SUPPLY CHAIN MANAGEMENT: A FRAMEWORK OF UNDERSTANDING

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ABSTRACT

The topic of supply chain management (SCM) is complex to understand because it encompasses many different flows of activities, components, functions, and role-players. The literature is scattered across multiple functions, varies in scope, and is often confined to certain elements within SCM. This article aims to provide a literature overview of SCM. It is explained with the aid of a newly-developed framework of understanding that offers a graphical representation of the term. It unifies and condenses different components within SCM and shows the relationship between them. The framework was developed by identifying the main themes in the definitions for SCM, examining existing categorisations and frameworks in SCM, and analysing frameworks in other disciplines. The outcome of this article can be used as a guide to explain and orientate researchers and practitioners in the field.

OPSOMMING

Die onderwerp van voorsieningskettingbestuur (VKB) is kompleks om te verstaan omdat dit baie verskillende komponente, vloei van aktiwiteite, funksies, en rolspelers insluit. Die literatuur oor VKB is versprei oor verskeie funksies, wissel in omvang, en word dikwels beperk tot sekere elemente binne VKB. Die doel van hierdie artikel is om 'n literatuur oorsig oor die onderwerp van VKB te voorsien. VKB word verduidelik met behulp van 'n nuut-ontwikkelde raamwerk van verstaan: 'n grafiese voorstelling van die term. Dit verenig die verskillende komponente binne VKB, en toon die verwantskap tussen hulle. Die raamwerk is ontwikkel deur die belangrikste temas in die definisies van VKB te bestudeer, en bestaande kategorisering en verwysingsmodelle te ontleed. Die uitkomste van die artikel kan gebruik word as 'n gids om navorsers en praktisyne te oriënteer in die veld.

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1 INTRODUCTION

The topic of supply chain management (SCM) has received extensive interest from researchers as well as practitioners in the field [1], and is a relevant topic in an increasingly changing and competitive market [2]. SCM has become a governing element in companies' strategies to enhance organisational productivity and profitability [3]. It includes the management of all activities and components within a supply chain (SC).

SCM is a complex topic to understand because it encompasses the management of many activities, and involves multiple role-players across divisional functions and organisations. SCM has been researched by a number of different disciplines including marketing, logistics, information management, operations management, economics, and systems dynamics [4,5]. According to Lummus and Vokurka [6], many confuse the term SCM with elements in the SCM phenomenon – such as supplier partnerships, inventory management, and process integration – instead of acknowledging the comprehensive scope of SCM. There are numerous definitions of the term SCM. Mentzer et al. [7] conclude that SCM has been poorly defined. There are many different variations in the understanding of the term SCM, and Burgess et al. [8] identify this lack of coherence as one of the issues faced by anyone studying the topic of SCM.

This article aims to provide a simplified view of SCM that can be used to guide future researchers and practitioners to gain an overview or understanding of the field. The study anchors its explanation of SCM with the aid of a newly-proposed framework of understanding that illustrates the different components within SCM as well as the relationships between them. It is derived from definitions of the terms within the field, as well as from previously-defined categorisations of SCM and other disciplines. The proposed framework is used to guide this article through the explanation of SCM.

2 THE CONCEPT OF SUPPLY CHAIN

SC and SCM are inter-related concepts: SCM is essentially the management of SCs. In order to understand SCM it is therefore important first to understand the concept of SC. This chapter briefly describes the term SC with the aim of assisting the reader to gain a better understanding of it.

There are many different definitions of the term SC. They vary in level of detail and scope, but relate to similar core principles. Section 4.1 identifies and discusses the different definitions in detail. Many authors use a graphical illustration to explain the concept of SCs. Refer to Figure 1 for an illustration of a generic SC.

As shown in Figure 1, a SC includes all activities associated with the flow of products and services, from raw materials to finished products. It also encompasses the interaction between different role-players who influence a product during its life-cycle. One product's SC ranges from raw material suppliers, through manufacturing and distribution, to retailers who sell the final product to consumers. Wisner [9] defines an SC as a series of companies involved in making end-products available to customers. It includes all functions, processes, and activities involved in sourcing, making, and delivering the products or services to customers.

SCs vary in size, length, and level of complexity. Some companies are likely to have a short SC that could include a single supplier. Other companies have complex, extended SCs reaching from suppliers' suppliers to customers' customers. A company producing multiple types of products is bound to have multiple SCs, depending on the materials and services used to make and distribute the products [9].

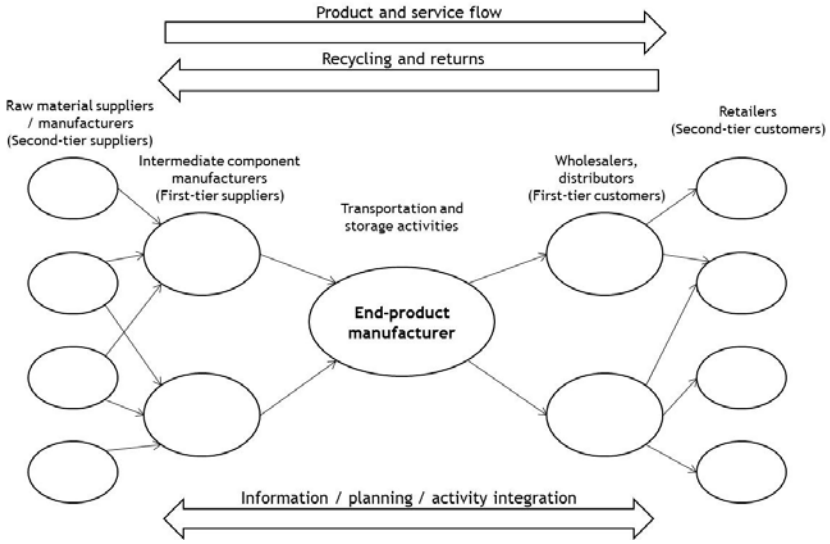

Figure 1: Generic supply chain adapted from Wisner [9]

3 SUPPLY CHAIN MANAGEMENT OVERVIEW

As with the term SC, SCM has also been defined by many authors. Wisner [9] identifies that the common themes within the definitions relate to the coordination and integration between SC partners participating in different activities related to products or services. The aim of SCM is to improve efficiencies, quality, and customer service through collaboration.

The interest in SCM has steadily increased since the 1980s, when companies started to realise the benefits of integration and alignment with suppliers. Companies such as Hewlett-Packard, Whirlpool, Procter and Gamble, Wal-Mart, and Becton Dickinson all implemented SC initiatives as early as the 1990s [6]. According to Fiala [4], effective integration of SC elements is seen as a good way to create value for customers. Lummus and Vokurka [6] state that it has also been shown to reduce the investment in inventory, reduce cash cycle times, lower material acquisition costs, improve employee productivity, and ultimately improve competitiveness. Initially the growth in SCM can be prompted by a need for businesses to become more effective, productive, efficient, and profitable. However, with increasing competition, a number of external factors have also recently contributed to the growth in SCM, such as globalisation, improved availability of information, business complexity, and reduced barriers to international trade [3].

At first, the focus of SCM was on how to make central elements within a company's SC more efficient [10]. The focus then shifted from efficiency within a single company's SC to the effectiveness of the entire SC, which includes a company's suppliers, customers, and partners. Today's competitive market is composed of interwoven organisations rather than single, independent businesses. Defee [11] says that it is no longer sufficient for companies to compete independently or individually: they now need to compete as an interacting web of SC partners and to measure the performance of the SC as a whole [12].

SCM has received extensive interest in the literature. Many different components of SCM have been researched, such as risk management, the value of information sharing [2], performance measurement [3,13], reference models, and process elements. Issues and problems within SCs such as demand forecasting, resource planning, and optimisation techniques have also been analysed [1].

A number of authors have mentioned areas for future research based on shortcomings in the literature about SCM. Burgess et al. [8] suggest that there is a lack of consensus on the definition of the term, a lack of single ownership between disciplines, and a dominant contextual focus on the manufacturing industry. Tan [14] states that the concept of SCM is liberally used, and the literature is replete with buzzwords predominantly referring to single elements within the field, such as integrated logistics, supplier integration, and SC synchronisation. Croom [15] states that SCM is not well understood, and that many authors have highlighted the need for "definitional constructs and conceptual frameworks" to help with the understanding of the term. These shortcomings support the need for a framework of understanding for the term. The process of developing such a framework is discussed in the next section.

4 FRAMEWORK DEVELOPMENT

This section discusses the development of the framework of understanding that is used to aid the explanation of the term. The framework aims to incorporate dominating themes and concepts within SCM. It is developed by using the following inputs from the existing literature:

- SCM definitions
- SCM categorisations and existing frameworks
- Frameworks in other disciplines

Section 4.1 looks into the different definitions for the terms SC and SCM, with the aim of identifying the most important elements within SCM to be represented in the proposed framework of understanding. Section 4.2 discusses different categorisations of SCM and explains existing frameworks in the field. SC is a multidisciplinary concept. Therefore it is helpful also to obtain insights from frameworks in other disciplines to integrate into the framework development. Thus reference models for other disciplines are discussed in Section 4.3.

4.1 Supply chain management: Definitions

There are many different definitions of SC. Chen and Gong [16] define SCs as "a set of facilities, suppliers, customers, products and methods of controlling inventory, purchasing and distribution"; they also state that it links suppliers and customers in all processes involved to transform raw materials into the finished products. Fiala [4] focuses the definition for SC on the different role-players within the SC: suppliers, manufacturers, distributors, retailers, and customers. A number of authors have defined supply chains as "the network of organisations that are involved through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer" [17]. Mentzer et al. [7] define it as "a set of three or more entities (organisations or individuals) directly involved in the upstream and downstream flows of products, services, finances and/or information from a source to a customer".

The term SCM, in general, has been defined as a set of approaches used to manage the SC. Another, more specific, definition for SCM is "a set of approaches utilised to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimise system-wide costs while satisfying service level requirements" [18]. Stock et al. [19] state that more than three quarters of SCM definitions focus on the components within SCM, which can include purchasing, transportation, materials handling, inventory control, manufacturing, and distribution.

Stock et al. [19] studied the themes in SC definitions and revealed that the dominant themes in the definitions are activities, benefits, and components. A similar approach has been used in this study. The common themes of components in definitions were identified with the aim of using them as building blocks for the proposed framework. It was found that

all the definitions studied defined the concept by mentioning at least two of the following: SC participants, life-cycle activities, and supporting functions. This study uses these three themes to group the term SC and incorporates it into the framework.

Participants are all the key role-players who could influence a company's SC. *Life-cycle activities* are the core processes involved in transforming raw materials into finished products. *Supporting functions* are those functions that relate to different activities in the SC and that are used to control and manage the SC. These three components are discussed in more detail in Section 5.

4.2 Existing frameworks and categorisations for supply chain management

Various methods of categorisation have been used in the attempt to explain and assist the management of SCs. Frameworks have also been developed to illustrate the constructs of SCM graphically. The existing frameworks differ in scope, focus, and intended use, and are explained in the remainder of this section.

One of the most well-known reference models for SCM is the Supply Chain Operations Reference (SCOR®) model. This model was developed by the Supply Chain Council (a recognised global non-profit organisation) to assist the SCM function by providing a set of practical guidelines for analysing SCM practices [20]. The SCOR® model is organised around five main components: Plan, Source, Make, Deliver, and Return. The components represent the main inter-related business processes during the life-cycle of a product [21]. The SCOR® model is typically used to improve SC processes by identifying, measuring, and reorganising them.

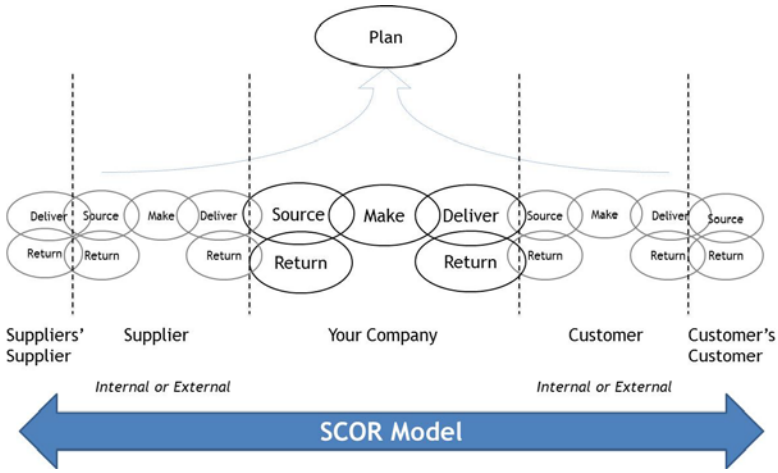

Figure 2: The SCOR® Model adapted from The Supply Chain Council [20]

Figure 2 presents a schematic framework of the SCOR® model, illustrating the interrelationships within SCs. The five integrated processes should be aligned with the company's organisational strategy, material, and information flows. The scope of the processes is from the customer's customer to the supplier's supplier.

Gunasekaran et al. [3] developed a framework for performance measurement in SCs. The aim of their framework is to encourage a better understanding of the importance of SC metrics. It demonstrates the key SC performance metrics, and is presented in the form of a matrix. The y-axis indicates the SC process (plan, source, make, and deliver), and the x-axis indicates the level of management (strategic, tactical, and operational). At a strategic level, SCM is about transforming the way that operations meet the needs of their customers. At an operational level, SCM integrates traditional functions such as sourcing, buying, storing, making, and distributing [3].

Similarly, Chen et al. [22] developed a research framework focused on the constructs and measurements of SCM. The study first consolidates relevant studies and integrates the findings into a research framework. Thereafter, through successive iterations of measurement analysis, a set of reliable, one-dimensional and valid measurements for SCM is obtained. The research framework includes the following elements: environmental uncertainty, customer focus, top management support, competitive priorities, information technology, strategic purchasing, supply network structure, logistics integration, supplier performance, and buyer performance.

Tan et al. [14] focused on the evolution of the SCM literature and illustrated the findings in a framework. Two main perspectives leading to the evolution of integrated SCM were identified. The first perspective is a purchasing and supply activities perspective, and the second is a transportation and logistics functional perspective. In the framework, the two streams of thinking are merged to provide one view of SCM.

Croom et al. [15] analysed various SC-related research papers with the aim of setting out the general problem domain of SCM. Papers were classified based on content- and methodology-oriented criteria. Considering the content-oriented criterion, the SCM literature was categorised according to the level of analysis and type of exchange. For the methodology-oriented criterion, the literature was categorised according to two epistemological dimensions: the first is theoretical and empirical, and the second is prescriptive and descriptive. It was found that 56 per cent of the literature papers studied are empirical and descriptive.

Mentzer et al. [7] aimed to define SCM. In the pursuit of a single definition and explanation of the term, the study developed two supporting frameworks. The first framework illustrates the antecedents and consequences of SCM. The second framework is a conceptual model that is derived from the proposed consensus definition of SCM in the article. The framework indicates the SC flows, the business functions included in the scope of SCM, and the critical role that customer value and profitability play as drivers for SCM. The framework is illustrated in Figure 3.

There are numerous existing frameworks and categorisations of the SCM literature. However, either existing frameworks are focused on single elements within the SC phenomenon, or their objectives are different from this study's objectives. This study aims to explain SCM and to develop a framework to assist the explanation of SCM. The proposed framework therefore has a wide focus that includes the comprehensive scope of SCM, but it also aims to provide a simpler, elementary view of SCM.

The SCOR® model provides a comprehensive reference guide for SCM. The model is intended to be a management tool, and so the sphere of influence of the model stretches beyond the scope of this study. The frameworks of Gunasekaran et al. [3] and Chen et al. [22] focus on performance measurement within SCM, and so their scope differs from this study's scope. The study done by Tan et al. [14] is centred on the evolution of SCM, and Croom et al. [15] classify SCM literature papers. None of the papers explicitly shows the different components within SCM or the relationship between them.

This study is similar to that carried out by Mentzer et al. [7], which aimed to define SCM. Both studies concentrate on the definition and explanation of SCM in general. The proposed framework can be considered as a variation of the framework in Figure 3. The proposed framework, however, includes a strategic view of SCM, and emphasises the different components within SCM as well as the relationships between them. Another difference is that the proposed framework can be used to explain SCM, whereas Figure 3 is derived from the definition of SCM. According to Mentzer et al. [7], the framework in Figure 3 serves as a guide and reminder to SC researchers and practitioners to include all the functions in SCM.

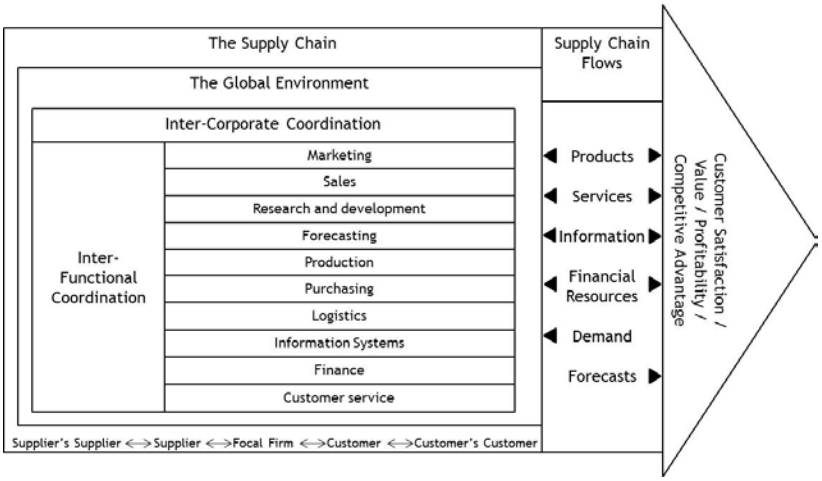

Figure 3: A model of supply chain management [7]

The existing reference models and categorisations are used in this study to identify the different components to be used in the proposed SCM framework. The development of the proposed framework, and its relationship to the previously-defined categorisations, are explained in Section 5.

4.3 Existing frameworks in other disciplines

Frameworks and reference models are commonly used in many disciplines to explain phenomena and to provide structure to a field of study. This article does not attempt to give a comprehensive view of all the frameworks available in the literature; rather, it discusses a few frameworks to evaluate whether there is scope for cross-pollination between SCM and other disciplines.

There are many different frameworks in the field of knowledge management. Rubenstein-Montano et al. [23] identified a number of different frameworks, most of which provide a stepped approach to knowledge management. Another well-known reference model is Porter's value chain model, which depicts the set of activities believed to add value to an organisation. Porter [24] differentiates value activities according to primary activities (inbound logistics, operations, outbound logistics, marketing and sales, service) and support activities (firm infrastructure, human resource management, technology development, and procurement). There are numerous frameworks in the field of quality management (QM). The Six Sigma (DMAIC) framework (define, measure, analyse, improve, and control) is a popular reference model; another is Deming's cycle and the related PDCA cycle (plan, do, check, act) [25]. The common theme in these reference models for quality management is the feedback loop necessary to enable improvements in quality.

In the field of physical asset management (PAM), the publicly available specification (PAS) was published in response to a need for a standard in the asset management industry [26]. A reference model (see Figure 4) was developed to explain the structure of an asset management system and its relationship with the organisational strategic plan and stakeholder expectations. Among the key elements in the reference model is the line of sight between stakeholder value, strategic plans, and asset management policies. The model also acknowledges the multiple components of asset management, and relates them to each other and to the organisation's strategy.

The proposed framework integrates different elements and concepts from the frameworks mentioned above. The PAS framework is used as a guideline for the general structure of the proposed framework. A feedback loop, common in QM frameworks, is incorporated to emphasise continuous improvement. Lastly, core elements of Porter's value chain model are also included in the framework.

The relatively new discipline of PAM is often misunderstood, and the PAS framework has proved to provide a clear overview of the field. The complexity and confusion regarding the PAM study field resonates with the issues in SCM. Furthermore, the intention of the framework is similar to this study's objective, which is to guide the explanation of the study field. Therefore the outline of the PAS framework is chosen as a guideline for the proposed new framework. The development of this framework and an explanation of the different components within the framework are discussed in the next section.

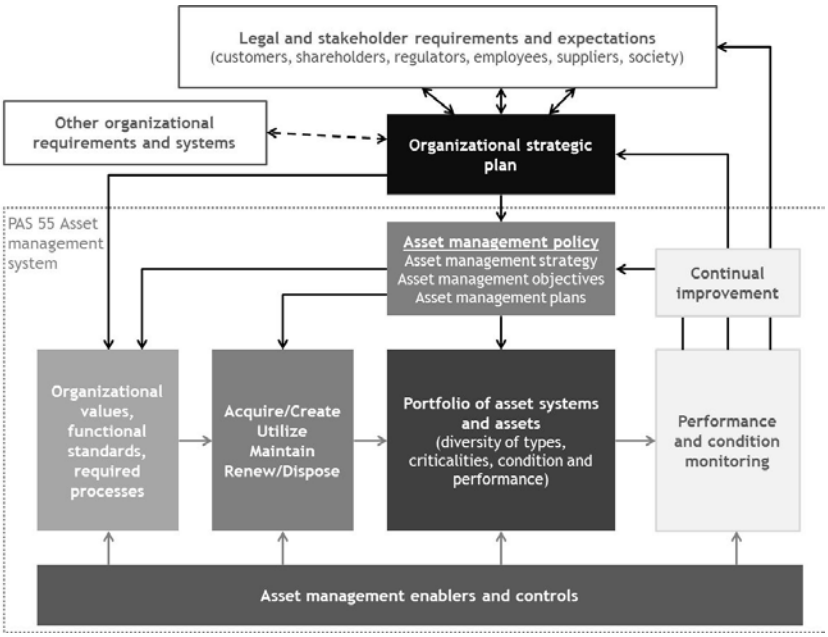

Figure 4: PAS 55 framework adapted from PAS [26]

5 SUPPLY CHAIN MANAGEMENT FRAMEWORK

In this section the proposed framework of understanding for SCM is introduced. Thereafter, SCM is explained with the aid of the framework. Figure 5 illustrates the proposed framework of understanding for SCM. The framework is proposed to provide an overview of the different components present in the SCM literature and the relationship between them. The framework includes the following main components: organisational strategy, SC policies, SC participants, SC life-cycle activities, SC support functions, performance measurement, continuous improvement, and SCM enablers. Each object in the framework represents a different component. The relationships between the components are illustrated by the relative position of the objects and the flow between them, as indicated by arrows.

The common themes in definitions, as discussed in Section 4.1, were used to categorise the SC into participants, SC life-cycle activities, and SC support functions. The PAS reference model was used as an anchor to develop the outline structure of the proposed SC framework. Deming's cycle is incorporated with the performance measurement feedback loop. Other sources of categorisation, such as Porter's value chain model [24], the SCOR model, and SC categorisations by other authors have been used to identify the subcomponents within each of the main components in the proposed SCM framework.

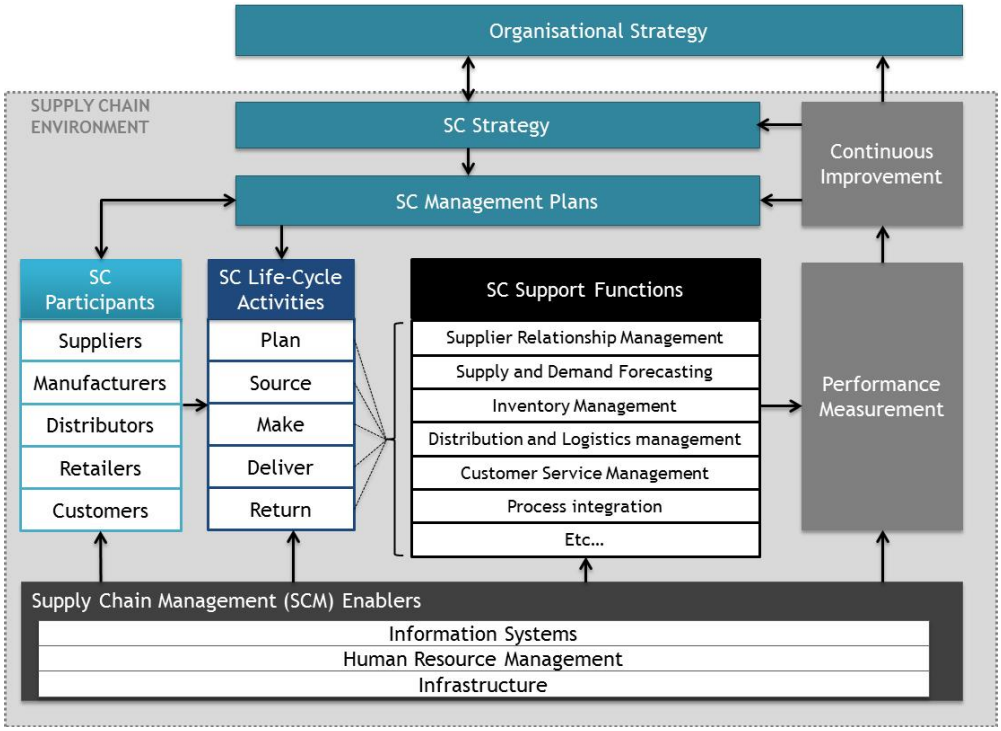

Figure 5: Proposed supply chain management framework

The proposed SCM framework in Figure 5 starts with organisational strategy, which flows into SC strategy because it is important to align SC strategy with organisational strategy. Strategies are implemented through management plans. SCM is therefore the next object in the framework. SCM further consists of three main components: SC participants, SC life-cycle activities, and SC support functions. SC participants link to SCM plans and are involved in the life-cycle activities. There is a many-to-many relationship between SC life-cycle activities and SC support functions. Performance measurement forms a critical part of this framework because it acts as a feedback loop into continuous improvement, which affects SC strategy and management. The different components within SCM are all affected by SC enablers that act across functions, activities, and participants. The remainder of this section provides an explanation of each of the different components in the proposed framework. It includes definitions, the identification of subcomponents, related literature work, and the components' relationship to other components.

5.1 Organisational strategy, supply chain strategy, and management plans

At the top of the proposed SCM framework in Figure 5 is the organisational strategy. The term 'organisational strategy' can be compared with what other authors refer to as 'corporate strategy'. According to Andrews [27], a 'corporate strategy' applies to the whole enterprise, while a 'business strategy' is less comprehensive and refers only to some products or areas within an organisation. In the context of SCM, SC strategies can be classified as 'business strategies', and have to comply with an organisational or corporate strategy. The object representing SC strategy is therefore positioned under the organisational strategy object to indicate that SC strategies should first and foremost be aligned with organisational strategies.

According to Christopher and Ryals [28], SC strategy plays an important role in generating shareholder value. This is because of the direct link between shareholder value and supply chain objectives such as revenue growth, cost reduction, and efficient use of assets. Ketchen Jr and Giunipero [5] studied the relationship between SCM and strategic management, and argued that better interaction between the two fields could enhance

organisations' ability to meet their goals. The proposed framework therefore includes arrows representing interaction between the organisational strategy, SC strategy, and SCM plans.

The terms 'SC strategy' and 'SCM' are often confused. SC strategy determines how a company should be designed and operated in order to compete, whereas SCM refers more specifically to the interaction between different supply chain processes [29]. Therefore, in the proposed framework, SCM plans link SC strategies to the components of SC (participants, life-cycle activities, and support functions). It is positioned at a higher level than life-cycle activities and support functions, because SCM over-arches SC components and manages the relationship between them. Participants are not positioned below SC strategy and SCM plans, because some of the participants could be from other organisations, and so would not necessarily conform to another company's strategy.

5.2 Participants

Participants in SCM are entities or units that play a part or are involved in a particular SC. The concept of SC is called multi-disciplinary because it consists of many role-players from different disciplines. In addition, some participants come from within an organisation, while others come from other organisations, depending on the SC scope of an organisation and its outsourced functions. Many authors mention role-players when defining the terms SC and SCM. Readers can identify with role-players, thus helping them to attain a better explanation of the term.

There are many different participants and role-players related to SCs. For the purpose of the proposed framework in Figure 5, the participant component is split into the role-players in a generic SC: suppliers, manufacturers, distributors, retailers, and customers. Mentzer et al. [7] refer to role-players in generic terms, such as units or entities involved in the upstream or downstream activities to produce products.

It is important to note that participants are classified according to their relative position within a specific SC. A company producing spare parts takes on the role of a supplier in relating to a factory using the spare parts; but it is also a manufacturer and a customer to its suppliers. In the proposed framework, the participants object is positioned next to the life-cycle activities, because participants play a part in the activities in a SC.

5.3 Life-cycle activities

Many definitions of SCM refer to the management of activities that affect the SC. Mentzer et al. [7] refer to all activities involved in the upstream and downstream flows of products and all activities involved in delivering a product. There seems to be consensus on the scope of SC activities in the SCM literature. SC activities are all activities that affect products through the course of their life-cycle, from producer (raw material) to customer (finished product). For the purpose of the proposed framework, activities are referred to as life-cycle activities, and are categorised according to the SCOR model: plan, source, make, deliver, and return. (Refer to Section 4.2 for an explanation of the SCOR model.)

The 'plan' process contains activities such as assessing supply resources, demand and supply forecasting, distribution and transportation planning, and determining production and material requirements. The 'source' processes include all activities associated with obtaining, receiving, purchasing, and paying for raw materials. The 'make' process includes activities such as requesting and receiving materials, manufacturing, quality control, and packaging. The 'deliver' process includes all activities between the manufacturer and the customer, including order management processes, managing customer relationships, determining prices, supporting financial activities, transportation, and warehousing. The 'return' process includes all defective and returned product processing, inspections, and credit note invoicing [30].

The activities are interconnected and form part of critical business functions. One company could control all the activities for a certain product, but in most cases it controls only some

activities, and therefore activities are connected and shared between different organisations. As mentioned earlier, it is becoming crucial for companies to compete collectively to realise SC benefits. It is therefore important to understand the relationship between these activities across different organisations.

In the proposed framework, life-cycle activities and support functions are split into two separate objects. Life-cycle activities are the basic activities involved in a SC, and run across the life-cycle of a product. Support functions are those that can be performed across various stages of a product's life-cycle, and are used to support and control the SC. One life-cycle activity could involve numerous support functions. The 'plan' activity, for example, will include support functions such as supply and demand forecasting, distribution planning, and scheduling. Similarly, each of the support functions could also relate to numerous life-cycle activities. The proposed SCM framework therefore depicts the interaction as a many-to-many relationship.

5.4 Support functions

As mentioned in the previous section, there are many management functions in the concept of SCM that are used to control and support the core life-cycle activities of an SC. These activities are referred to as support functions in the proposed SCM framework.

According to Lummus and Vokurka's [6] definition of SCM, it includes many different components: warehousing, inventory management and tracking, order management, distribution, logistics management, and customer service. There is a common misunderstanding of the term SCM [6]. Many limit the term to specific supporting functions such as inventory management, supplier partnership, or other subcomponents. These components are included in SCM, but should not be confused with the broader scope of SCM, which stretches beyond any one of its subcomponents.

Wisner [9] categorises SCM into the foundational elements of SCM: purchasing management, supplier relationships management, sustainable procurement and sourcing, forecasting, resource allocation, inventory management, process management, global logistics, customer relationships management, process integration, and performance management. The SCOR reference model identifies a number of activities within SCM: assessing supply resources, demand and supply forecasting, distribution and transportation planning, determining production and material requirements, sourcing raw materials, requesting and receiving materials, manufacturing, quality control, packaging, order management processes, managing customer relationships, determining prices, supporting financial activities, transportation and warehousing, and inspections [30].

The list of possible support functions within the field of SCM is endless. For the purposes of this article, only a few of the common functions within the SCM literature are included in the framework in the form of subcomponents. This list of subcomponents includes examples of support functions, and should not be regarded as a comprehensive overview of support functions within SCM. The subcomponents included in the proposed framework are supplier relationship, supply and demand forecasting, inventory management, distribution and logistics management, customer service, and process integration.

5.5 Performance measurement and continuous improvement

Recently, much interest has been shown in measuring organisational performance. According to Gunasekaran et al. [3], performance measures and metrics play a crucial role in an organisation's success, as it affects all levels of planning and control. Performance measurement in the context of the proposed framework forms part of the feedback loop that links the SC support functions, SC strategy, and SC management. Cai et al. [13] state that continuous improvement is becoming a critical issue in the context of dynamic SC. Suppliers, manufacturers, distributors, and retailers are all aiming continually to improve their operations to gain a competitive advantage.

Many metrics, models, and frameworks have been designed to assist the measurement of SC performance. Chen and Gong [16] use four categories of costs as a main index to evaluate SC performance: production costs, disruption costs, co-ordination costs, and vulnerability costs. Many authors use the SCOR reference model to identify metrics and measure SC performance across the different SC processes. The balanced scorecard is another influential assessment model that is a balanced approach to address strategy alignment and systematic thinking [13] . Related to the topic of SC metrics are the topics of supply chain risk management (SCRM) and disruption management, which are currently both relevant and trendy topics in society.

'Continuous improvement' within the context of SCM is a collective term that can be used for improvement initiatives within any areas within SC. Continuous improvement in the proposed framework links performance measurement and SC strategy. Continuous improvement initiatives should be aligned with a firm's strategy, but should also feed into strategy formulation. A number of different tools have been used to assist in the continuous improvement of SCs. Among these are Lean and Six Sigma process improvement initiatives, simulation, analytical models, and supplier/partner collaboration.

5.6 Supply chain management enablers

In the context of the proposed framework, the participants, life-cycle activities, support functions, and performance measurement are all influenced by certain elements that enable their performance. These elements are referred to as 'SC enablers'. As with the support functions, there are many different enablers within the context of SCM. For the purposes of this article, information systems, human resource management, and infrastructure are considered to be critical enablers for effective SCM. The identification of these elements was influenced by Porter's Value Chain model. Porter [24] refers to procurement, technology management, human resource management, and infrastructure as support activities in an organisation's value chain.

Information systems are regarded as one of the key enablers of SC excellence. According to Zhou and Benton Jr [31], SCs can be improved through effective SC practice as well as effective information sharing. Porter [24] suggests that human resources are one of the elements that every value activity employs to perform its function. Firms' infrastructure is another enabler for SCM. Many authors explain SCs by mentioning the flow of products through physical infrastructure elements of the SC such as warehouses, factories, and assembly points (refer to Figure 1). Without the necessary infrastructure, SC flow is not possible.

The next and final section concludes the study by providing a brief summary, elaborating on how the proposed framework can be used in practice, and providing recommendations for future studies.

6 CONCLUSION

The concept of SCM is complex to understand because it consists of many elements, components, and interlinked relationships. The numerous definitions in the literature add to this complexity and confuse many readers. Burgess et al. [8] believe that this is one of the issues within the field of study. In addition, the literature regarding SCM is scattered across multiple disciplines, functions, activities, and components. This article explains the concept of SCM by consolidating different constructs from previous SCM research and from research in other disciplines. The explanation is guided by a newly proposed framework that graphically presents the different components of SCM and the relationship between them.

The framework has a number of distinctive features that promote its use in research and in practice: it provides a simple graphical representation of SCM, it is easy to use, and it focuses on illustrating the relationship between components in the field. The framework is intended to be used as an explanatory tool and reference guide. The framework and

accompanying discussion can aid the explanation of SCM to those new in the field. It also serves as a reference guide to existing practitioners and researchers in the field. In this sense, the framework provides the necessary structure to map SCM-related studies so that users can gain insights into how individual elements of SCM relate to the broader SCM field of study. By dividing SCM into different components, defining the components, and showing the relationships between them, the framework assists users to make sense of a complex phenomenon.

There are a number of limitations to this study that provide opportunities for future research. The proposed framework of understanding is intended to assist the explanation of SCM in general. Therefore, it does not provide an all-encompassing view of SCM or of any one of its components. Future research can extend the framework int more detail, focusing on specific elements of SCM. Furthermore, the framework is a two-dimensional graphical representation of SCM. In practice, SCM is an interacting web of activities. It is therefore possible to add more dimensions to the framework to provide a better representation of the relationship between the different components in the framework. Lastly, the framework does not provide a comprehensive list of subcomponents (e.g. activities and participants). It is possible to expand the lists and also to study the relevance and importance of the different subcomponents and components in the framework.

This article consolidates and summarises research in the field of SCM. It provides an explanation of SCM with the aid of a newly proposed framework. In line with this study's objectives, it furthers the understanding of the term SCM, and contributes towards the broader objective of obtaining a consensus definition for the term.

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