has a stronger direct effect on supplier resource allocation than the interaction dimension. This finding implies that the relationship identified by Ellegaard and Koch (2012) may be more complex than initially thought. Collaboration, instead of interaction, might influence resource allocation stronger because collaboration has a stronger effect on the function's coordination of behavior. High collaboration means that functions have a high willingness to work together, share resources and have a common vision and goals (Kahn & Mentzer, 1996). High collaboration also implies that the functions work together informally and share ideas because they want to work together as one front (Bals et al., 2009). These aspects might give rise to coordinated behavior, which can influence supplier satisfaction and trust (Dyer & Chu, 2000; Ellegaard & Koch, 2012; Sako & Helper, 1998). Interaction, on the other hand, concerns information sharing between functions (Kahn & Mentzer, 1996). Sharing information between functions that are not willing to work together and which do not have a common vision can lead to uncoordinated behavior and a decrease in supplier satisfaction and trust. Since supplier satisfaction and trust have shown to be factors that influence supplier resource allocation and since collaboration influences these factors more, collaboration might have shown a stronger effect on resource allocation. The finding might also have implications for other research regarding the effect of internal integration on supplier behavior, such as external supplier integration (Horn et al., 2014; Zhao et al., 2011), so that the effect of collaboration might be different than interaction within these situations.

Second, the results show that interaction negatively influences supplier resource allocation directly. This is contradictory to the expectation that interaction has a direct and indirect positive influence on supplier resource allocation. In line with Santa et al. (2010), the findings show that solely implementing formal communication mechanisms, such as cross-functional teams, is not enough to affect organizational performance. Clear and consistent shared goals are needed for cross-functional integration to be successful (Santa et al., 2010). A possible explanation of the negative influence of interaction might be that interaction, such as meetings, emails, information-sharing and formal cross-functional communication mechanisms, can be time consuming for a buying company (Bals et al., 2009; Lambert et al., 2005). Without a clear and consistent goal that is shared across the functions, interaction might be a waste of

resources that could otherwise be used to invest in supplier relationship management (Ross et al., 2008). When a buying firm spends a great amount of time on cross-functional interaction, it can be that less time is available to invest in relational capabilities, such as building personal relationships, trust, and respect. Since relational capabilities have shown to positively influence supplier resource allocation (Pulles et al., 2016b), not investing resources into the development of these capabilities can negatively affect supplier resource allocation. Since these relational capabilities are an antecedent of supplier satisfaction and preferred customer status, the finding that interaction without collaboration has a negative influence on the supplier's behavior might also contribute to the literature regarding preferred customer status (Hüttinger et al., 2014; Pulles et al., 2016b; Vos et al., 2016).

Third, it was found that supplier value does not mediate the relationship between internal integration and supplier resource allocation. Furthermore, the dimensions of internal integration do not affect supplier value. In other words, the level of interaction and collaboration within the buying firm do not affect what the supplier perceives to gain from the relationship with the buying firm (Blois, 2004; Ramsay & Wagner, 2009). These findings are contradictory to the idea that the level of information sharing between functions, which is caused by internal integration, affects supplier value (Williams et al., 2013). The finding might also imply that internal integration does not affect the buying firm's coordination of behavior, as was concluded by Ellegaard and Koch (2012). The results show that instead of collaboration affecting resource allocation through supplier value, collaboration only directly influences supplier resource allocation. These findings imply that suppliers do not allocate its scarce resource to internally integrated firm because the rewards in this relationship are perceived to be higher, but because allocating the scarce resources to the internally integrated firm serves as an incentive for the buying firm to increase its positive behavior (Blau, 1964). Furthermore, the results show that the effect of collaboration on non-financial value is even negative and above the cut-off value. A possible explanation might be that collaboration is very time consuming (Tsai & Hsu, 2014). As a result, less time can be invested in the relationship with the supplier, making collaborating with the buying firm less efficient for the supplier, or in developing market knowledge and capabilities. As both are sources of non-financial value (Songailiene et al., 2011), high collaboration may negatively influence non-financial supplier value. The finding also contributes to the literature regarding supplier resource allocation (Baxter, 2012; Pulles et al., 2016a; Pulles et al., 2016b) by highlighting that buying firms can still obtain preferential resource allocation, even though the benefits the supplier expects to receive from supplying a customer are low.

6.2 Practical contributions

Next to the theoretical contributions, the practical contributions of this study are twofold. First, it was found that collaboration positively influences supplier resource allocation, while interaction has a negative impact on innovation resource allocation. This finding implies that when trying to increase internal integration, buying firms should be aware that the attitude of its employees towards integrating with colleagues from other functions is the first and most important step to obtain preferential resource allocation from suppliers. Solely investing in communication mechanisms and information sharing between functions might even have a negative impact on supplier resource allocation when the willingness to work together and a clear vision is not present. Employees should be eager to work together and willing to share ideas and resources. In addition, a common vision and shared goals between different functions helps to realize coordinated behavior between functions (Santa et al., 2010), which ultimately influences supplier behavior. Therefore, before investing resources in setting up formal communication mechanisms between functions, such as cross-functional teams and meetings, buying firms should invest in explaining the added value of integration towards its

employees. Besides, managers should try to make sure that the reward-systems of employees within different functions encourage employees to work towards common goals (Pagell, 2004). Collaboration could also be enabled through a joint task structure, where functions share responsibility (Pagell & Wu, 2006, p. 301).

Second, it was found that collaboration negatively influences non-financial supplier value. The finding implies that when a buying firm invests in cross-functional collaboration, it has less time to invest in its market intelligence or its knowledge-related, operational, and social capabilities, which normally make it easier to work together with the customer (Songailiene et al., 2011). Therefore, buying firms should be aware of the amount of time that is invested in cross-functional collaboration. Even though cross-functional collaboration can be rewarding because of preferential resource allocation, cross-functional collaboration can also be very time-consuming and buying firms should, therefore, look for the right balance (Tsai & Hsu, 2014).

6.3 Limitations and future research

This study comes with some limitations that should be taken into account when drawing conclusions based on the findings. The limitations can also provide opportunities for future research. The two buying firms that form the setting of this research are Dutch and operating in the machinery industry and high-tech industry that provides solutions for the defense, cybersecurity, and transportation market. The sample size of 103 is in line with Hair et al. (2010) who argued that a minimum sample of 100 is required when testing hypotheses with five or less latent constructs. However, since the sample size is still small, the theoretical and practical contributions are based on the cut-off beta-values of 0.15 and -0.15. Therefore, the findings may not be generalizable. Besides, the data on the buyer's side has only been collected at two firms. It is likely that the level of internal integration is similar for employees within the same firm. Therefore, future research should incorporate data on a large sample of buying firms within more industries and countries to enlarge the scope of the findings.

Internal integration was measured by collecting data from purchasers and other employees of the buying firm, which could give rise to social desirability bias (Podsakoff et al., 2003). Employees might not be honest when they are answering questions about their employing firm (Ried et al., 2022). Future research can handle this bias by also analyzing more objective data, such as reports, meetings and company structures, as done by Cheng et al. (2022). Besides, all respondents have indicated to at least somewhat agree on the statements that the interaction and collaboration between the functions is good, which can indicate acquiescence bias (Baxter et al., 2015). This possible bias can also be reduced in future research by using multiple data methods or by using other measurement items for internal integration, such as the ones used by Cousins et al. (2006) or Narasimhan and Das (2001).

The results of this study show that collaboration influences supplier resource allocation, without being mediated by supplier value. Collaboration even negatively influences innovation resource allocation. Further research can examine why suppliers decide to allocate their scarce resource to firms with good cross-functional collaboration when this negatively influences the perceived non-financial gain related to the relationship with the customer. Future research could also investigate why collaboration negatively influences non-financial supplier value and whether this effect is because cross-functional collaboration takes up a lot of the buying firm's time. While doing so, it should be taken into account that non-financial supplier value may be influenced by many other factors that are not considered in the research model (Hald et al., 2009; Songailiene et al., 2011; Stahl et al., 2003; Werani, 2001). Future research should also take other factors into account, such as knowledge capabilities, access to new customers and ease of collaboration, to provide a more complete picture of the

underlying mechanisms. Lastly, only few studies have differentiated between the dimensions of internal integration, interaction and collaboration (Ferreira et al., 2019; Franz et al., 2016; Hsieh & Chen, 2007). It might be interesting to differentiate between the different dimension within all future research regarding internal integration as it allows for an understanding of the importance of the dimensions in different contexts.

ACKNOWLEDGMENTS

First and foremost, I am very thankful for the support and the prompt responses my supervisor, dr. ir. Niels Pulles, has given me over the course of completing this master thesis. Besides, I greatly appreciate having had the opportunity to gather data at the hosting company. Hereby I thank the respondents again for making the time to participate. I also want to thank the colleagues of the hosting company that guided me through the practical issues of this research.

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APPENDICES

Appendix A: Definitions internal purchasing integration

Concept	Definition	Focus of study	Reference
Cross-functional integration	“The <i>interaction and collaboration</i> of the PSM function with other functions, such as product development, production and manufacturing, and marketing”	Purchasing integration	Foerstl et al. (2013, p. 694)
Cross-functional integration	“... <i>sharing and processing information</i> in organisations”	Purchasing integration	Heikkilä et al. (2018, p. 4)
Functional integration	“Functional Integration implies <i>information shared and understood</i> with/by the other function, and this information being <i>translated into aligned decisions</i> ”	Purchasing-marketing integration	Gonzalez-Zapatero et al. (2017, p. 773)
Interdepartmental integration	“a process of interdepartmental <i>interaction</i> and interdepartmental <i>collaboration</i> that brings departments together into a cohesive organization”	Logistics integration	Kahn and Mentzer (1996, p. 9)
Internal integration	“A process of <i>interaction and collaboration</i> in which manufacturing, purchasing, and logistics work together in a cooperative manner to arrive at mutually acceptable outcomes for their organization”	Purchasing-operations integration	Ellegaard and Koch (2012, p. 150)
Internal integration	“...the degree to which a manufacturer <i>structures</i> its own organizational <i>strategies, practices and processes into collaborative, synchronized processes</i> , in order to fulfill its customers’ requirements”	SCI	Flynn et al. (2010, p. 59)
Internal integration	“Internal integration refers to <i>unifying functions and processes</i> inside the firm and includes those related to warehousing, transportation, inventory management, purchasing, demand planning, and production”	Logistics-supply management-production integration	Germain and Iyer (2006, p. 32)
Internal integration	“...the magnitude of <i>interaction and communication</i> , the level of <i>information sharing</i> , the degree of <i>coordination</i> , and the extent of <i>joint involvement</i> across functions”	Purchasing integration	Horn et al. (2014, p. 56.57)
Internal integration	“a process of <i>interaction and collaboration</i> in which manufacturing, purchasing and logistics work together in	Purchasing-manufacturing-logistics	Pagell (2004, p. 460)

	a cooperative manner to arrive at mutually acceptable outcomes for their organization”	integration	
Internal integration	“...a process of <i>interaction and collaboration</i> in which manufacturing, purchasing and logistics work together in a cooperative manner to arrive at mutually acceptable outcomes for their organization”	Purchasing-manufacturing-logistics integration	Pagell and Wu (2006, p. 297)
Internal supply chain integration	“...a <i>collaborative system of cross-functions</i> within manufacturers to meet customer satisfaction”	SCI	Kim and Chai (2016, p. 466)
Internal supply chain integration	“The <i>coordinated and strategic alignment of business processes and functions</i> within an organization that is organized to ensure that firm achieves maximum performance”	SCI	Kumar et al. (2017, p. 817)
Lateral purchasing integration	“Lateral purchasing integration employs three separate but closely interrelated integration mechanisms or dimensions: stakeholder integration, process integration, and data integration”	Purchasing integration	Kaufmann and Gaeckler (2015, p. 218)
Purchasing integration	“...the integration and <i>alignment of strategic purchasing practices and goals</i> with that of the firm”	Purchasing integration	Cousins et al. (2006, p. 778)
Purchasing integration	“Purchasing integration involves <i>the active participation of purchasing in the strategic debate</i> within the firm, and is aimed at promoting the <i>alignment of purchasing practices and goals with strategic business priorities</i> ”	Purchasing integration	Narasimhan and Das (2001, p. 596)
Purchasing integration	“...the <i>involvement</i> of purchasing in <i>strategic planning activities</i> , such as strategy meetings, as well as the contribution to the company through challenging demand and to optimization initiatives through supply market analysis”	Purchasing integration	Schütz et al. (2020, p. 3)

Appendix B: Effects of purchasing integration in reviewed literature

Reference	Concept	Definition	Focus of study	Effect on
Cousins et al. (2006)	Internal integration	“...the integration and alignment of strategic purchasing practices and goals with that of the firm” (p. 778)	Integration purchasing and all other functions	<i>Supplier relationship outcomes</i> (product design, process design, product quality, lead times, contribution increase product sales) <i>Supplier integration</i> <i>Financial performance</i>
Ellegaard and Koch (2012)	Internal integration	“A process of interaction and collaboration in which manufacturing, purchasing, and logistics work together in a cooperative manner to arrive at mutually acceptable outcomes for their organization” (p. 150)	Purchasing-operations integration	<i>Supplier resource mobilization</i>
Flynn et al. (2010)	Internal integration	“...the degree to which a manufacturer structures its own organizational strategies, practices and processes into collaborative, synchronized processes, in order to fulfill its customers’ requirements” (p. 59)	Internal SCI – Integration between all functions	<i>Operational performance</i> (lead-time, flexibility, on-time delivery, speed NPD) <i>Business performance</i> (sales growth, ROI, profit)
Foerstl et al. (2013)	Cross-functional integration	“The interaction and collaboration of the PSM function with other functions, such as product development, production and manufacturing, and marketing” (p. 694)	Integration purchasing and all other functions	<i>Purchasing performance</i> (price savings, total cost, quality, lead-times and contribution to innovation)
Germain and Iyer (2006)	Internal integration	“Internal integration refers to unifying functions and processes inside the firm and includes those related to warehousing, transportation, inventory management, purchasing, demand planning, and production” (p. 32)	Integration warehousing, transportation, inventory management, purchasing, demand planning, and production	<i>Logistical performance</i> (delivery lead-times, inventory turnover rates, on-time delivery to customer)
Horn et al. (2014)	Internal integration	“...the magnitude of interaction and communication, the level of information sharing, the degree of coordination, and the extent of joint involvement across functions” (p. 56.57)	Integration purchasing and all other functions	Precondition for <i>External integration</i>
Jääskeläinen and Heikkilä	Cross-functional	-	Integration purchasing and all	<i>Customer value</i> (new supplier offerings,

(2019)	integration		other functions	supply flexibility and speed (NPD)
Kaufmann and Gaeckler (2015)	Lateral purchasing integration	“Lateral purchasing integration employs three separate but closely interrelated integration mechanisms or dimensions: stakeholder integration, process integration, and data integration” (p. 218)	Integration purchasing and all other functions	<i>Purchasing decision-making speed</i>
Kim and Chai (2016)	Internal supply chain integration	“...a collaborative system of cross-functions within manufacturers to meet customer satisfaction” (p. 466)	Internal SCI – Integration between all functions	<i>Overall performance</i> (ROA, profit, lead time, deliver reliability, ability to respond to poor supplier performance, customer response time)
Kumar et al. (2017)	Internal supply chain integration	“The coordinated and strategic alignment of business processes and functions within an organization that is organized to ensure that firm achieves maximum performance” (p. 817)	Internal SCI – Integration between all functions	<i>Supply chain performance</i> (production flexibility, inventory turns, order fulfilment rate, total logistics costs)
Schütz et al. (2020)	Internal integration	“...the involvement of purchasing in strategic planning activities, such as strategy meetings, as well as the contribution to the company through challenging demand and to optimization initiatives through supply market analysis” (p. 3)	Integration purchasing and all other functions	Moderates effect of purchasing knowledge on <i>savings performance</i>
Williams et al. (2013)	Internal supply chain integration	“The extent to which internal functional teams (e.g., operations, purchasing, logistics, sales, marketing, finance, engineering, information technology) work together to accomplish supply chain planning and execution” (p. 552)	Internal SCI – Integration between all functions	Moderates effect of supply and demand visibility on <i>responsiveness</i>
Zhao et al. (2011)	Internal supply chain integration	“Internal integration refers to the degree to which a firm can structure its organizational practices, procedures and behaviors into collaborative, synchronized and manageable processes in order to fulfill customer requirements” (p. 19)	Internal SCI – Integration between all functions	<i>Supplier integration</i>