Theoretical Basis of Supply Management
The Network Theory in Supply Management

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ABSTRACT
During the last decades several so called 'grand theories' have been proposed to underpin supply management and purchasing. They are meant to progress these disciplines by providing a theoretical basis to the field. Next to theories as for instance the resource based view, the resource dependency theory, the transaction cost economics or the agency theory, the network theory has been put on the agenda of researchers. The network theory describes the relationships between companies located in the same supply chain. The concept developed over time from the simple consideration of relationships or strategic alliances between just two companies, towards the explanation of relationships between several counterparts within a supply network, are they suppliers, organisations, buyers, customers or manufacturers. However, no clear consensus have emerged in the field of the contribution of the theory towards supply management and purchasing yet. Therefore, this literature review aims to provide insight in the applicability of the network theory for supply management and purchasing. Besides describing general facts about the theory, namely the history, the underlying assumptions, the description of an empirical test retrieved from the literature, a core concept of the theory is developed in order to provide insight in the most important hypotheses and variables of the theory. These factors helped to reveal the contribution of the theory for purchasing and supply management. For this, a 3-phase model including four major decision points for purchasers was developed to show the applicability of the theory for each aspect. Lastly, a matrix was developed in order to create an overview of the most important contributions which can be used by managers and purchasers interested in the field of networks in supply management.

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1. INTRODUCTION

The correct management of the supply chain and the effective use of strategic purchasing play vital roles in today's organisations. The strategic purchasing function of an organisation is important to secure and organize the supply of materials (Monczka, Handfield, Giunipero, Patterson, & Waters, 2010, p. 12). No organisation can operate in isolation, but also acts as a customer while buying materials from a supplier for the own manufacturing process (Monczka, et al., 2010, p. 6). Therefore, organisations have to engage in the strategic sourcing process and deal with several decisions in order to find adequate suppliers.

During the last decades several so called "grand theories" have emerged to explain the effective management of the supply chain. Besides managing the overall supply chain, these theories include the management of supplier relationships with respect to making effective use of the supply base. According to Chicksand et al. (2012), theories are essential in order to understand the complex environment in which organisations are operating (Chicksand, Watson, Walker, Radnor, & Johnston, 2012, p. 456). Thus, theories contribute to purchasing and the management of the supply base.

The evaluation of the contribution of a grand theory to supply management presupposes an understanding of the activities of the purchasing function.

The span of control (i.e. the main responsibilities) of a purchasing function can be summarized as follows: evaluate and select suppliers, review materials bought, act as the primary contact with suppliers and decide how to make a purchase (Monczka, et al., 2010, pp. 28-29). However, besides these main activities, the purchasing function has a broader range of objectives, such as the support of organizational goals and objectives, the development of an integrated purchasing strategy in line with corporate objectives, the support of operational requirements, the efficient and effective use of resources, supply base management as well as the development of intra-firm relationships (Monczka, et al., 2010, pp. 25-26). The strategic direction of a corporation is outside the range of control of the purchasing function and happens at an earlier stage as the purchasing process itself. Further, the main activities are depended on supportive processes in order to be efficient and effective. For instance, a sourcing strategy needs a supporting cost- and/or risk-based analysis.

Based on these considerations, four major decision points have been determined as the main factors with which the purchasing department has to deal with. These decision points are included in the three phase model which structures the annual activities of the purchasing department, namely the anteceding processes, the primary processes and the supporting process. The entailed decision points can be defined as the demand planning decision, the category strategy, the supply strategy and the negotiation. A detailed description of these decision points will be given in one section of the paper.

As already stated the grand theories have emerged during the last decades. Besides theories as for instance the resource based view, the resource dependency theory and the agency theory, the network theory is one of the most important theories which have been considered to be a contribution to purchasing and supply management. Whereas for example the resource dependency theory can be seen as a current strategy, the network theory is assumed to describe future strategies (Shook, Adams, Ketchen Jr, & Craighead, 2009, p. 9). Traditional strategies considered firms to be independent entities which aim to build resources and market positions for reaching competitive advantage (Zaheer, Gulati, & Nohria, 2000, p. 212). In the network theory, markets are viewed as a system of relationships among various entities including for instance customers, suppliers, or manufacturers (Coviello & Munro, 1995, p. 50). Firms which are now operating in networks, are considered to gain advantage, not through the achievement of own goals, but through the business relations and partnerships they are engaged with in the network (Zaheer, et al., 2000, p. 203).

This literature review aims to examine the contribution of the network theory to the real-life business, and mainly the contribution to purchasing and supply management. For this, the following research question was designed:

RQ1: In how far does the network theory contribute to purchasing and supply management?

In order to answer this question, the paper is structured in different sections. First a short summary of the network theory will be given, including the main findings, and the applicability for the sourcing decisions. Afterwards the network theory is examined by introducing the history and the origins of the theory. The next section deals with the underlying assumptions researchers have made about the network theory and which could be found in the existing literature. This is followed by a section including a presentation of the core concept of the network theory by defining the most important hypotheses, as well as variables, and which further provides a core model which visualises the most important factors. Furthermore, empirical findings on the network theory, retrieved from the existing literature will be described. Here, one empirical investigation of researchers will be summarised and described. Subsequently, the next section deals with the actual contribution of the network theory towards purchasing and supply management, by applying the concept on four decision points which were defined as the major activities of the purchasing department in an organisation. These findings will be further summarised in a matrix. Finally, the last section is meant to provide concluding thoughts, incorporating the main critics made by researchers about the theory, as well as managerial implications.

As already stated the first section of the literature review aims to provide a short summary of the network theory, the main findings and a short

explanation of the applicability towards the four decision points.

2. THE NETWORK THEORY IN SUPPLY MANAGEMENT

2.1 Summary of the Network theory: Its importance for supply management, the main findings and the applicability for sourcing decision support

The network theory is one of the grand theories for purchasing and supply management which have been introduced during the last decades. Mainly the network theory is considered to describe the relationships in which companies, suppliers, customers or buyer are engaged. The theory was first introduced during the 1970s and the 1980s and developed from the focus on relationships between just two entities, or strategic alliances, towards an approach which entails multiple relationships between different counterparts throughout the supply chain. Harland (1996), defines the network as a *specific type of relation linking a defined set of persons, objects or events* (Harland, 1996, p. 67). Chang, Chiang & Pai (2012) further state that *the supply chain network is a complicated network model, and its specific context depends on the relationships among the network members* (Chang, Chiang, & Pai, 2012, p. 1114). Next to this Thorelli (1986) states that the term *network refers to two or more organizations involved in long-term relationships* (Thorelli, 1986, p. 37). Moreover, networks are seen as beneficial for every company embedded through the investments and actions of the other counterparts involved in the process (Håkansson & Ford, 2002, p. 134).

Furthermore, it was found that there are several underlying assumptions, as for instance that a central position of companies within a network could lead to competitive advantage, or that companies share information and knowledge with their partners. Moreover, in terms of the contribution to purchasing it can be said that the theory is applicable to the most important decision points. The theory helps with the demand planning through the simplification of the resource allocation reached through the settlement of strategic long-term partnerships. Moreover, companies embedded in a network have the ability to choose from a greater set of suppliers and through this can even ensure the supply of critical commodities. Furthermore, the relationships among companies are assumed to be trustworthy and thus contribute to the value addition on both sides and further simplify the decision about the selection of the supply strategy. Lastly, the network theory contributes to the fourth decision point, namely the negotiation, since companies in networks aim to engage in long-term contracts through which strong partnerships between the counterparts are designed.

These findings will be discussed in detail in the following sections, starting with the history of the network theory and the definition of its origin.

2.2 The History of the Network Theory: An outline of the origin of Networks in Supply Management

As described by many researchers, the network theory deals with the cooperation of firms with various entities, as for instance suppliers, customers or buyers throughout their supply chains.

To start with the history and origins of the theory it can be stated that the term ‘relationship’ in the 1970s, although the term ‘supply chain management’ was already present at that time, was not in use to describe operations as for instance with suppliers (Harland, 1996, p. 69). Still, a first introduction in terms of supplier evaluation and the contribution of stronger relationships towards quality, delivery and price was evident (Harland, 1996, p. 69). However, the early research during this decade, started with focusing on closer relationships between two companies, by examining topics such as trust, co-operations or strategic partnerships and not on the network perspective itself (Mills, Schmitz, & Frizelle, 2004, p. 1015). After that period and during the early 1980s the organisations in the business environment started to report shifts towards an increase in competition, and aligned a call for the movement away from a central coordination and multi-level hierarchies, towards a variation of flexible structures, indicating that the traditional hierarchical pyramids are resembled towards a network approach (Snow & Miles, 1992, p. 53). During that time, highly competitive firms started to downsize to their core competences, reconstructed the management hierarchies and started to outsource certain operational activities (Snow & Miles, 1992, p. 55). Vice versa, new business organisations avoided growth by focusing on vertical integration, but instead searched for strategic alliances with independent suppliers (Snow & Miles, 1992, p. 55). Despite incorporating the network approach, early research of the 1980s still focused on the observation of the collaboration of simple partnerships between two organisations, or the description of strategic partnerships and alliances (Yee & Platts, 2006, p. 231). After that, a broader view on so called ‘supply networks’ was taken by researchers and they started to incorporate, the process of product development and collaborative learning, next to the actual flow of materials (Mills, et al., 2004, p. 1015). The interest of researchers moved away from focussing on solely one business unit or organisation, towards the examination of the management of dyadic relationships with long-term cooperative partners (Yee & Platts, 2006, p. 231). A network perspective was brought to the agenda of studies about strategic alliances and the creation of inter-organisational networks contributing to the formation of strategic alliances was first introduced (Gulati, 1999, p. 398). From that time on, strategic

alliances were considered to be *essentially dyadic exchanges, key precursors, processes, and outcomes* which can be *defined and shaped by the network within most firms are embedded* (Gulati, 1999, p. 398). Since the late 1980s, Supply chains were defined as the network that contributes to the inbound and outbound of products and services within the value chain, and thus have gained more alertness from the theorists in organisations (Miles & Snow, 2007, p. 459). It was assumed that the introduction of the term 'network' was meant to widen the concept of supply chain management to gain more knowledge about resource potential and increase the effectiveness of partnerships (Lamming, Johnsen, Zheng, & Harland, 2000, p. 676). This was due to the fact that, the literature and certain empirical investigations discovered that organisations were generally embedded in more than one supply chain with several customers and different suppliers (Mills, et al., 2004, p. 1014). From that time on, the concept of 'supply networks' was researched in two different ways which influenced the development of the whole concept, described by Lamming, Johnsen, Zheng & Harland (2000). In their research they state that a descriptive study on industrial networks was conducted by the researchers of the Industrial Marketing and Purchasing Group (IMP), who created models in order to enhance a better consensus of business markets in relation with connections between buyers and suppliers and the embeddedness of organisations in networks. Next to that another study, which belongs to the more prescriptive studies on the management of supply chains, was according to Lamming et al. (2000), investigated in the sector of strategic management, operations management and logistics (Lamming, et al., 2000, p. 675).

Although the network theory has no clear origin when it was first introduced, it was still an important topic discussed in research during the 1970s and 1980s. Researchers have been primarily concerned with the grasp of what makes an organisation effective, and which processes are required for this. However, the understanding of achieving effectiveness though the exchange and interaction with other parties of the supply chain was recognized throughout the past decades (Håkansson & Snehota, 1989, p. 188). Nevertheless, as Miles & Snow (2007) claim in their article, *the emergence of the multi-firm network organization opened a whole new arena for strategic choice, and many firms became much stronger competitors by linking with specialist providers in an integrated supply chain* (Miles & Snow, 2007, p. 460).

Whether this statement could be accepted as true and if the network theory really created new opportunities for managers in organisations will be discussed in the following sections, starting with the underlying assumptions researchers have made about the network theory.

2.3 Assumptions: Why Researchers think the Network theory is an appropriate Concept for Supply Management

This section is meant to provide the most important assumptions which can be found in the existing literature and were stated by researchers and theorists. Besides a more general view on the assumptions underlying the theory and its operations itself, four major assumptions can be retrieved from the existing literature, which deal with the relationship building of companies in the network, the centrality a certain firm entails within its network, as well as the information sharing among the entities. Each of these assumptions will be discussed in the following, starting with the underlying assumptions concerning the relationship building of companies in a network.

As already stated above, the network theory is supposed to define the relationships among competitive firms within the supply chain network. Therefore, the first underlying assumption of the network theory is that companies embedded within a network cannot freely decide how to act towards their own aims, nor can they operate in isolation from each other (Håkansson & Ford, 2002, p. 135). However, the organisations' actions and operations with other firms in a network are assumed to be fully understood as a fragment of significant counterparts as well as strategic relationships (Håkansson & Ford, 2002, p. 135). According to Harland (1996), there are different factors which can be identified as being important while formatting a network, namely the selection of collaborative partners, the establishment of a competitive position, the monitoring of competitors, and the correct management of relationships (Harland, 1996, p. 67). Further, Håkansson & Snehota (1989) claim that if a company was able to attract other firms to do business with, and they share a common interest and a certain business environment with each other, the company is embedded in relationships with other organisations, and thus be part of a network (Håkansson & Snehota, 1989, p. 191). Shook et al. (2009), concludes that the network theory does not explicitly provide an explanation for companies of when to make, buy or ally, however it seems to give an explanation for companies of which other firm they should choose to buy from, or hire as strategic alliance partners (Shook, et al., 2009, p. 5). Thus, the correct management as well as the strategic search for companies with which to start a relationship, is a central point in the theory of networks. Håkansson & Snehota (1989), even go so far, as arguing that *some of the organization's relationship with other organizations in the network constitute in themselves one of the most – if not the most – valuable resources that it possesses* (Håkansson & Snehota, 1989, p. 193). Further they argue that through these relationships, resources and activities are easier to access, and in return, be better mobilized as well as utilized by the

organisation in order to enhance its own performance (Håkansson & Snehota, 1989, p. 193).

The next assumption derived from the network theory in supply management is that the centrality of a firm embedded in a network is an important factor and could explain a competitive position or advantage. As already argued, no company in a network can work in isolation and they are dependent on their established relationships with other parties. Through this, one could gain the impression that there is no centre in the network and that each company operates with a common goal in mind. However, being able to establish a more central position within a network and create stronger relationships with firms or suppliers which are central to the network could be valuable. In order to be able to establish such a strong position, Miles et al. (2006) describe that organisations, which want to be able to hold a strong collaboration with other firms, should start with working on the ability to collaborate internally in an effective manner. Thus, firms located in the centre of a network could be considered to comprise a strong internal collaborative power inside their own business unit (Miles, Miles, & Snow, 2006, p. 7). Moreover, a key factor to success is the access to resources when needed. Occupying a central position within a network, enhances the awareness for resources and capabilities which are obtainable within the supply chain and further have a positive impact on the coordination between the buying firm and the suppliers (Bernardes & Zsidisin, 2008, p. 212).

Furthermore, it is assumed that networks contribute to the information sharing among the entities in the supply chain. Normally information, as for instance the costs of something or where to retrieve the best resources, are not shared among organisations in the same supply chains, since they could fear that their competitors could use it to their advantage (Ballou, Gilbert, & Mukherjee, 2000, p. 17). Further organisations could fear that sharing information about their unique products, as well as the resources needed for the production, could lead to imitation by other companies in the supply chain, and through this they might lose their competitive advantage (Lamming, et al., 2000, p. 681). Still, networks are assumed to be open for information sharing among companies and thus offer great learning potential. Zaheer et al. (2000) defines that, *strategic networks provide a firm with access to information, resources, markets, and technologies; with advantage from learning, scale and scope economies; and allows firms to achieve strategic objectives, such as sharing risks and outsourcing value-chain stages and organizational functions* (Zaheer, et al., 2000, p. 203).

2.4 The core concept of the Network theory: Defining the main Hypothesis, Variables and a presentation of a Core Model

Besides, stating definitions, providing inside in the history of the theory and the presentation of the underlying assumptions, a theory needs other aspects to be considered as a good theory. Chicksand et al. (2012), claim in their article, that next to its ability to explain and forecast empirical phenomena, a theory must entail certain factors to be considered as a scientific method as well as to make sure that each researcher is able to understand what is being said, and either agree or disagree on the investigated theory (Chicksand, et al., 2012, p. 456). First of all, these factors include the description of the units of analysis, which are assumed to be the *'what' or 'whom' being studied* (Babbie, 2010, p. 98). Concerning the network theory, the unit of analysis being studied is most often the network itself, or the companies operating in this specific network (Chicksand, et al., 2012, p. 461). After defining the unit of analysis, the next step to study the theory is to create certain hypotheses, which could be either confirmed or rejected after the empirical test. A hypothesis is concerned to be *an expectation about the nature of things derived from a theory,* and further *it is a statement of something that ought to be observed in the real world if theory is correct* (Babbie, 2010, p. 46). A hypothesis for the network theory could for example stand in line with the above stated research question which was mentioned in the introduction. Thus, the hypothesis could have the wording that, the network theory contributes to the field of purchasing and supply management. Another possible hypothesis which is based on the underlying assumptions researchers have made could be, that the central position of a firm in a network contributes to competitive advantage. Besides defining the unit of analysis and the hypothesis of a theory, Wacker (1998) states that the process of creating a good theory entails the definition of variables (Wacker, 1998, p. 361). Two types of variables can be found in the literature, namely the independent and dependent variable, each of them containing two values. An independent variable by definition consists of *values that are not problematic in an analysis but are taken as simply given* and further an independent variable *is presumed to cause or determine a dependent variable* (Babbie, 2010, p. 18). In reverse, a dependent variable is *assumed to depend on or be caused by another* (Babbie, 2010, p. 18). Various articles of the existing literature of researchers dealing with the definition or operations of the network theory, tried to define the most important variables and statements of the concept. For instance, Harland (1996) states in her article that the perspective on the network theory has changed and that literature now has its focus on several most important aspects, which are namely the competitive position of networks, the definition of components of networks, the structure of networks, as well as their performance

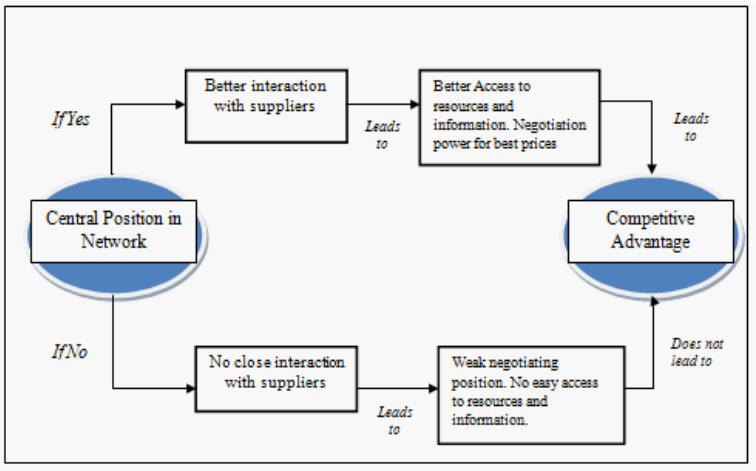

Figure I.: The Effect of a Central Position in Networks

(Harland, 1996, p. 67). A key aspect of the network theory, which could also be described as one of the most important variables of the theory, is the location of the organisation or firm within the network which is assumed to have an influence on the performance and lead to competitive advantage. In other words, *centrality is a key concept within network theory* (Shook, et al., 2009, p. 5). Here, the independent variable would be the centrality of the firm in the network, with the values highly central or low. Likewise, competitive advantage could be considered as the dependent variable. Due to the fact that the relationships of firms within a network are likely to be complex and with a long-term focus, the effective management of these inter-organisational relationships is a key factor for success (Håkansson & Ford, 2002, p. 133; Shook, et al., 2009, p. 4). Firms enhancing a more central position in the network are considered to be more likely to manage relationships as for example with suppliers, and thus be able to increase operational efficiency (Chicksand, et al., 2012, p. 461). Furthermore, a firm being highly central positioned in the network, gains competitive advantage through the ability of placing rush orders and seek out suppliers offering the best prices or quality (Shook, et al., 2009, p. 5). Following the approach of Hult et al. (2006), the central location of a firm within a network enhances the four key aspects of supply chains, speed quality, costs and flexibility (Hult, Ketchen Jr, Cavusgil, & Calantone, 2006, p. 463). Other examples for variables in the theory of networks could be for example embeddedness of a firm, or the sharing of knowledge and information throughout the network (e.g. Bernardes & Zsidisin, 2008; Hult, et al., 2006).

As already stated, a possible hypothesis of the network theory could be that that if a firm is able to achieve a central position in the network this could result in a competitive advantage. In order to visualise this scenario, a model to show the effect of a central position in networks was designed *(see Figure I.)*.

Here the originator is the central position of a company within a network, with two arrows indicating either the achievement of such a position (indicated with 'If Yes'), or the non achievement (indicated with 'If No'). Starting with the negative point of view, which is the non achievement of a central position, the figure shows that this implies that the company has no close interaction with the suppliers and thus no strong relationship. This leads to a weak negotiating position of the company and thus no easy access to resources at a reasonable price or the information of suppliers and other counterparts in the network. The end-result is that the effect of the non-achievement does not lead to competitive advantage.

In reverse the achievement of a central position, as shown in the figure, leads to a better interaction with the suppliers. Through this the company gains better access to resources and information and has a strong negotiating position for best prices. The end result here is positive and implies the competitive advantage.

After defining the most important hypotheses and variables, the core of a theory should be tested. Therefore, an empirical test retrieved from the existing literature will be discussed in the following section.

2.5 Empirics: A presentation of an empirical study on the contribution of the Network theory for Supply Management.

After the description of the underlying assumptions theorists and researchers have made for a certain theory, and the definition of the core of the theory, by stating its most important hypothesis, the concept needs to be tested. According to Colquitt & Zapata-Phelan (2007), these tests are most often designed in order to see whether a certain theory, including the assumptions and hypothesis, are valid (Colquitt & Zapata-Phelan, 2007, p. 1282). With the respect to the network theory, Lamming et al. (2000) claim that most often researchers based their empirical test on certain case examples of firms, which are already embedded in a network, and through this gained some sort of competitive advantage (Lamming, et al., 2000, p. 676). In order to provide insight in the empirical

findings of the network theory, the study of Yee & Platts from the year 2006 will be presented in the following (Yee & Platts, 2006, pp. 230-247).

The aim of their research was to design a framework to seize the interaction of strategic decisions within the network and further grasp how organisations embedded in a network cooperate with each other. For this, the researchers investigated an in-depth longitudinal case study in a supply network which consisted of 20 firms. For the data collection a so called 'Supply Network Analysis Process' (SNAP) methodology, as well as the 'Cambridge's strategy charting technique' was used. Both of the methodologies are intended to capture and display network strategy data in an expressive way. Furthermore the researchers aimed to extend the already existing literature on manufacturing strategy by inserting the key aspects of the strategy into a network context. Through this, knowledge should be provided for managers in order to help them visualising and understanding how their strategic decisions regarding the supply network are developed and implemented at the business strategy level of the firm. Here the methodology used, helped to map the complex information in a reduced form and to a stage in which it could be easier analysed by the managers working in the field of networks. As described in the article, the SNAP tool consists of two circles, namely the objective choice circle as well as the decision choice model. Here, the objective choice circle was used to describe the overall business of the individual firms and their competitive objectives defined as market share and profit. The decision choice model contains three key elements, particularly the internal activities, the target groups, and the strategy approaches. Firstly, the internal activities stand in line with for instance downsizing or expanding activities of a firm. Target groups define the group of dealers the firm has to deal with within the network. Lastly, the strategy approaches refers to the position a firm takes in response to competitors, dealers, and other players. As already stated the SNAP tool was intended to provide a framework for managers. Therefore the original case study was conducted with the help of semi-structured interviews with managers of 13 different organisations, who were responsible for the operations outside their firm. The authors claim that the findings from these case studies revealed many unique working relationships among firms within the supply network. Concerning the extension of the foregone manufacturing strategy they were now able to extend the strategy in terms of business objectives, competitive objectives as well as strategic decisions, and through this be able to develop the intended conceptual framework. This framework helped managers to reveal and understand the significant network strategies. The provision of feedback from the managers showed that the framework was indeed a good help to draw a picture on how networks should be managed, revealed co-operation possibilities, help to organise effective network strategies and to keep an eye on others' performance and strategies over a certain time period. Further, the authors conclude that the framework *enables managers to build a 'Landscape' of their supply networks, to read competitors' movements, to identify markets, and to recognise opportunities for utilising network resources* (Yee & Platts, 2006, p. 244). Lastly it should be stated that the authors developed a tool to analyse decisions and strategies made within a network and the benefits of this can be seen from two sides. On the one hand for managers using the framework to analyse their network, but also for researchers to use the model for their studies or even extend it over time.

After the description of the general aspects of the theory, namely the history, the assumptions, the core and the empirical findings, the network theory can be implicated to the 3-phase model of the purchasing year cycle. This model includes the four major decision points purchaser face in their operations. A detailed description of the model and the application of the theory can be found in the next section.

2.6 The purchasing Year Cycle: An Outline of the four major Decision Points in Purchasing

In order to evaluate the contribution of a theory to supply management one first has to understand the activities of the purchasing function. For this, a 3-phase model was established which aimed to structure the annual activities of the purchasing department. In each phase of the model, purchasers are faced with certain decision-making points, which could function as a testimonial for the evaluation of the contribution of the underlying theory.

The first phase is described as the antecedent process, which occurs outside the range of responsibilities and consists of two different inputs, namely the purchasing targets and the demand planning. The purchasing targets can be considered to be linked to the corporate strategy, whereas the demand planning process determines which material has to be bought at a specified quantity and time (P. Cousins, Lamming, Lawson, & Squire, 2008, pp. 13-15; Monczka, et al., 2010, pp. 33-35). The demand planning process is also considered to be the first decision point, mainly the decision whether to make-or-buy. Coming to the second phase of the model, the primary process, it can be said that this process describes the main tasks of the purchasing department and is divided into 5 different processes. Here, the so called 'Category strategy' describes the first process. The process describes the labelling of products and services which are afterwards categorised into different groups depending on the commodity type. Further, it describes the second decision point in which purchasers have to determine how their sourcing strategy for a certain commodity should look like, be it global or local sourcing, single or multiple sourcing, or sourcing with the help of partnerships or competitive bidding (Schiele, 2006, p. 2; VanWeele, 2005, p. n/a). The

second process is defined as the 'supplier strategy' in which the relationship with a supplier is defined and the actual planned purchasing volume is determined. This step also defines the third decision point, namely the selection of supplier strategies and the performance of supplier portfolio decisions. This step is followed by the fourth process which is called 'quotation, supplier selection and negotiation' which also determines the fourth decision point, namely the awarding of contracts after the negotiation with suppliers and the conducting to the supplier strategies. After that the process of 'operative procurement' ensures that the outcomes of the negotiation as well as the contractual conditions are met. The last process, integrated in the primary process of the purchasing department describes the evaluation of the suppliers, where the actual performance of the supplier is reviewed in term of for instance delivery, quality, costs and service (Monczka, et al., 2010, p. 220).

The last process of the 3-phase model is the so called 'supportive process' which supports the foregone primary process. Although this process does not include activities in the span of control of the purchasing function it still serves as a means to enhance performance, including the four phases of controlling, contract management, organisation and personnel as well as the final analyses.

In conclusion it can be said that there are 4 major decision points which are of great importance to the purchasing department, namely the planning of demand, the category strategy, the supplier strategy and the negotiation. Since these decisions are faced by purchasers throughout every process, the aim is to provide supportive information and operations, through which the purchaser is more efficient and effective in his decision making. Here, the application of the grand theories could be a useful tool to build up understanding and knowledge. Since this paper focuses on the network theory and its contribution to purchasing, the following sections deals with the contribution of the network theory for every decision point.

2.6.1 Application of the decision points

Decision Point 1: Demand Planning

As already stated in the above section, the first decision point, namely the demand planning, provides indication for purchasers of whether to make or buy. Here, the purchasing department has to decide whether the own supply capacities are efficient enough to meet customer requirements by producing the product in-house, or if the supply organisation needs to purchase externally. The resource allocation throughout the supply chain is aligned with high uncertainty. Thus, effective demand planning decreases the uncertainties and with this also the supply risk (Gupta, Maranas, & McDonald, 2000, p. 2613).

With the respect to the network theory it can be said that the structure of a supply network, generally consists of firms located in a network which are engaged in the manufacturing and assembling of parts which are required to produce a finished product (Choi & Hong, 2002, p. 469). Furthermore this approach includes the collaboration among other parties in the network to serve a demand which is generated from the market or industry in which they are operating in (Li, Ji, Sun, & Lee, 2009, p. 841). If a purchasing department in one organisation sees no opportunity to build a specific item in-house, the outsourcing or buying process of this item could be supported by the network approach. As already indicated before, the environment in which businesses are operating is characterised by high uncertainty and ongoing changes. Therefore a large amount of research of the supply networks was focused on the flow of information, as well as resources between organisations within the co-operative environment (Salancik, 1995, p. 346). Due to the fact that firms within a network are linked to each other, the information sharing is high among the counterparts. These information flows between members of the network, allows the purchasing department to increase the accuracy of demand forecasts through which operations become more efficient (Samaddar, Nargundkar, & Daley, 2006, p. 746). Furthermore, close relationships between firms in a network contributes to the development of new competencies, retain resources and share risks (Yee & Platts, 2006, p. 231). This underpins the view that firms in networks are not just focused on the price of the outsourcing process, but more on the co-operative strategic planning (De Toni, Nassimbeni, & Tonchia, 1994, p. 41). And lastly, the production of value to the end-customer has become a co-operative effort for which flexibility and early recognition of demand shifts is vital (Hameri & Paatela, 2005, p. 42). Thus, a network approach for organisations contributes to the purchasing process, since companies within the network aim to reach a common goal, share information among each other, and through this, resources can be attained quicker with a lower risk.

Decision Point 2: Category Strategy

The Category strategy decision point describes the second major activity in the process of a purchasing year cycle, namely the selection of specific sourcing strategies for each category of the business. Here, strategic sourcing can be seen as one of the most valuable aspects of a company, since it enables companies to achieve their aims in terms of assurance of supply, cost reductions, higher competitiveness and quicker time-to-market (Rendon, 2005, p. 9). Each strategy should be defined according to the importance of the commodity type which is purchased. Thus, commodity types which are of high value to the buying firms need explicit sourcing strategies to ensure the supply.

In a network of companies, the sourcing strategies are mostly connected to each other. Since a network can be defined as a set of companies and individuals linked to each other by close partnerships one could also assume that the sourcing strategies employed in the network stand in line with each other. Further it can be said that the overall supply network strategy is considered to improve the supply performance across the whole network (Harland & Knight, 2001, p. 476). Thus, counterparts in the network aim to enhance performance with the help of a corporate supply strategy. Moreover, companies can choose from a greater set of suppliers who are willing to co-operate, and with this ensure the supply of critical assets or commodities as well. Next, the sourcing strategies of a company depend mainly on the value of the commodity in terms of price, value adding profile or on the supply market complexity in terms of supply monopoly, pace of technological advantage and entry barriers. Once a company is located within a settled supply network, the entry barriers are overcome and advantage can be made out of information sharing and co-operation between the partners. Thus, the information flow and technological know-how can have a positive influence on company specific issues, such as pricing, or the development of new products or transportation planning (Christopher & Jüttner, 2000, p. 122). Lastly it can be said that the buyer-supplier relationships in networks are not solely based on price but are assumed to be a co-operative action enhancing the form of intersection between the domains of strategic planning (De Toni, et al., 1994, p. 41). Thus, the categorical planning decisions of the purchasing department can be smoothened through the engagement in networks, since the co-operation and relationships with suppliers ensures the supply of even critical commodity types.

Decision Point 3: The supplier strategy; selecting the right suppliers and making portfolio decisions

After deciding on the right sourcing strategy and the tactical levers, the potential suppliers have to be chosen according to the supply strategy. Purchasing activities with the respect to the development of a supply base are considered to ensure that the suppliers chosen for collaboration are world class. Furthermore, due to the pressure generated from the market, suppliers should provide a set of value adding aspects and through this enable both parties in the relationship to gain competitive advantage (P. D. Cousins & Spekman, 2003, p. 20).

Companies embedded in a supply network can choose from a wide range of suppliers located in the same environment. Moreover, a company within a network is often engaged in long-term contracts with the suppliers. Thus, the chance to create a trustworthy relationship is given, and through this value could be added from both sides of the relationship. Next to that, a trustworthy relationship often entails the transfer of knowledge, know-how and skills. Therefore, both parties are able to enhance performance and reach competitive advantage.

Decision Point 4: Negotiation; Awarding contracts after negotiating with suppliers and taking the supplier strategies into account After deciding whether to make-or-buy, establishing the category strategy and the supply strategy, the last decision faced by purchasers is the negotiation and contracting of suppliers. Here, the terms for the collaboration are defined and contracts are signed. Different types of contracts exist, be they fixed-price, long-term or short-term.

As already mentioned, a network consist of close relationships between companies and suppliers, each building up on trust and the sharing of information as well as knowledge. Therefore, the usual contract type signed by companies and suppliers located in network is a long-term contract which can be seen as a contribution to purchasing. Companies are faced with a highly competitive environment through which they are forced to continuously improve quality and reduce lead times (Aksoy & Öztürk, 2011, p. 6351). Therefore, the purchasing departments aim to establish long-term partnerships with suppliers, and make effective use of the supply base by using fewer but reliable suppliers (Ho, Xu, & Dey, 2010, p. 16). Through these long-term contracts as well as partnerships it is ensured that current but also future needs of the organisation are met (Prahinski & Benton, 2004, p. 39).

The four decision points discussed above belong to the major activities of the purchasing department. Since the network theory was considered for every decision a matrix with the most important findings for each decision point was designed *(See Table I.)*. This matrix can be further used to insert the other grand theories of supply management, and thus provide a good overview of each theories contribution to purchasing.

Table I.: The Decision Matrix for the Network Theory

Theory	Decision Points			
	Make-or-Buy	Selecting specific sourcing strategies for each commodity	Selecting supplier strategies and making supplier portfolio decisions	Awarding contracts after negotiating with suppliers and taking the supplier strategies into account
The Network Theory	• High Information sharing • Clarifies demand uncertainties • More accuracy in demand forecasts • Risk sharing	• Strategies mostly connected • Choose from greater set of suppliers • Ensurance of supply of critical commdities through relationships • openess of the supply market • information sharing on strategies, tehnological know-how and skills	• Trustworthy relationships • Value adding on both sides •Long-term relationship • Transfer of knowledge to increase performance • Competitive advantage	• Long-term contracts • Partnership fomation • Ensures current and future needs, also for critical commodities

3. CONCLUSION

This literature review was conducted to define whether the network theory contributes to purchasing as well as supply management. It was started by providing a general introduction of the network theory and a short summary of the main findings and the applicability of the theory for the sourcing decisions. Afterwards the history, the underlying assumptions, the core concept, and a presentation of an empirical study of the network theory were discussed. Here it was seen that the theory, introduced in the 1970s, was first only considered to describe the strategic alliances or partnerships between two single organisations. Nowadays networks in supply management are defined in terms of strong relationships and collaboration between various entities, be they organisations, manufacturers, suppliers or customers. Relationships are viewed as strategic long-term collaboration in which, centrality, the flow of information or the knowledge sharing among the counterparts are seen as factors leading to competitive advantage for all parties. Furthermore, networks are considered to simplify the resource allocation process which is a valuable aspect during the rough times of an ever changing business environment. In the last section of the paper it was shown that the right application of the network theory includes advantages for purchasers in supply management. Here, the theory was adapted to the four major decision points of the purchasing department. In terms of the demand planning or the so called 'make-or-buy' decision, the network theory contributes to the outsourcing of specific items. Since a network is defined by its close relationships among organisations and suppliers, and the generated information flow, demand forecast can be made more accurate and the risk of resource shortages is decreased. With the respect to the category strategy, purchasers can make use of the network theory to ensure the supply of even complex and high value-adding commodities. Furthermore, the searching of suitable suppliers is simplified due to the fact that there are various possible suppliers which are suitable for the collaboration. Networks are assumed to be more interested in supply strategy and the building of trustworthy long-term agreements and not only on the price or the competitive bidding. Thus, the contracting decision made by the purchasing department is characterized by the formation of long-term agreements with strategic partners within the network. These long-term agreements decrease the risk of supply shortages and further generate the serving of customer demands even in an ever changing and uncertain business environment.

The designed matrix further contributes to the development of a competitive purchasing strategy since all valuable aspect of the theory are summarised. By including the other grand-theories, mentioned above and their main aspects, an overview is created through which purchases have the chance to apply strategies which best fit to a certain situation in the market.

However, there are also critics on the theory presented in the existing literature. First of all it can be claimed that although some empirical studies of the network theory can be found, to date they are still very limited studies on the real-life contribution of networks due to the difficulties of obtaining data (Kim, Choi, Yan, & Dooley, 2011, p. 194). Furthermore, the absence of knowledge of the dynamics of the structures of networks, the collaboration mechanisms and the environment still produce a gap in the evolution of supply networks (Li, et al., 2009, p. 851). Network companies are defined by strong connections between members of the supply chain and although this idea is relatively easy to understand, the structure of a network is still a very complicated concept (Chen & Paulraj, 2004, p. 124). Most often the interactions, which are the building blocks of the theory are simply taken for granted (Salancik, 1995, p. 346). Nevertheless, these interactions involve various parties, be they manufacturers, distributors, retailers, as well as consumers. Due to the fact that this includes a large number of decision-makers, coupled with several decision-making criteria, managers are challenged to serve the demand of the partners, but also be careful to reach own goals (Nagurney, Cruz, Dong, & Zhang, 2005, p. 120). Further the large number of decision-makers might result in a failure of coordination and with this also a failure of achievement (Salancik, 1995, p. 346). Besides, as already stated in the section about the concept of the theory, companies aim to enhance a central position within the network through which competitive advantage could be gained. However, some companies might abuse this central position and use collaboration only to achieve own goals. Through this, a network could be again converted into a hierarchical chain. Even so, the interdependencies reached through strong collaboration and partnering could cause problems for the individual firm as well in terms of implementing their own market strategy and reach own goals (Wilkinson & Young, 2002, p. 124).

However, the positive aspects of the network theory and its contribution to purchasing and supply management overweigh the critical aspects. Nevertheless, it is important to notice that the network theory was found to be a relatively new concept in the supply chain management, and thus further research has to be conducted in terms of managerial approaches and best practices for the several network types to ensure the correct application of the theory. This could further increase the contribution to purchasing and supply management. Furthermore, researchers should focus on the provision of empirical studies in order to give examples on how a network could contribute to supply management. Through this, guidelines for the correct management and application of the network theory could be designed and further help managers to understand the underlying concept.

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