**CATEGORIZATION IN PROCUREMENT: FRAMEWORK FOR A SPEND TAXONOMY**


Lappeenranta–Lahti University of Technology LUT

Master's Programme in Supply Management, Master's thesis



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ABSTRACT

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Supply Management

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**Item Categorization in Procurement: Framework for a Spend Taxonomy**

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This thesis examines the structure and governance ST’s in Organization X and their alignment with category management practices and organizational strategy. A spend taxonomy (ST) is a hierarchical classification system used by organizations to categorize and organize their spending data. Through literature review, empirical analysis, and stakeholder interviews, the current study uncovers challenges in developing and utilizing ST to support effective sourcing strategies.

The findings reveal inconsistencies in Organization X's current ST, hindering spend analysis and strategic decision-making. Challenges stem from factors like acquisitions and lack of alignment with system architecture. However, stakeholder engagement, data alignment, and governance procedures emerge as critical enablers for developing an effective ST.

Based on the findings, recommendations for Organization X include harmonizing the ST, enhancing stakeholder engagement, and strengthening governance procedures. Addressing challenges can streamline procurement processes, optimize resource allocation, and drive value creation. This study contributes insights for organizations seeking to optimize procurement analytics through spend taxonomies and understanding what factors determine forming procurement categories. Future research areas include comparative analysis across industries and exploration of technology solutions.

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Tämä opinnäytetyö tarkastelee Organisaatio X:ssä kulutaksomian rakennetta ja hallintoa, sekä niiden yhteensovittamista kategoriahallinnan käytäntöjen ja organisaation strategian kanssa. Kulutaksonomia on organisaatioiden käyttämä hierarkkinen luokittelujärjestelmä, jonka avulla ne voivat kategorisoida ja järjestellä kulutietojaan. Kirjallisuuskatsauksen, empiirisen analyysin ja sidosryhmähaastatteluiden kautta tämä tutkimus paljasti haasteita kulutaksomian kehittämisessä ja hyödyntämisessä tehokkaan hankintastrategian tukemiseksi.

Tulokset osoittivat Organisaatio X:n nykyisessä kulutaksomiassa epäjohdonmukaisuuksia, jotka haittaavat kuluanalyysiä ja strategista päätöksentekoa. Haasteet johtuivat tekijöistä, kuten yritysostoista ja puutteellisesta yhteensovittamisesta järjestelmäarkkitehtuurin kanssa. Sidosryhmäsitoutuminen, tietojen yhteensovittaminen ja hallinnointimenettelyt nousivat keskeisiksi tekijöiksi tehokkaan kulutaksomian kehittämisessä. Tutkimuksen pohjalta laadittiin Organisaatio X:lle suosituksia koskien kulutaksonomian rakennetta ja hallinnointia. Nämä suositukset kattavat kulutaksonomian harmonisoinnin, sidosryhmäsitoutumisen tehostamisen ja hallinnointimenettelyjen vahvistamisen. Tunnistettujen epäkohtien korjaaminen voi virtaviivaistaa hankintaprosesseja, optimoida resurssien allokaatiota.

Tämä tutkimus tarjoaa näkemyksiä yrityksille, jotka pyrkivät optimoimaan hankintaprosesseja ja kulutaksomeja moninaisissa liiketoimintaympäristöissä. Tulevaisuudessa olisi tärkeää tutkia eri teknologiaratkaisuja, sekä vertailla kulutaksonomiaa eri teollisuusalojen välillä.

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# 1 Introduction

Procurement has evolved from an operational and clerical function to strategic that has potential to create value for organizations with the right skill set (Mena, Van Hoek and Christopher, 2014; Keith et al., 2016). Procurement has a role in transferring value from the supply market into the organization as well as its customers (Iloranta, 2015) but this is a task the function still has much to improve on (Mena, Van Hoek and Christopher, 2014).

Procurement can be seen as a gateway between the supply market and internal organization and in recent years, the importance of category management and executing spend strategies has gained attention, and companies are increasingly dividing internal roles to take advantage of the supply market to gain long-term benefits (Cordell and Thompson, 2018). As organizations evolve, the relevant spend categories also evolve and adapt, influenced by mergers and acquisitions, as well as shifts in the supply market to which organizations need to be agile towards.

To be able to internally conduct meaningful analysis, transactional data also needs to be accurately categorized on item level to reflect actual spending patterns (Pandit and Marmanis, 2008). Effective master data management is therefore required, and this becomes a more difficult task, especially in companies that operate with multiple different ERP systems and master data management is dispersed (Loshin, 2010). At its best, effective master data management provides organizations with a “golden record” of data (Otto, 2012) that can be used by different department and systems within an organization further allowing accurate decision making, at its worst the data is unfit for any meaningful analysis (Berthold et al., 2020).

As digitalization is increasing, the need for data quality become even more prevalent as without trusted master data many companies fail to realize its full benefits (Moran, O’Kane and Walker, 2018). A thorough understanding of spending patterns also has potential to lead to valuable knowledge on how companies can better “organize internal governance over spending categories of parts and services, including supply chain risk, vulnerability, and exposure” (Handfield, 2023). Therefore, sourcing within procurement plays a crucial role in transferring data internally from the downstream supply chain and upstream towards the internal and external environment.

## 1.1 Objectives and research questions

The research is centered on Organization X, a multinational organization operating within the food and beverage, with procurement activities spanning multiple nations. As part of its ongoing efforts to streamline operations across its diverse entities, Organization X has broadened its range of sourced items due to acquisitions and shifts in the supply market. This expansion necessitates a structured categorization of sourced items to facilitate efficient procurement processes as it has not been clear how to categorize items in a spend taxonomy (ST) as well as how to view this in relation to forming category management teams. While the organization has centralized its procurement operations and implemented category management practices, the current structure of the ST fails to provide the necessary granularity and clarity required for effective decision-making.

In recent years, Organization X has centralized its procurement operations and implemented category management practices to enhance efficiency and effectiveness. However, to further optimize procurement strategies and decision-making, there exists a need for a systematic understanding of item categories and hierarchies within the ST. Therefore, the goal of the study is to investigate and understand how to optimize the structure of the ST within Organization X to support the development of an effective supply strategy.

The primary research question guiding this study is:

**How can the structure of a spend taxonomy (ST) be optimized to support development of an effective supply strategy?**

Additionally, the subsequent sub-questions were formulated to develop comprehension of the main research question within the context of the case organization.

The sub questions are:

**How is the existing ST structured in Organization X?**

**What type of framework can organizations utilize to create a suitable ST and organize their sourcing function?**

## 1.2 Research Methods

The study is structured into two main sections: theoretical and empirical. The theoretical component delves into existing literature on taxonomies, category management in procurement, master data management, and analytics. The primary objective is to explore the interconnectedness between organizational strategy, sourcing strategy, category strategy, and the supply market, focusing on how a ST can support these aspects. Additionally, the theoretical review encompasses the principles of categorization and classification beyond procurement, aiming to establish a foundational understanding of taxonomy creation.

The empirical phase adopts a qualitative case study approach, involving interviews with members of the sourcing leadership team and sourcing managers from Organization X. Through these interviews, the study seeks to elucidate the organizational structure of Organization X and its objectives regarding category management and spend analysis, as well as the role of the ST in achieving these objectives. Citing McCutcheon and Meredith (1993), case studies are deemed valuable for evaluating real-world examples, while Ellram (1996) underscores their applicability in providing practical explanations of practices. Figure 1 provides an overview of the chosen methodology for this thesis.

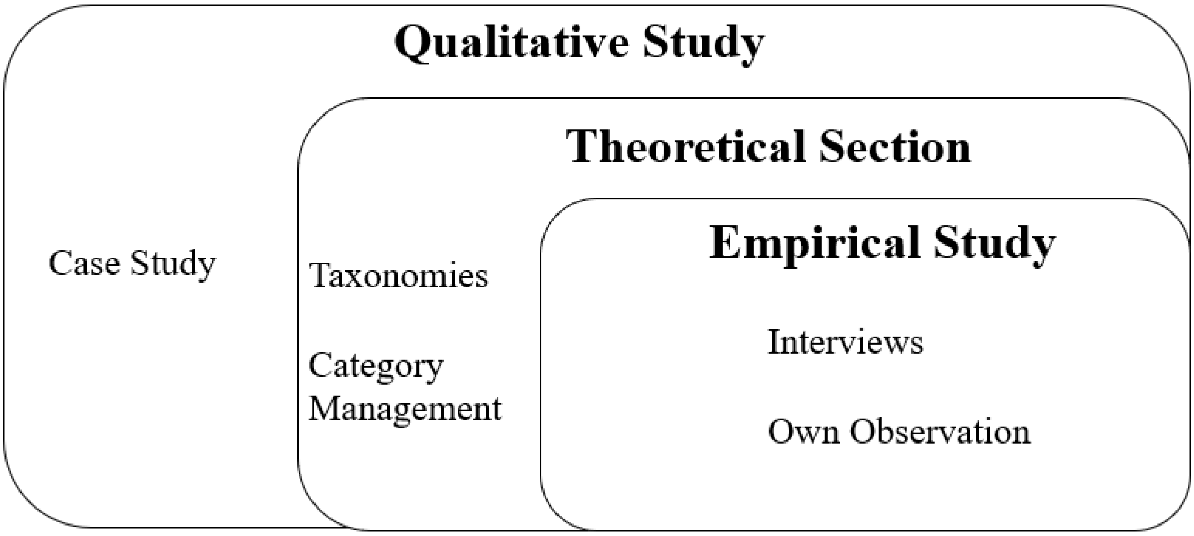


Figure 1: Research Methodology

## 1.3 Limitations

To narrow the scope of this research, the focus will be on direct materials, which are the materials and products utilized in the manufacturing of an organization's end products (Van Weele, 2014, p. 6). Specifically, the study will concentrate solely on the case organization, aiming to furnish them with a framework for developing and adapting their category hierarchy to meet evolving needs effectively. Consequently, the findings may not be directly applicable to companies of different sizes or operating in diverse industries. Nevertheless, it is worth noting that the concept of spend taxonomies and category hierarchies holds significance for any organization engaged in procurement activities, suggesting that a framework for iteratively refining these taxonomies can have broader managerial implications beyond the scope of the case organization.

This research will not cover theories regarding how Organization X should structure spend taxonomies within system architecture to maximize analytical capabilities. As highlighted by Cleven and Wortmann (2010), companies vary significantly in this aspect, with the structure of a ST closely intertwined with organizational strategy and master data management, while alignment is influenced by user preferences. Therefore, the findings may have limited applicability outside the context of the case organization. Another limitation of this study pertains to the naming conventions of categories themselves and the associated literature on best practices in naming conventions. This topic is more relevant in the context of system architecture, particularly concerning master data management. For this thesis the true names of the sourcing categories are not in all categories revealed.

## 1.4 Current state of Research in Category Management

A substantial body of literature delves into category management, focusing on the allocation of responsibilities among professionals based on the supply market (O'Brien, 2009; Van Weele, 2014; Cox, 2015; Iloranta, 2015; Keith et al., 2016; Cordell and Thompson, 2018). Previous research underscores the significance of organizing resources and aligning organizational strategy with supply strategy. Van Weele (2014, p.14) also emphasizes the challenge of gathering detailed spend management information, highlighting the pivotal role of a category tree as the foundation of a category sourcing strategy, a notion also recognized by Pandit (2008).

Moreover, master data is widely acknowledged as crucial for organizational operations and analytics, given its broad dissemination and capacity to provide context to transactional data (Allen and Cervo, 2015). High-quality master data is imperative for companies to achieve strategic business objectives such as optimizing decision-making processes and efficiently managing the supply chain (Ofner et al., 2013). Without reliable master data, companies hinder their ability to leverage the benefits of digitalization (Moran, O'Kane and Walker, 2018).

Item master data categories should align with analytical and operational needs to offer meaningful insights within relevant categories and their sub-categories. Despite recognizing this importance, little emphasis has been placed on constructing such categorizations to ensure that analysis across different organizational areas supports organizational objectives and aids procurement professionals. Glassel's (1998) assertion that "the ability to accommodate different users who may approach the same information from different perspectives is an essential feature for successful information retrieval" remains pertinent for companies operating in various enterprise systems.

Although literature suggests a close link between spend analytics and supply strategy, there exists a research gap in how organizations should iteratively develop a ST to enhance the efficiency of transactional data analysis and organizational resourcing. While extensive research has explored taxonomies and hierarchies in a theoretical sense irrespective of context (Lambe, 2007; Weinberger, 2007; Stewart, 2008;Broughton, 2017), limited attention has been given to spend taxonomies and the approaches companies can employ to establish meaningful classifications.

Heikkilä and Kaipia (2009) highlighted the need to investigate the role of main purchasing categories within firms and the logic of combining subcategories into main categories over fifteen years ago. Heikkilä, Kaipia and Ojala (2018) emphasize the importance of considering purchasing categories as crucial organizational design elements that influence the overall structure and efficiency of the organization. Schiele et al. (2015, p. 148) noted the absence of a commonly acknowledged and theoretically sound approach to determine what products or services to combine into a purchasing category, urging further investigation into structuring spending and the supply base to align with competitive priorities. Ates (2014) and Hesping & Schiele (2015) advocated for exploring methods to organize procurement spend and the supply base to align with specific competitive priorities in diverse business environments. This research will examine these issues through the lens of a ST to shed light on how materials should be grouped within a taxonomy and how it relates to category management. While both structuring category management teams and developing spend taxonomies involve hierarchical organization aimed at streamlining procurement processes and enhancing decision-making efficiency through structured categorization and strategic initiatives, existing literature lacks clarity on their differentiation and mutual synergies.

## 1.5 Theoretical framework and key concepts

The figure below serves as a depiction of the conceptual framework intended to be explored in this study. It outlines the relationship between organizational strategy, procurement strategy, category management, and spend taxonomy. The aim is to investigate how these elements could interact to optimize internal knowledge organization within companies, leading to more efficient procurement processes.

The proposed framework suggests that organizational strategy influences procurement strategy, which, in turn, impacts category management decisions and the development of the spend taxonomy. By exploring this hypothetical relationship, the study seeks to understand how alignment among these components could enhance procurement efficiency. Furthermore, the study aims to explore how a clear understanding of categorization principles within the spend taxonomy could facilitate insightful spend analysis, thereby improving procurement efficiency and informing strategic decision-making in category management.

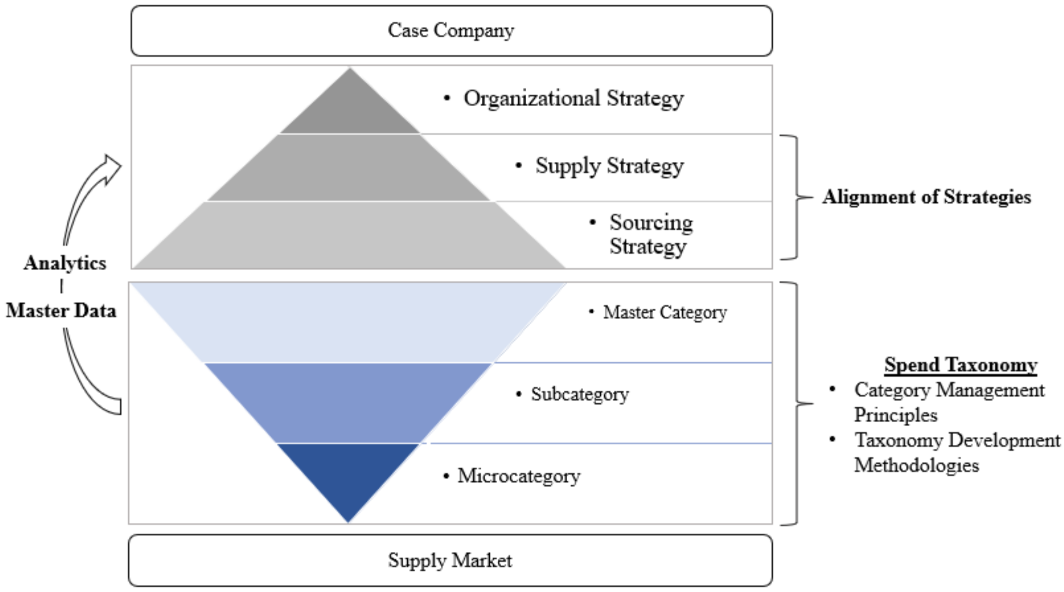


Figure 2: Conceptual Framework

The key concepts used in this thesis are highlighted below:

**Purchasing and procurement** will be used interchangeably in this thesis although literature occasionally divides between the two. Purchasing refers to the effective management of an organization's external resources involves securing the supply of goods, services, capabilities, and knowledge required to run, maintain, and manage its primary and support activities, under the most favorable conditions (Van Weele, 2014). Procurement refers to the process of acquiring goods and services for an organization (Novack and Simco, 1991). It includes activities such as strategic sourcing and purchasing. Procurement can therefore be seen as more encompassing than purchasing.

**Sourcing** can be seen as a subset of procurement as procurement involves the activities of strategic planning as well as purchasing whereas sourcing encompasses the comprehensive process of identifying, assessing, selecting, and overseeing suppliers to procure necessary goods and services vital for an organization's operations (Copaṛā, 2019). It involves not only finding suppliers but also establishing relationships with them to ensure the timely delivery of quality products or services at the best total cost of ownership.

**Supply Strategy** is the approach that an organization employs to purchase and manage goods and services within a specific spend category (Keith et al., 2016). The sourcing strategy is a subset of a supply strategy that refers to the "specific actions the purchasing function may take to support its objectives" (Ellram and Carr, 1994). The supply strategy of an organization should be aligned with the organization strategy (Watts et al., 1992). According to Hallikas et al. (2011) "an effective supply strategy requires a holistic approach which adapts the supply function into the firms' strategy and firm into its value chain".

**Spend Category** refers to a collection of related products or services that are purchased from the supply market and utilized by our organization to meet the demands of internal or external customers. This grouping is based on coherent factors such as the nature of the products or services, their purpose, and how they are sourced (Van Weele, 2014).

**Taxonomy** is a type of classification scheme in which in contract to classification, describes how one item relates to the other item (Lambe, 2007, p. 6). Taxonomies can take many forms but most commonly in literature this relationship is created in a hierarchical fashion in which items in a category include subcategories further explaining their attributes (Stewart, 2008, p. 48).

**Spend Taxonomy** (ST) will be used to describe a hierarchy that groups items in meaningful classes suiting business needs. A ST can be used to describe a hierarchical taxonomy in which each term relates to one another in a broad term/narrow term relationship as defined by (Inmon et al., 2010, p. 202). A category hierarchy as defined by Cordell and Thompson (2018) as a categorization of items and services according to supply-market opportunities will be used interchangeably with ST.

**Material Group** will be used as a term to describe a group of homogenous sourced items for direct procurement that have similar supply market characteristics. Some related terms are categories (Van Weele, 2014; O'Brien, 2019), and "commodity groups" (Schiele, 2007). A Material group is used as a term to describe grouped set of items or materials in a ST. Material will be used interchangeably with product and item.

**Category management** (CM) in procurement is the process involves managing a sourcing strategy for a particular spend category throughout the sourcing cycle, ensuring that all aspects of the procurement process are overseen and optimized for maximum efficiency and cost-effectiveness (Keith et al., 2016). Recently, the collaborative nature of procurement category management is emphasized by defining that in CM retailers and manufacturers work together in a mutually beneficial manner to manage categories as strategic business units (Van Weele, 2014). Moreover, it is a strategic approach that places significant emphasis on analyzing an organization's spending on goods and services obtained from its suppliers (O'Brien, 2019).

**Master Data** refers to the essential real-world entities that an organization uses in its business operations, including customers, suppliers, products, organizational structure. It represents the core information that is critical to the organization's daily operations and decision-making processes (Spruit and Pietzka, 2015) and can be stated to be the most essential type of data for the organization's operations and analytics (Allen and Cervo, 2015). Transactional data brings little value without master data and vice versa (Dahlberg and Nokkala, 2015). A procurement taxonomy should be structured in system architecture to bring benefits in analytics as well as user efficiencies.

**Spend Analysis** is a critical element of strategic sourcing and serves as the foundation for achieving spend visibility, compliance, and control. It involves organizing procurement data based on supplier hierarchies, commodity alignment, and spend amount to gain insights into spending patterns and identify opportunities for cost savings and process improvements (Pandit and Marmanis, 2008).

# 2 Taxonomies

The following section dives into the significance of taxonomies within procurement contexts. Taxonomies serve as pivotal tools for organizing information, offering semantic frameworks with meaningful vocabularies. Representations such as trees, hierarchies, and matrices provide diverse perspectives, each presenting unique advantages and challenges. While polyhierarchical taxonomies allow for multiple organizing principles, they risk undermining structure coherence, necessitating consideration of associative relationships or facets. Faceted classification, originating in library science, breaks down taxonomy vocabulary into distinct, mutually exclusive facets, enabling nuanced organization without reliance on singular hierarchies. This section explores these taxonomy concepts, while clarifying their complexities and applications within procurement.

## 2.1 Types of Taxonomies

A taxonomy in general refers to the science of ordering and arranging to organize information (Lambe, 2007, p.4; Stewart, 2008, p. 48). It is important to note that taxonomies should be semantic, meaning that they no not rely on codes but instead provides a vocabulary that describe their knowledge and that vocabulary needs to be “meaningful and transparent to ordinary users” (Lambe, 2007, p. 6). Some common ways to represent taxonomies are trees, hierarchies, polyhierarchies, matrices, facets, system maps (Lambe, 2007, p. 13). Lambe (2007, p. 15) further elaborates on a tree structure as representing the “transition from general to specific or from whole to part”. A hierarchy can be visually represented as a type of tree structure in which parent/child relationships can be conceptualized (figure 2) (Stewart, 2008, p. 54). Broughton (2017, p. 25) explains that this type of tree structure demonstrates the “relationships of subordination and superordination” and that a class is subordinate to its containing class. For example, chair is subordinate to furniture and furniture is superordinate to chairs.

All items within one taxonomy group do not necessarily always fall neatly under one group, and this is where polyhierarchical taxonomies (figure 2) are useful (Lambe, 2007, p. 25; Stewart, 2008, p.55). Polyhierarchical taxonomies typically are needed if you have more than one organizing principle (Lambe, 2007, p. 25). For example, in Figure 2 tree fruit and vine fruit represent what type of plant apples, pears and grapes appear but salad vegetables are a category that should include vegetables used for salad. Spiteri (1998) uses the term "intertwingled" when describing such items that represent characteristics from two or more categories.

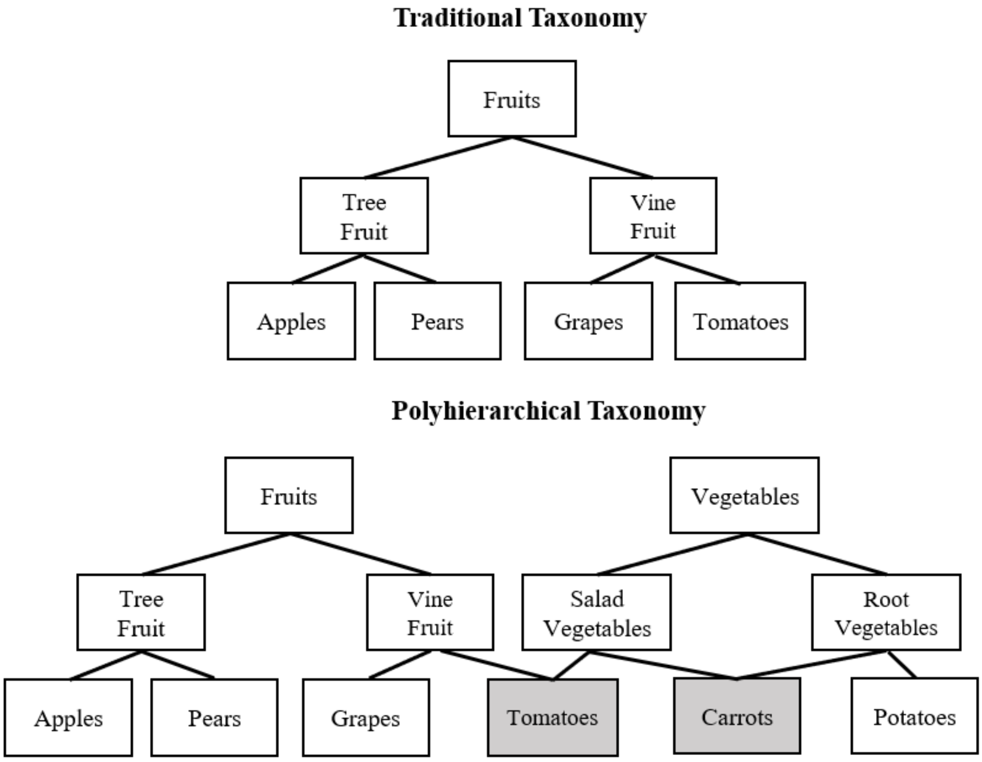


Figure 3: Hierarchical Taxonomies (adapted from Stewart, 2008, p. 56)

A way to combat the need to build polyhierarchical taxonomies is to carefully consider the angle or perspective by which the taxonomy is built (Stewart, 2008). Consider the polyhierarchical taxonomy above in which the higher category of fruits was constructed based on the type of fruit, but the vegetables category consisted of the subcategories of salad vegetables (a specific use for a vegetable) and root vegetables (type of vegetable). Therefore, considering the specific use case for that taxonomy is an important element of creating a consistent taxonomy.

In a matrix structure a taxonomy is represented in rows and columns and perhaps the most common form of a matrix structure is the periodic table of elements (Lambe, 2007). In the field of management, a type of matrix applied is the Kraljic Matrix (1983) that is a two-by-two matrix allowing companies to segment their supply base by the type of items they purchase. The matrix divides how a purchased item impacts the profit in terms of “volume purchased, percentage of total cost, or impact on product quality or business growth” against supply risk through material “availability, number of suppliers, competitive demand, make-or-buy opportunities, and storage risks and substitution possibilities (Kraljic, 1983, p. 112). Two-by-two matrices can also be found in the world of sales and marketing as well through the Boston Consulting Group Growth Share Matrix in which market share is compared against cash flows for one organization (Henderson, 1970).

Matrices are useful when categorizing against two dimensions, but they can also be used in three dimensions as well. Van Weele (2014) presents such a taxonomy by introducing a purchasing spend cube (PSG). In a PSG the purchasing expenditure is analyzed from three different angles: purchasing categories/segments (for example indirect and direct), spend/supplier and spend against purchasing department (figure 3). In general, matrices are useful when trying to make sense of something that is more ambiguous through assisting us in classifying items against different dimensions (Lambe, 2007, p. 26).

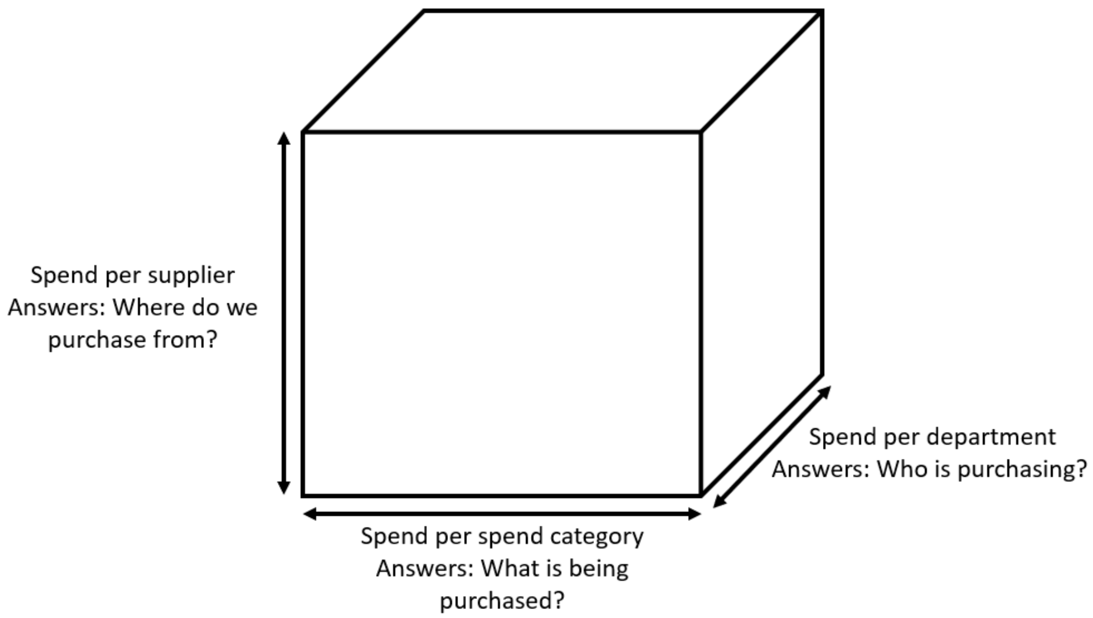


Figure 4: Purchasing Spend Cube (adapted from Lambe, 2007, p. 31; Van Weele, 2014, p. 14).

## 2.2 Facets

Representing taxonomies using polyhierarchies can be challenging because connecting too many hierarchies can result in a loss of regular and consistent structure. This goes against the very purpose of a hierarchy, which is to provide a clear and structured framework for organizing information (Lambe, 2007, p. 25). Another way to avoid having organizations use of polyhierarchies is through the usage of associative relationships that are also known as facets (or related terms) (Stewart, 2008, p. 133). By using related terms, we can establish connections between terms that are placed into different hierarchies. For example, in the polyhierarchical taxonomy in figure 2, if a vegetable or a fruit works in a salad, the facet salad could be applied instead of trying to input that into the hierarchy itself.

A faceted classification "deconstructs the vocabulary of the classification into its simplest constituent parts" (Broughton, 2017, p. 37). Wynar (2000, p. 320) explains that facets are "clearly defined, mutually exclusive, and collectively exhaustive aspects, properties, or characteristics of a class of a specific subject" and that its roots are in colon classification as defined by the librarian Ranganathan. A faceted classification is widely used in for example shopping websites as a customer might for example be interested in blue shorts (color facet) or they might be interested in sport wear (function facet) (Urquhart et al., 2018, p. 20). A faceted classification brings the advantage of not having to organize based on one single hierarchical structure but instead allow us to use building blocks that when combined take bring to the end result  (Broughton, 2017, p. 300).

Faceted taxonomies prevent ambiguity by making sure that each facet is distinct and designed be mutually exclusive or orthogonal to each other (Lambe, 2007, p. 37). For example, items might be classified based on what type of sustainability certificate is applicable (Rainforest Alliance, Fairtrade, etc.), purchased item brand, whether the item is a packaging material (PM), etc. none of which can be conceptually overlapping.  For example, if we are to organize the polyhierarchical taxonomy in figure 2. according to facet theory, we would use facets type of plant-based food (vegetable, fruit), angiospermous fruits (tree fruits, vine fruit), type of fruit (apple, pear, grape), culinary use (salad, barbeque), type of vegetable (tomato, carrot, potato). It is important to note that the power of facets does come with a price as in for example information architecture the application of facets can be considered so simple that users improve their own operational tasks by making ad-hoc changes to master data resulting in loss of structure over time.

# 3 Category Management

This section of this thesis builds upon the understanding of taxonomies discussed in the preceding section, extending the exploration to the strategic application of category management principles in both sales and marketing, as well as procurement contexts. Rooted in market segmentation, category management has traditionally been associated with optimizing sales strategies to maximize consumer value. However, as the role of procurement becomes increasingly strategic within organizations, category management has expanded its to become a crucial component of strategic sourcing and supply chain management. This section addresses the interconnectedness between supply strategy and organizational objectives, researching how category management principles align procurement efforts with broader business goals. The section also examines procurement category boundaries, drawing insights from existing literature to clarify the criteria and considerations involved in this determination.

## 3.1 Supply Strategy

Strategy formulation in organizations has been defined as a “pattern in a stream of decisions” (Mintzberg and Waters, 1985, p. 257). It involves the decision-making process by to formulate long-term goals (Lintukangas et al., 2013). Strategic management in turn can be characterized as a framework that incorporates corporate values, planning capabilities, and organizational responsibilities which serves to link strategic thinking with operational decision-making across all levels and functions within the organization (Gluck, Kaufman and Walleck, 1980).

As the role of supply management is becoming more strategic for organizations, the role of procurement is as well (Ellram and Carr, 1994). One key aspect of this shift is the increased emphasis on managing costs effectively while maintaining quality standards. Procurement departments are tasked with adept negotiation skills, fostering strong supplier relationships, and identifying opportunities for cost savings throughout the supply chain (Agrawal & Smith, 2009). Additionally, there is a growing trend towards collaborative partnerships with suppliers, moving away from short-term transactions towards long-term relationships focused on innovation and product development (Handfield, 2023). Furthermore, procurement plays a critical role in mitigating supply chain risks, such as geopolitical uncertainties and disruptions, through the implementation of robust risk management strategies (Hawkins et al., 2014). Strategic sourcing practices are also gaining traction within procurement, aligning sourcing decisions with broader business objectives through data-driven analyses and market insights (Talluri & Narasimhan, 2004). Moreover, procurement is expanding its focus beyond cost reduction to encompass value creation initiatives, including driving innovation and sustainability efforts through collaborative engagements with suppliers (Mena, Van Hoek and Christopher, 2014). These developments highlight the evolving nature of procurement as a strategic ally in achieving organizational success and competitiveness.

In literature, procurement and purchasing are often used interchangeably but there is literature that distinguishes between the two (Ellram, 1996; Miemczyk, Johnsen and Macquet, 2012). Procurement is sometimes seen to be more strategic than purchasing with procurement encompassing decisions such as whether organizations should make-or-buy, centralize procurement, how to manage supplier relations (Murray, 2009). In some literature, procurement is used for the public sector and purchasing for the private sector to describe the same phenomenon (Rozemeijer, 2008). This thesis will use purchasing and procurement interchangeably.

Supply management (not to be confused with supply chain management which is a term to describe the "total flow of a distribution channel from the supplier to the ultimate user" (Cooper and Ellram, 1993, p.13)) is an activity that describes the systematic planning, execution, assessment, and control of strategic and operational purchasing decisions (Kocabasoglu and Suresh, 2006). Therefore, supply chain management takes a wider scope and involves strategic decision to the entire supply chain all the way to consumers whereas supply management involves the process of sourcing, procurement and management of goods and services within an organization. For simplicity, the terms supply management and procurement will therefore be used interchangeably in this work.

The connection between a supply strategy and overall strategy for the organization has been addressed in literature (Watts et al., 1992; Ellram and Carr, 1994; Ahtonen and Virolainen, 2009). Watts et. al. (1992, p. 5) that a supply strategy is a "pattern of decisions related to acquiring required materials and services to support operations activities that are consistent with the overall corporate competitive strategy" further emphasizing how the supply strategy needs to be aligned with the higher-level organization strategy (Ellram, 1996). Ahtonen and Virolainen (2009) emphasized how the overall organizational strategy is to act as a basis for the supply strategy and that formation starts with the decision whether the organization should make or buy a product. Lintukangas et al. (2013) also highlights how every purchasing scenario needs its own strategy that is to be tailored to the category or type of product that is being purchased. This in turn emphasizes the importance of purchasing category management and category strategies.

## 3.2 Sales and Marketing Category Management

Category management is commonly known as a sales and marketing term that is recognized as an approach with its roots in market segmentation. Market segmentation is defined as the "process of splitting customer, or potential customers, in a market into different groups, or segments, within which customers share a similar level of interest in the same, or comparable, set of needs satisfied by a distinct marketing proposition" (McDonald, 2012, p. 9). Category management in turn is defined as "the strategic management of product groups through trade partnerships, which aims to maximize sales and profits by satisfying customer needs" (Barnett, 2016, p. 121). Therefore, market segmentation and category management are linked to each other in that market segmentation is used to identify and group customers with similar needs and preferences, while category management is used to manage a group of products or services that meet the needs and preferences of those customer groups. Once a customer group has been identified, category management can be used to develop and implement strategies to meet the specific needs of each group. The objectives of category management can be mirrored against CM in procurement as the key objective according to Dussart (1998) is to manage the product category as a business unit and to be able to tailor the marketing to local shopping practices. Sales and marketing category management is a practice in which the market is segmented according to for example geographic and customer behavioral differences but in sourcing divided according to the supply market offerings (Appelfeller and Buchholz, 2011).

Category management is viewed as a collaborative process between retailers and suppliers to manage product categories as strategic business units, with the aim of producing better business outcomes by prioritizing the delivery of increased consumer value (Dupre and Gruen, 2004). Dupre and Gruen (2004, p. 445) further state that “retail’s sales and profits will be maximized by an optimal mix of brands, SKUs, and pricing that is determined from the perspective of the consumer and is based on historical sales data”.

The category management plan begins with aligning with the retailer’s overall strategy with the specific category strategy and activities (Aastrup, Grant and Bjerre, 2007). After this, according to Andersen Consulting (2000), the category management plan continues by defining a category according to the consumers buying behavior. Similarly, Blattberg and Fox (1995), define a category as a group of products that is distinctly manageable and in which consumers view the products to be related and/or substitutable. In sales and marketing the category may also be defined differently between the supplier and retailer but for maximal co-operation between the supplying firm and its customers it is sensible to work in co-operation so that changes in consumer behavior is aligned with both parties and categories remain relevant (Andersen Consulting, 2000).

Where organizations are located on the supply chain, whether you are a retailer, distributor, manufacturer, supplier companies hold different information resources and information resources that are relevant for category management are not equally distributed (Dewsnap and Hart, 2004). Retailers have access to detailed point of sale (POS) data, which for example includes contribution and profit information. On the other hand, suppliers may have deeper insights into consumer behavior and trends within the product category. In addition, third-party information such as market and panel data are also available. The main objective of category management is to enhance closer collaboration between retailers and suppliers by leveraging richer and more nuanced information. This can lead to a better understanding of consumers, categories, and category roles, resulting in more informed category strategies and tactics that align with retailers' desired outcomes.

## 3.3 Procurement Category Management

Cordell and Thompson (2018, p. 16) define CM in procurement as “a continuous process of gathering, analyzing and reviewing market data in order to create and execute spend strategies that deliver long-term business benefits”. Van Weele (2014, p. 167) describes category management as a collaborative business process where suppliers and retailers work interactively to oversee product categories. Cordell and Thompson also state that category management should be distinguished from sourcing as category management should bring much more value than just sourcing as it accounts considerations such as “make versus buy, outsourcing, insourcing, offshoring/reshoring, renegotiation, forward/backward integration, supplier relationship management, new product development, acquisitions and joint ventures” (Cordell and Thompson, 2018, p. 16). The categories themselves should represent the important areas of organizational spending on purchased goods and services based on their function, mirroring the distinct organizational structure observed in marketplaces (O’Brien, 2019). The primary objective is to identify commonalities among procurement objectives, grouping them together to centralize manageable procurement processes (Agrawal and Smith, 2009).

Category management should support the realization of the organization's business goals and consequently, the objective is to establish categories that prioritize the requirements of the organization's product users and the preferences of end customers (Sakki, 2009, p. 185). Cordell and Thompson state six key principles that are required to be able to perform successful category management: customer focus, changing the status quo, process thinking, cross-functional approach, facts and data drive, and continuous improvement (Cordell and Thompson, 2018). To elaborate on the cornerstone of customer focus, for external customers in areas of direct spend, the business requirements necessitate a careful balance between meeting business needs and exceeding customer expectations. These business requirements serve as the foundational basis for all category management activities. Without a thorough analysis and understanding of these requirements, any category management solution is likely to be less than optimal. Therefore, it is important to note that category teams need to be structured in a manner that serve internal stakeholders.

Category management in sourcing should integrate departments like procurement, marketing, finance, operations, logistics, and R&D. Procurement ensures efficient sourcing, marketing offers consumer insights, finance provides financial analysis, operations and logistics optimize supply chain, and R&D drives innovation together with sourcing. Collaborative decision-making aligns strategies with organizational goals, fostering efficiency and value creation throughout the supply chain.

## 3.4 Category Management Process

CM is explained to be a cyclical process with distinct steps (Cordell and Thompson, 2018; O'Brien, 2019). The CM process according to O'Brien (2019) consists of the following five stages: initiation, insight, innovation, implementation, improvement represented in a cyclical manner. As the internal and external environment is in constant state of change, CM work does not have any end the works needs to be iterative. It is important to highlight that even though the category management process consists of steps, it is not a one-time project activity but requires constant attention. Cordell and Thompson (2018) on the other hand define the category management process as beginning with initiation, research, analysis, strategy, implementation. Van Weele (2014) emphasizes how prior to developing a category sourcing strategy, all spend categories are analyzed based on their cost savings potential as well as the ease of implementation of a specific sourcing effort. Even more importantly Van Weele (2014) highlights that any efforts in cost savings need to begin with spend analysis to be able to conduct the aforementioned.

| **O'Brien (2019)** | | **Cordell and Thompson (2018)** | |
|---|---|---|---|
| **Process Step** | **Definition** | **Process Step** | **Definition** |
| Initiation | • Scope category project<br>• Opportunity analysis<br>• Stakeholder mapping | Initiation | • Establishing governance<br>• Defining project team<br>• Category Hierarchy<br>• Building organizational commitment |
| Insight | • Internal data gathering<br>• Supplier data gathering<br>• Market data gathering | Research | • Gather comprehensive data on the category, market, and suppliers.<br>• Forming a deep understanding of the category |
| Innovation | • Summarize insights.<br>• Strategic option generation<br>• Strategic option evaluation and selection<br>• Risk and contingency planning<br>• Category plan development and sign-off | Analysis | • Category SWOT analysis<br>• Macro-economic analysis on category<br>• Supplier preferencing |
| Implementation | • planning, change management, and contract execution.<br>• Contract planning, exit planning, and contract management.<br>• RFP/RFQ/tender, e-auctions, supplier selection, and negotiation can boost effectiveness. | Strategy | • Selecting appropriate category sourcing strategy<br>• Power positioning against suppliers<br>• Opportunity analysis<br>• Category plan documentation |
| Improvement | • Lessons learned review.<br>• Supplier Relationship Management<br>• Continuous Improvement<br>• Restart Triggers | Implementation | • Breaking down activities into tasks<br>• Change management.<br>• Continuous improvement<br>• Supplier Management |

Table 1: Category Management Process

To elaborate on the CM process according to Cordell and Thompson (2018), the initiation phase of category management involves establishing governance structures and assembling the necessary teams to oversee the category management process. Governance encompasses defining boundaries, accountabilities, and decision-making rights. This phase emphasizes stakeholder management and forming a cross-functional team to analyze and strategize on the best way forward for the category. A three-tiered governance approach is commonly adopted, comprising a category sponsor, program managers (if multiple categories are involved), and a category team consisting of representatives from relevant functional disciplines. The category manager, chosen from within the team, coordinates management efforts with approval from the sponsor. While early category management initiatives may not immediately yield significant commercial benefits, an iterative approach is necessary, recognizing that breakthrough success typically occurs after multiple iterations of refining strategies and building organizational commitment. The initiation stage is also the stage in which Cordell and Thompson (2018) recommend setting a category hierarchy as it is essential for understanding and managing supply markets effectively. It simplifies the breakdown of category divisions, aids in developing targeted strategies, prevents duplication, and enables the identification of synergies and interdependencies between categories.

O'Brien (2019) in the initiation stage emphasis is on creating governance frameworks and assembling diverse teams to oversee the category management process. This phase involves defining roles, responsibilities, and decision-making authority while appointing a category sponsor. The objective is to establish a foundation for effective category management, prioritizing stakeholder engagement and team collaboration to analyze and strategize for the category's advancement. The focus on the analytical aspect of category management can be found in the second CM step that O'Brien (2015) defines as insight that includes gathering thorough organizational, supplier, and market data, followed by analyzing this data using a variety of analytical tools and techniques. To ensure organizations can make strategic decisions, they require precise analytics on their existing purchasing categories, highlighting the significance of an accurate ST.

## 3.5 Defining PCM Categories

CM often begins by defining the PCM category and/or categories so that no area of spend is left unaddressed as mentioned (Keith et al., 2016; Cordell and Thompson, 2018; O'Brien, 2019). This review needs to include product and services that are not only purchased but also outsourced as well as new product and services that organizations need to determine whether to make or buy. Analysis on internal and external factors need to understand the spend category and its relevant market characteristics (Keith et al., 2016). According to Smith (2014), the opportunity for achieving more intelligent procurement, eliminating redundancies, enhancing efficiency and effectiveness, and attaining greater satisfaction with delivered products or services lies in the key principles of aggregation, rationalization, and standardization. Employees in the procurement department need to therefore understand external market elements, cost structures, and how the buying organization is positioned against supplier in the market and what types of capabilities suppliers generally have. It might also be worth analyzing spend from a broader perspective that what might be traditionally done as it could grant more opportunity to create value through decreased supplier dependency and risk further shifting the perspective from a “commodity to a strategic enabler” (Keith et al., 2016, p. 193). This market understanding of sourcing categories demands moving away from forming sourcing categories along solely technical differentiators, such as the production process, toward market-, competence- or problem-oriented thinking. The logic underlying the formation of sourcing categories determines the purchasing performance potential in an organization (Trautmann et al., 2009)

Van Weele introduces the term category tree and defines it to present “product classification based upon product or supply market characteristics” and that categories are to consist of homogenous products allowing the category tree to act as a basis for category sourcing practices and formation (Van Weele, 2014, p. 199). Schiele et. al. (2011, p. 322) define a category as a “general category of purchased items, including materials or services of a similar type provided by the same group of suppliers”. O’Brien (2019) states that the most important element in forming a category is that it must mirror the market.

Cordell and Thompson (2018, p. 10) uses the term “category hierarchy” to represent categories, subcategories, and micro categories (figure 4.) to categorize items by supply-market opportunities further simplifying the task of the category manager. To elaborate on this, literature has made it clear that not all relationships with suppliers are to be managed in the same way due to differing conditions within a certain category of items (Karjalainen and Salmi, 2013). For example, services can be categorized as travel with the subcategories for flights, accommodation, taxi etc. that represent distinct marketplaces.

| Classification | Description | Example |
|---|---|---|
| **Master Category** | Highest level grouping from which all other categories stem. Also, the category from which the category strategy is developed from. | PMs |
| **Category(ies)** | These are categories within the master category that have similar characteristics/properties. These categories can also have individual strategies. | Flexibles |
| **Sub-Category(ies)** | A subcategory used to identify more specific similarities that might impact the strategy-development process resulting from the supply market structure. | Film |
| **Micro-Category(ies)** | A subdivision through which we can identify specific goods that are niche players. | Shrink Wrap |

Table 2: Category Definition (adapted from Cordell and Thompson, 2018, p. 11)

Differing terminology is used in what a group of homogenous products is called as sometimes they are referred to as “categories” (Van Weele, 2014; O’Brien, 2019), “commodity groups” (Schiele, 2007), “material groups” being a term for direct procurement (Horn et al., 2013), or even spend categories.

Cordell and Thompson (2018, p. 11) introduce the following six factors that should be taken into account in creating these categories: “(1) they should be based on a similar supply source, (2) they should possess similar production processes, (3) they should have a similar use or purpose, (4) they should have similar material content, (5) they should have similar specifications and (6) they should employ similar technology”. To elaborate on these factors, what is meant with the first point is that the category should be procured from comparable or related suppliers and the manufacturing process should be similar and suppliers manufacturing capabilities are comparable. For example, the category of corrugated PMs begins with the process of producing paperboard serving as the basis for corrugated packaging. The organization procuring the items should consider using them for a similar internal process and the technical specifications that products within a category are uniform.

One common way for companies to distinguish from different procurement categories or material groups is by differing between direct and indirect procurement as these are the two kinds of high-level groups of materials and services that enterprises procure. Direct purchasing relates to a category of products and materials that are used directly in a manufacturing companies' end products whereas indirect purchasing refers to all materials, components, and services required to sustain the organization's infrastructure and back-office operations (Van Weele, 2014).

Under direct sourcing many manufacturing organizations have a category such as packaging materials followed by a subcategory of for example paper and cardboard, flexible plastics, metal, glass etc. as these are categories and subcategories that represent the supply market as the production processes are distinct. It is challenging for an organization to maintain multiple types of production processes while focusing on core competences. Organizations also need to differentiate between primary, secondary, and tertiary packaging, especially if they operate in the food industry, where strict control over materials in contact with food is essential. Creating a procurement taxonomy strictly on whether a category of packaging material is secondary, primary or tertiary would not bring insights in analytics, although it can be seen as a facet of a subcategory of plastics if that is an element that would either want to be analyzed or it is data that is required in transactional purchasing.

# 4 Spend Taxonomies in Analytics

This section of the thesis goes into depth on procurement analytics with focus on spend analytics. Understanding how a ST feeds into analytics and vice versa gives insights into the importance of spend taxonomies, how they tie into not only more efficient PCM but understanding how to categorize sourced items in information architecture. Hallikas et. al. (2021, p. 36) state that "a prerequisite for utilizing both external and internal data is that the information must be in a form that can be combined" and that attention must be paid in "improving the reliability of information content". Hallikas et. al. (2021) continue by stating that there is potential for organizations to make a better connection with supplier market information to support sourcing decisions.

## 4.1 Spend Analysis

Spend analysis plays a vital role in strategic sourcing, forming the foundation for attaining visibility, compliance, and control over spending. This process involves structuring procurement data according to supplier hierarchies, commodity alignment, and expenditure amounts. The goal is to uncover spending patterns, pinpoint opportunities for cost savings, and identify areas for enhancing processes (Pandit and Marmanis, 2008). Spend analysis traditionally provides a tool for organizations to perform analysis on historical purchasing data to further identify savings opportunities (Talluri and Narasimhan, 2004; Pandit and Marmanis, 2008). Spend analysis beings with an organization level strategy to understand what spend analysis is used for (Sollish and Semanik, 2011).

Pandit and Marmanis (2008) introduce an approach defined as ETLA (extract, transform, load, analyze) to implement a spend analysis. Transactional data needs to first be extracted from systems to perform external analysis with business intelligence software. Companies vary regarding what types of transactional software is used and helpful to support spend analysis. Raw data extracted from systems may not be in a suitable format for analysis and it might need to be cleansed so that for example potential errors are removed, descriptions are enriched, populating empty data.

O'Brien (2019, p. 33) state that spend analysis "remains one of the biggest weaknesses amongst organizations; the value of spend data is only as good as the care with which it has been captured" and continues by "spend-data systems need to capture and classify data around the definitions of categories and subcategories if they are to be productive when analyzing and developing an effective category strategy later in the process". Unfortunately, businesses do not often know what they spend as large companies that go through mergers, acquisitions, operate in multiple locations, and have different decision-making processes often find themselves with multiple legacy IT systems (O'Brien, 2019). How each category is defined might be far too broad or meaningless rendering them open for interpretation further meaning that users across an organization deem the useless. Oftentimes also spend is "unclassified" or "other" meaning that the ST has not accounted for all possible categories of third party spend. A well-structured category hierarchy assigns a specific place to each thing. If numerous items lack designated places and are consequently relegated to the miscellaneous category, the tree is not fulfilling its purpose (Weinberger, 2007). It is important to note that to identify the needed categories and subcategories and their definitions, sometimes spend analysis might be a valuable precursor so that we can find a helicopter view on spend patterns (Hawkins, Nissen and Rendon, 2014).

Now in the age of digitalization there are numerous software-as-a-service (SaaS) vendors that conduct the above steps for organizations as it can become a difficult task, especially for companies that operate with multiple ERP's or have expanded business through Organization acquisitions for example. The process of cleansing data becomes very resource intensive, and companies might not have the needed expertise to perform it. Commonly these vendors also include external market information to companies spend data to assist organizations in supplier discovery and risk analysis for example. One SaaS vendor called Sievo (2023) introduces a six-step-process to conducting spend analysis for organizations:

1. Identify Data Sources
2. Data Extraction
3. Data Cleansing
4. Data Enrichment
5. Classification
6. Analysis of Data

To elaborate on part 5, Sievo (2023) states that this this process involves “classification is about harmonizing all purchasing transactions to a single taxonomy, enabling procurement to gain visibility of the global spending to make better sourcing decisions” and “when designing a taxonomy, it needs to be thoroughly communicated and aligned internally with key stakeholders such as finance and local/global category Managers”. Accurate classification of your data is facilitated by having a clear definition and understanding of each subcategory within the taxonomy.

## 4.2 Master Data

Achieving strategic business objectives, such as effective decision-making and flexible supply chain management, requires high-quality master data as a prerequisite (Ofner et al., 2013). As the success rate of data extraction and data cleansing is highly dependent on the quality of master data in systems from which transactional data is extracted from, it is difficult to discuss spend taxonomies without touching master data. Master data refers to the core data that is shared across an entire organization, is static in nature, and represents objects such as suppliers, products, and customers (Spruit and Pietzka, 2015). Therefore, master data is the type of data that gives context to transactional data (Allen and Cervo, 2015). For example, a purchase order in an ERP will include master data such as a supplier and most likely a product that is being ordered. The transactional data consists of these master data elements combined with some quantity being ordered and a time stamp for example. With inaccurate master data, transactional data is inaccurate as the assigned static data elements are incorrect. For example, if one were to analyze a purchase transaction and the underlying item type or the group assigned to it is incorrect, it would be difficult determining what type of product for example is being ordered.

Master data is often created and managed by users of the system that the data resides in. This in turn can cause the definitions of master data entities to lack a singular, definitive description. to combat this, many companies engage in master data management which is defined to be a complication of best practices aimed at establishing a unified, harmonized, accurate, and timely dataset essential for the effective management of business operations (Silvola et al., 2011). Therefore, organizations need to be clear in how they define certain master data elements as well as who and what function oversees maintaining them. Examples of such elements include but are not limited to material groups or sourcing categories.

To assist in this, many organizations engage in data governance which Abraham (2019) defines as being a framework going beyond data management and involves not executing the work to manage master data but instead setting what decisions need to be made and specifies who is responsible for making those decisions. It sets the guidelines, policies, and procedures for how an organization's data should be managed, ensuring that data is handled consistently, accurately, and in compliance with established standards.

Master data therefore a crucial role in facilitating spend analysis by providing the foundational information necessary for accurate and insightful procurement insights. Specifically, in the context of spend analysis, master data refers to the standardized and centralized information about suppliers, products, prices, contracts, and other relevant procurement-related data points. This data acts as the backbone for categorizing and organizing spending information, enabling organizations to effectively track and analyze their expenditures across various categories. By maintaining clean, accurate, and up-to-date master data with efficient governance, organizations can enhance the accuracy and reliability of spend analysis efforts.

# 5 Empirical Research Process

This section describes the research methodology employed in this study, encompassing the chosen approach, data collection methods, and analysis techniques. Specifically, it delves into the qualitative approach adopted as most apt for addressing the research problem at hand. Primary data is procured through semi-structured interviews conducted with the sourcing leadership team and sourcing managers, supplemented by insights from additional sources and the Organization's ERP systems. Subsequently, the discussion expounds on the methodology, followed by an elucidation of the data collection process and the implementation of interviews.

## 5.1 Description of Case Organization

Organization X is a multinational entity within the food and beverage industry with a dispersed purchasing function spanning multiple different countries. The organization has experienced significant growth, punctuated by acquisitions within the food and beverage industry. These acquisitions, characterized by disparate organizational structures, operational environments, sourcing processes, and system architectures, necessitate integration efforts, aligning with Organization X's centralized sourcing model. With views to rank among the fastest-growing companies in the sector, Organization X prioritizes scalability across its operations. However, amidst this growth trajectory, the organization faces the challenges of operating in a volatile and intricate landscape, demanding agility, a culture of continuous improvement, and unified operational standards. Presently, business processes remain fragmented across legal entities, marked by localized technical and procedural solutions, fostering siloed thinking, inefficiencies, and non-value-adding activities. Moreover, a lack of centralized data brings forth decision-making inefficiencies. To address these issues and ready itself for future endeavors, Organization X embarks on a business transformation journey aimed at increasing unity and scalability across its operations.

The sourcing department was centralized in 2018 and organized according to a PCM structure. As the supply market is everchanging, Organization X is growing, sourced items vary and have adapted to changes in the supply market but also the customer market. However, the category management team structure and the alignment of category management practices with master data have not kept pace with these developments. Now with the ongoing business transformation, Organization X will take advantage of one ERP system to support its operations and instead of simply migrating master data from legacy systems, Organization X will also harmonize the underlying definitions in for example products and how what types of categorization principles will be applied.

Organization X is advancing its digitalization efforts, encompassing initiatives in supplier management and analytics as well. These projects also bring forth new and more intricate requirements for sourced item data, forcing Organization X to contemplate a shift in its management approach for this business-critical operational item. The primary ability is to recognize similarity among materials across various sourcing functions. Essentially, the organization seeks a singular truth for its sourced items.

## 5.2 Methodology

Qualitative research is described as allowing “detailed exploration of a topic of interest in which information is collected by a researcher through case studies, ethnographic work, interviews” (Conrad and Serlin, 2011, p. 148). This thesis has been conducted as qualitative research to understand the context of purchase transactions by gathering insight from stakeholders. Interview transcripts underwent thematic analysis.

More specifically this thesis is a case study which Yin (2009) defines as a study that explores a current phenomenon in its real-life context, characterized by unclear boundaries between the phenomenon and its surroundings and utilizes multiple sources of evidence to gain a comprehensive understanding. Many business researchers are more familiar with quantitative methods, viewing them as providing more rigorous results, however, qualitative research is deemed relevant when prior insights about a phenomenon are modest, making it exploratory and flexible (Eriksson and Kovalainen, 2008). As previous studies on spend taxonomies and understanding how to format them does not exist, incorporating qualitative elements into this research provides more comprehensive results. Additionally, as an ST is closely linked to the organization utilizing it, qualitative examination was deemed most effective.

The aim of the interviews was to understand how different sourcing categories have been formed and what types of sourced items were considered part of that category, what types of difficulties does the category face within a supply market, what challenges does the case organization have in sourcing in general and how a ST ties into this. Interviews also attempted to create a basic understanding of how a ST is linked to category management in Organization X. Essentially, they provide a contextual understanding, perspectives, and connection to purchasing processes. Instead of simply answering “what” and “how much” that analysis of transaction would provide, it provides focus into the question of why current categories and categorization principles exist.

## 5.3 Data Collection

This section outlines the research methodology used to gather and analyze data for Organization X's sourcing department. Eight semi-structured interviews were conducted with key stakeholders, covering category specifics, costing perspectives, and the relationship between categorization and spend analysis. Transactional data from the enterprise warehouse for 2023 was analyzed, and thematic analysis was employed to deepen understanding. Interviews were tailored to stakeholders' roles, providing insights into sourcing processes and categorization needs. See Appendix 1 for interview framework details.

### 5.3.1 Interviews

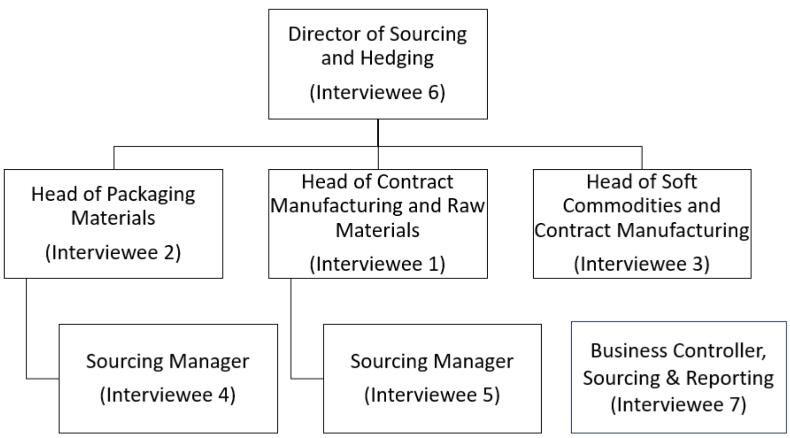


Figure 5: Interviewees

Eight semi-structured interviews were conducted to gather interview material from key stakeholders in Organization X's sourcing department. All participants were professionals in the sourcing function and employed by Organization X. Among these interviews, four were held via recorded Microsoft Teams meetings, while the remaining five took place in-person. Prior to each interview, the structure was communicated to participants through meeting invitations. The interviews covered discussions with the heads of all current sourcing categories and the director of sourcing to gain insight into each category's specifics and their distinctions from one another. Additionally, an interview with a sourcing controller was conducted to explore categorization needs from a costing perspective and to examine the relationship between categorization and spend analysis. For further details on the interview framework, refer to Appendix 1.

## 5.4 Transactional Data

Quantitative data that was used as support and collected from Organization X’s enterprise warehouse (EW). An EW is a solution used to gather data from different data sources, transformed for the use case of further analysis through for example dashboards (Chawla, Khattar and Alur, 2020). Transactional data from the full year 2023 was extracted from the EW and analyzed with business intelligence software. Data elements included in the query from EW were the supplier used for transaction, sourced item name and description, item type, item ID (to verify that distinct values were analyzed), purchased quantity in purchased unit of measure, transaction value, transaction date, sourcing manager. With the item type field, the basis for the existing organization ST was formed and existing item categorization could be condensed into preliminary spend categories. Data in this thesis will not reveal monetary values or the real naming conventions for categories.

## 5.5 Thematic Analysis

Thematic analysis was employed in this thesis to deepen the qualitative data, providing additional empirical insights. The interviews conducted with various stakeholders contributed valuable perspectives to address the research questions. Tailored interview questions were utilized based on the roles and functions of each interviewee. For instance, Interviewee 6, responsible for shaping sourcing categories and strategy, received questions focused on these areas, while Interviewees 1, 2, and 3, who possessed expertise in subcategory formation within master categories like PM, were queried on related topics. Interviewee 7 provided insights on categorization principles from a business controlling standpoint, excluding questions related to sourcing strategy. Finally, Interviewees 4 and 5, operational sourcing experts, were asked about gaps in category management and spend analysis relevant to their roles.

# 6 Empirical Findings

This section of the thesis will present the empirical findings by first diving into findings from the analysis of how the ST is structured prior to development recommendations. The current situation will utilize transactional data while connecting that with findings from interviews. More in depth analysis will be conducted through each category team separately.

## 6.1 Description and Analysis of Current Situation

Organization X is a food and beverage manufacturer, and its sourcing portfolio encompasses primary, secondary, and tertiary PM, agricultural crops, and third-party manufactured food products, among others. Following a restructuring initiative in 2019, Organization X centralized its sourcing department into four distinct category teams: raw materials (RM) (excluding soft commodities), PM, contract-manufactured (CM) items, and soft commodities (SC), which include hedged RM. Under the guidance of the Director of Sourcing and Hedging, the sourcing function operates within the supply chain function, with each category head directly reporting to the Director. The development of sourcing strategy follows an integrated approach, blending top-down and bottom-up methodologies to ensure alignment with overarching organizational goals and specific category requirements.

*"We have an annual clock in which the organization strategy is always updated in the Fall and from there it cascades down into the supply chain and sourcing strategy. When I create the sourcing strategy, I take a lot of influence from the leaders of the different sourcing categories bringing a bottom-up approach as well" (Interviewee 6)*

This integrated approach ensures that sourcing strategies are not developed in isolation but are connected to the overall direction of the organization while also being flexible enough to addressing different sourcing categories. Creating a sourcing strategy together with leaders from category teams elevates the importance to create a strategy that seizes individual opportunities stemming from the sourcing categories. This integrated approach promotes strategic alignment and agility in adapting to changing business environments.

The separation between sourcing and purchasing functions is evident, with the sourcing function handling strategic sourcing, and the purchasing or supply planning function managing material procurement and overall procurement planning. This division signifies a clear distinction between strategic and operational roles. The sourcing function engages in activities such as identifying, evaluating, and cultivating relationships with suppliers to align with the organization's long-term goals and objectives. Conversely, the supply planning function focuses on internal operations to ensure optimal inventory levels are maintained, efficiently meeting internal demand. The responsibilities in Organization X procurement are therefore clearly divided amongst purchasing and sourcing.

The sourcing department at Organization X serves as a strategic cornerstone, aiming to ensure a reliable and resilient supply chain while optimizing costs and quality. With a focus on securing supplies over time and cultivating a robust supplier base, the department plays a critical role in mitigating supply chain risks and enhancing operational resilience. Moreover, by collaborating closely with internal stakeholders such as sales and quality teams, the sourcing department aims to identify the most suitable products at optimal total cost of ownership, thereby contributing directly to the organization's profitability. As highlighted by Interviewee 1, while RM may be available without the sourcing function, its proactive efforts are instrumental in generating profits for the organization, underscoring the department's role in driving sustainable growth and success.

*"Sourcing attempts to secure supply over time, create a resilient supply base, have supply at the best possible cost level considering the total cost of ownership while working together with sales and quality to find the right products at the right cost. It is important to remember*

*that our organization will have raw materials without the sourcing function, but we have a huge role in generating profit" (Interviewee 1)*

As Organization X has grown in recent years through acquisitions, it has aimed to harmonize its ST in system architecture so that group wide spend analysis could be conducted. In other words, a shared ST was attempted to be created. Without harmonization of these categories in business intelligence software or ERP's Organization X would not have been able to analyze group level spend data in a meaningful manner.

Sourcing controlling has a role in Organization X to analyze the movements of sourced item prices and attempt to forecast where prices move. Regardless that the ST has been revised in recent years, the function partly fails to do so due to issues in the current ST. Interviewee 8 highlighted how the case organization created a ST that does not compare "apples to apples but apples to oranges" rendering it inefficient for spend analysis. More specifically, a taxonomy cannot be built so that all angles of categorization are considered but instead decisions must be made as to what the use of that specific taxonomy is, and it must be kept consistent across. Interviewee eight also highlighted how a general advice based on their experience is that if an item needs to be replaced with another one, the alternate item should fall within the same sourcing category.

*"The lowest level of sourcing categories needs to be detailed enough so that we in controlling can follow price movements of a category of items that has similar characteristics and follow the same price indexes. At the same time, the lowest level of categorization cannot include all angles of analysis needs and needs to be consistent across all categories" (Interviewee 7)*

In Organization X there is a clear link with how the supply market is organized, how the organization is internally aligned in terms of category management teams and how categories are applied in data analysis and thereafter in decision making. Factors that have a role in creation of a ST are therefore supply market orientation, internal organization structure, sold product taxonomy. Extra needs on what Organization X needs from its taxonomies are for example being able to follow materials with a certain price index such as PA6 (Polyamide 6) and LDPE (Low-Density Polyethylene) in the context of PM. How the sourced items are categorized is in turn linked with how meaningful data analysis can be conducted, how the internal capabilities are to be arranged ensuring more efficient category management.

*"We currently fail to analyze our purchasing data effectively specific to one category as we have not managed to harmonize category data on item level" (Interviewee 5)*

In recent years, Organization X has undergone acquisitions, revealing shortcomings in its current ST's adaptability to changing needs. The addition of new item groups often necessitates the creation of new categories, disrupting the consistency of the existing taxonomy. With a future growth strategy in mind, Organization X recognizes the importance of developing a more flexible ST capable of accommodating evolving entities seamlessly. As highlighted by Interviewee 5, the current inability to effectively analyze purchasing data at the category level underscores the need to harmonize category data at the item level. Thus, the revised taxonomy must prioritize scalability and adaptability to facilitate more efficient analysis and decision-making processes.

## 6.2 Existing Spend Taxonomy

The categories are extracted from a field that in Organization X's data lake is labelled as Sourcing Area Name. What is apparent is how the categories of RM and contract manufacturing (CM) have overlap and characteristics of a polyhierarchical taxonomy as defined by Lambe (2007) as a taxonomy that provides an inconsistent structure. With this categorization, if sourcing professionals were to analyze spend for RM, items from the category of CM would appear and vice versa. This is represented by the grey boxes in Figure 6.

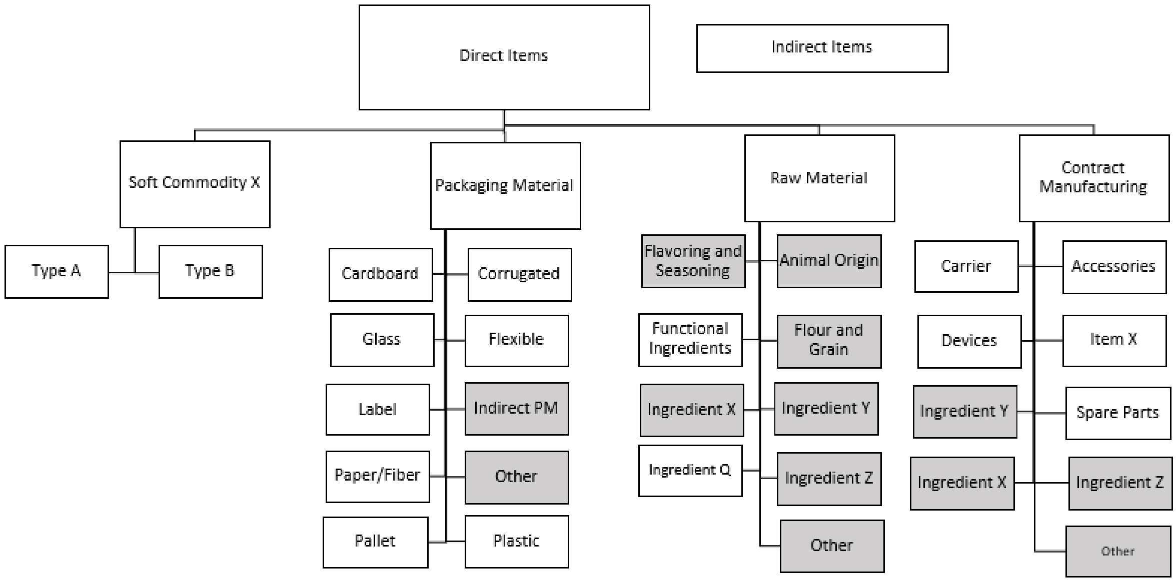


Figure 6: Existing Master Categories and Subcategories

Figure 6 highlights that master categories such as soft commodity X and CM do not align with the organizational structure of sourcing categories in which one sourcing team is responsible for sourcing all soft commodities. Similarly, other SC like flour and grain are not grouped under a specific SC category but are instead categorized as RM. In the context of Organization X, RM are defined as materials requiring further processing before becoming finished goods. Consequently, all SC are classified as RM since they undergo processing before reaching the consumer. To ensure consistency and granularity throughout the taxonomy, it may be beneficial to integrate the category of SC under the RM master category in the developed ST. Meanwhile, the PM category stands as a distinct master category, mirroring the division of sourcing responsibilities.

In summary, while the overall ST partially reflects the category team structure, the absence of a dedicated SC category indicates a need for refinement. This gap stems from the historical structure of sourcing teams at Organization X and the subsequent development of a separate SC category. Given the extensive portfolio of items falling within the category of SC, establishing a distinct category for them seems warranted. The following sections will delve deeper into analysis of the existing master categories and their subcategories.

## 6.3 Contract Manufacturing

A CM product at Organization X refers to a product that is produced by a third-party manufacturer or supplier under a contractual arrangement and undergoes minimal processing at Organization X prior to being distributed to consumers. Instead of the organization producing the product in-house, it outsources the manufacturing process to an external entity. The external manufacturer, often referred to as a contract manufacturer, is responsible for producing the product according to the specifications, requirements, and quality standards set forth by the contracting organization. Organization X sources CM products to many sites and the sourcing responsibility of CM items is geographically distributed according to where the internal stakeholders are for that group of CM items. Consequently, two category sourcing leaders are responsible for overseeing items falling within the CM category. The sourcing team lead for two categories of CM is also responsible for the sourcing of SC.

By strategically aligning sourcing responsibilities with the locations of R&D, sales, and finance teams, the sourcing function can foster improved communication, collaboration, and understanding of the unique requirements associated with each item group. Different item groups often possess distinct characteristics, technical specifications, or market considerations, making proximity to internal expertise essential for effective decision-making. This approach enables sourcing teams to leverage internal knowledge more efficiently, ensuring a better grasp of the specific requirements and specifications for each group of items. Moreover, Interviewee 1 emphasized the importance of supplier collaboration and knowledge exchange in CM. Given that sourced items in this category mirror those sold by the organization, fostering collaboration with suppliers becomes important for innovation and product improvement as well. Consequently, aligning the category management teams with sales and marketing facilitates a holistic view of procurement activities and strengthens transaction costs internally. Additionally, sourcing managers must possess a deep understanding of the supply market in which they operate to effectively navigate supplier relationships and procurement strategies.

The sourcing category of CM products poses a unique challenge due to the diversity of sourced items. This category encompasses a wide spectrum of products. Managing this diversity presents complexities as each product has distinct specifications, production processes, quality standards and with that supply markets. The heterogeneity within the category requires a different approach to supplier selection, quality assurance, making it important for the sourcing managers to understand at depth the supplier they work with and the products that they source. As many of the products in the CM category are delivered to Organization X as finished products, they undergo minimal processing before being delivered directly to the customer which in turn creates different categorization needs as the sourced items are also strongly connected to product categorization. For example, in the past Organization X distinguished sourced items in Category X through the brand name by which they were sold but this does not bring value spend analysis that can provide insight to the sourcing function itself. The reason for this is because as a sourcing as is does not reveal anything about the item and or the supplier.

The category of CM has a large percentage of spend that is categorized as "Other". Weinberger (2007) states a category hierarchy is not fulfilling its purpose by assigning everything a place. risks such as a lack of visibility, hindering effective sourcing strategy and supplier relationship management. It can also lead to quality issues, difficulties in performance measurement, and increased operational complexity, emphasizing the importance of a well-structured taxonomy for efficient procurement. In Figure 7, the spend across subcategories is represented in percentage in relation to the CM category without the true category names.

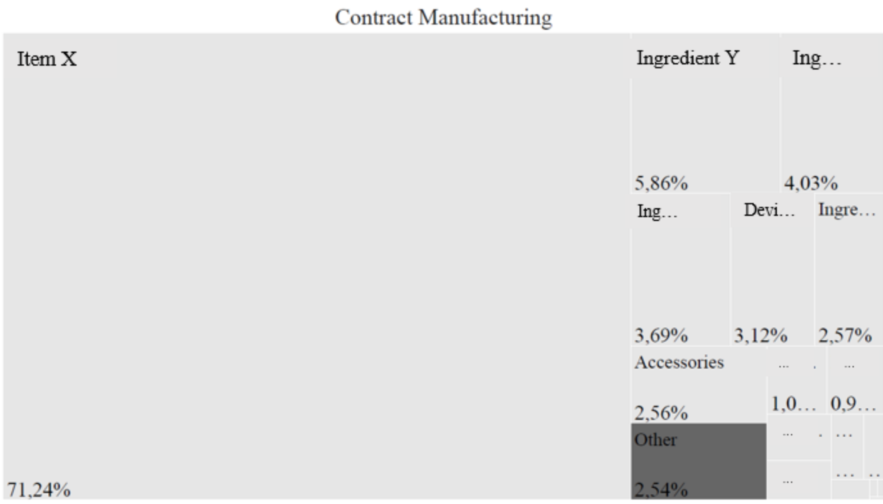


Figure 7: Contract Manufacturing Spend in Percentage

Within the category of CM, becomes evident from Figure 6 that Organization X has structured categories with varying levels of granularity. This implies that, while categories are descriptive, clearly defining the contents they encompass, other categories might lack the same level of descriptiveness. Additionally, some categories consist of only a few items that belong in them while others might have dozens. Consequently, these categories do not lend themselves well to direct comparisons due to the inherent differences in the entities they represent. As one item category also comprises 71% of spend, it might be useful to promote micro categories for more consistent granularity.

Considering Interviewee 2's insight regarding the importance of understanding supplier capabilities for effective categorization, it is recommended to consider grouping CM food products based on their production processes in the ST. This approach not only aligns with the structure of the supply market but also provides a practical framework for procurement teams to manage sourcing complexities. This understanding is crucial for developing targeted sourcing strategies and fostering productive supplier relationships. Overall, adopting a production process-based categorization approach enhances alignment with supply market dynamics and supports more informed procurement decisions.

## 6.4 Packaging Materials

The PM sourcing category at Organization X encompasses a diverse array of materials utilized in product packaging. This category involves sourcing primary, secondary, and tertiary materials. The PM category management team is structured with two category sourcing managers; one oversees supply market intelligence for flexibles and plastics, while the other manages fiber-based PM at the group level. The remaining sourcing managers in the PM team handle supplier relationships and oversee the end-to-end source-to-contract process for suppliers relevant to the specific site they are sourcing for. This division of responsibilities within the team is designed to streamline operations and optimize supplier market output, especially considering the distinct differentiating factors present in the supply market.

*"The same supplier does not supply plastic and fiber-based packaging materials which is why we need to distinguish by these product types. Different principles apply in different sourced packaging materials which is why we need to divide our roles so that we can take control of the supply market" (Interviewee 2)*

Similarly, to CM products, PM also represent a significant portion of spend within the "Other" category. With 4% of PM spend left uncategorized, Organization X faces similar risks of lacking visibility into its procurement activities. Notably, certain items like glue are categorized as "indirect" while others like tape fall into the "other" category, indicating inconsistencies in categorization practices. Despite a recent business decision to include items such as tape and shrink foil in the bill of materials (BOM), this practice lacks harmonization across the organization. Since the definition of indirect items encompasses materials and services necessary for sustaining the organization's infrastructure and back-office operations, items listed in a BOM should not be classified as indirect. Aligning the BOM definition across the group would necessitate relocating the category of indirect PM. Many PM categories also reflect the finished goods they belong to providing limited insight into PM composition and supply market alignment. While Organization X currently also categorizes PM's based on internal production processes meaning that some categories in PM describe what FG they are used for, a more consistent approach would be to categorize PM based on material composition or primary substance. This approach not only enhances spend analysis and categorization consistency but also facilitates communication within the industry and ensures the selection of appropriate materials based on product requirements and supply chain considerations.

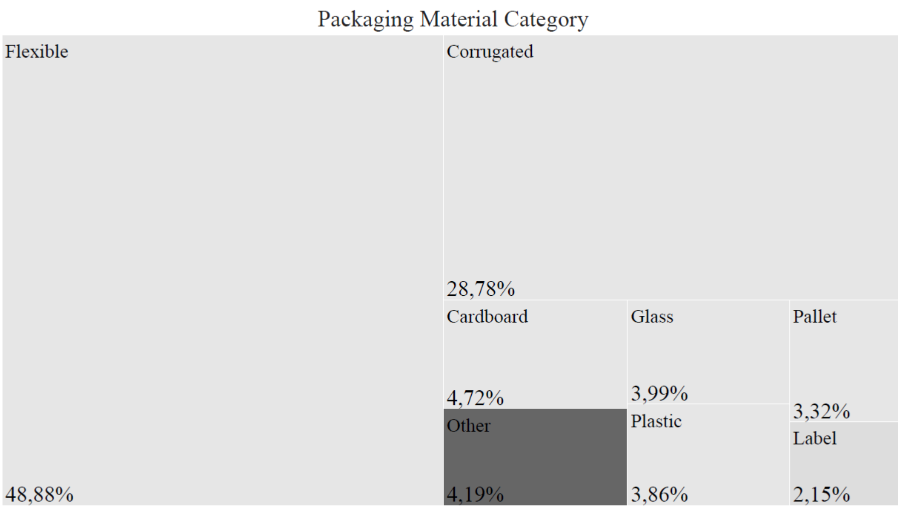


Figure 8: PM Spend in Percentage

The PM category entails additional categorization needs that are unsuitable as a basis for a ST due to their multifaceted nature, which does not align well with hierarchical structures. These include attributes like recyclability, the specific type of synthetic polymer used (such as Low-

Density Polyethylene, Nylon 6, Polyethylene Terephthalate), which often influences material costs, size, color, and internal usage of the material. Instead of being integrated into the hierarchy tree, these attributes should be treated as facets connected at the item level so that they can be employed in analytics.

## 6.5 Soft Commodities

Organization X has sourcing category team that source SC's. These are materials that are grown rather than being extracted or mined. These RM are subject to price fluctuations from influences such as weather conditions, global demand, geopolitical events, and economic trends. By establishing this focused category, the organization can leverage specialized expertise in effectively managing these dynamic factors, enabling the implementation of more efficient risk management strategies. This specialization also facilitates the development of stronger relationships with suppliers, as the organization gains a deeper understanding of their specific needs and challenges. Furthermore, having a separate category streamlines compliance efforts with regulations concerning quality, sustainability, and fair labor practices, enhancing transparency within the supply chain. Given the relatively similar cost structures of SC—comprising market prices and premiums—and the analogous internal decision-making forums for sourcing, consolidating the management of the soft commodity category makes practical sense for Organization X.

*"Because the category of soft commodities shares a similar cost structure (market price and premium) and the price that we in sourcing pay for the raw material has a high percentage cost in the finished product, the decision-making forums internally are also similar" (Interviewee 3)*

This team comprises two category sourcing managers, five sourcing managers, a market and risk analyst, and two quality professionals. The category sourcing managers hold the responsibility of implementing the overarching category sourcing strategy, defining objectives, and ensuring alignment with broader sourcing goals. On the other hand, sourcing managers are tasked with managing specific types of soft commodities (SC). Within one category of SC, the division of responsibilities is set based on the geographical location of suppliers and in another

SC category the sourcing responsibility is divided based on where the materials are needed for in production. Therefore, the allocation of tasks within the SC category is a balance between the orientation towards the supply market and the internal structure of Organization X.

The category of SC is not represented in the ST as a category at all, but SC are instead placed into RM and SC X. In this regard the ST does not mirror the sourcing teams and SC are included in separate main categories. For a more consistent ST, SC should be considered under the category of RM as they undergo further processing prior to becoming semi or finished goods or alternatively a category of SC can be created as a master category. The reasoning for this is that SC have unique determinants that influence their prices such as weather conditions and geopolitical events and analyzing them as a single entity enables more informed decision making. At present, representing SC in the master categories of RM and SC X provide an inconsistent structure that can easily be confusing when for example analyzing price movements for certain commodities.

## 6.6 Raw Materials

At Organization X, RM are characterized as materials that undergo additional processing before reaching the stage of being considered finished goods. Based on this definition, the category consists of some spice mixes as well that could also be considered CM items but as they are used in production and not sold as finished goods, Organization X has decided to include them in the RM category in the ST. The responsibility of sourcing RM (excluding SC) is in the sourcing team that is led by Interviewee 1. That team is responsible for sourcing CM items as well, but the division of roles is so that three category sourcing managers source a mix of RM and CM products based on whether the CM items of RM items belong to a specific group of finished goods. This division moreover assists in internal alignment as mentioned earlier. Previously the sourcing of some SC was also part of the RM category but as these are SC, they were separated from RM the sourcing responsibility shifted to the SC category.

Due to the size of the sourcing department of Organization X, it has found unnecessary to divide the category of RM and CM into two distinct categories. Interviewee 1 highlighted how the sourcing activities for contract-manufactured items involve managing relationships with third-party manufacturers, negotiating detailed contracts, and coordinating production with suppliers to ensure adherence to specifications and quality standards. This requires a focus on quality control, risk management, and flexibility in production capacity. On the other hand, sourcing RM entails developing relationships with material suppliers, ensuring a stable supply chain, and managing factors such as quality control, pricing, and inventory. The emphasis is on securing reliable sources, managing risks associated with supply chain disruptions, and maintaining the quality of the final product. Contract-manufactured items involve engaging with specialized manufacturing partners, often requiring strategic relationships and considerations for intellectual property. In contrast, the supply market for RM is diverse, influenced by global commodity markets and subject to supply chain complexities.

The existing ST reflects the historical division of responsibilities in RM sourcing before the establishment of a dedicated sourcing team for SC. Animal origin should not be considered as a separate category but rather as a facet within another category. The reason for this is that the basis for categorization varies in contrast to other categories that instead are descriptive of the material content. Spice mixes Although share some characteristics with contract-manufactured items as the sourced items are semi-finished goods, it may be more appropriate, given the consistency in the taxonomy, to categorize them as RM as they are treated as such in Organization X. This decision aligns with the sourcing activity definition of RM at an operational level, where items classified as RM undergo further processing internally.

The subcategory of functional ingredients encompasses a wide range of RM, including premixes tailored to enhance product profiles, various chemicals utilized in food processing for preservation or modification, leavening agents like baking powders, and acidic substances such as vinegar. Additionally, functional ingredients encompass a diverse array of attributes, such as texturizing agents, stabilizers, and emulsifiers, all contributing to enhancing the overall quality and consistency of end products. While functional ingredients as a category may not inherently define its micro categories, Organization X has deemed it sensible to maintain it as a separate subcategory for both spending and sourcing responsibilities, with one sourcing manager currently overseeing its procurement. However, to support growth initiatives effectively, revising the subcategory to its constituent parts may be warranted, especially if the category experiences an increase in sourcing volume.

Functional ingredients, although technically sourced as finished goods, are categorized as RM within Organization X due to their role in production processes. Analyzing spending on functional ingredients is crucial, given their significant expenditure and their pivotal role in shaping the characteristics, quality, and appeal of final products in the food and beverage manufacturing sector. For instance, the complexity of functional ingredients procurement can lead to working with multiple suppliers across various sites, resulting in a fragmented supplier landscape and diminished purchasing power.

# 7 Results and Conclusions

The goal of this study was to understand how a ST should be structured to support the supply strategy of Organization X. Research relating to taxonomies and how taxonomies are on a theoretical level to be structured, category management, supply strategy and analytics played a pivotal role in providing a basis for the empirical part of the study. Organization X’s current ST along with interviews of sourcing professionals were used to understand the context of the ST and how category management practices are reflected in Organization X’s ST.

## 7.1 Interview Themes

| Theme | Explanation |
|---|---|
| Sourcing Strategy Alignment with Organization Goals | The sourcing strategy closely aligns with the overarching organization strategy at Organization X but there is a need for more alignment between ST structures, sourcing activities, and organizational goals, to enhance efficiency, transparency, and effectiveness in procurement operations.<br><br>Emphasis on creating value and seizing opportunities is essential for successful sourcing.<br><br>Sourcing strategy focuses on securing and resilient supply chains, optimizing costs, and aligning with overall organization objective.<br><br>The sourcing strategy is created in an integrated manner (top-down, bottom-up). |
| Categorization Principles Criteria | Categorization of items and teams according to supply market capabilities, raw material composition, supplier production process and internal stakeholders.<br><br>Generic supplier market categorization for organizational purposes could clarify the overall structure and organization.<br><br>Shift from traditional categorization based solely on product types to parameters related to both production processes and raw materials.<br><br>Categorization principles need to be reviewed on a yearly basis to align internally |
| Future Needs from Spend Analysis | Ability to follow price movements of specific raw materials.<br><br>Product categorization and profit prioritization.<br><br>Understanding resource allocation within teams through spend analysis. |
| Current Taxonomy Deficiencies | Irregular structure not aligned with category management principles.<br><br>Rigid structure unsupportive of organizational growth. |
| Sourcing Roles and Team Structure | Sourcing roles are dynamic, allowing team members to specialize in core portfolios while maintaining flexibility for diverse category management.<br><br>A core portfolio and float approach in team structure contribute to effective workload management.<br><br>Creation of category teams according to internal stakeholder structure for more efficient decision-making. |

Table 3: Main Themes

Sourcing strategy alignment with organization goals: the study revealed that while Organization X's sourcing strategy aligns closely with its overarching organizational strategy, there's room for improvement in aligning ST structures, sourcing activities, and organizational goals. Enhancing this alignment is crucial for improving efficiency, transparency, and effectiveness in procurement operations. The strategy emphasizes creating value and seizing opportunities to support successful sourcing initiatives, focusing on securing resilient supply chains, optimizing costs, and aligning with overall organization objectives through an integrated approach.

Categorization principles criteria: the analysis identified key criteria for categorizing items and teams within Organization X's procurement processes, including supply market capabilities, RM composition, supplier production process, and internal stakeholders' needs. However, there's a recognized need to transition from traditional categorization methods solely based on product types to parameters considering both production processes and RM. Regular review of categorization principles is essential to ensure internal alignment and adaptability to evolving industry standards.

Future needs from spend analysis: Organization X expressed several future needs from spend analysis, including the ability to track price movements of specific RM, improve product categorization, prioritize profits, and understand resource allocation within teams. Meeting these needs is vital for optimizing procurement strategies and effectively utilizing resources to support organizational goals.

Current taxonomy deficiencies: the study highlighted significant deficiencies in Organization X's current taxonomy structure, characterized by irregularity and an inconsistent manner to mirror category management teams. These deficiencies contribute to rigidity that hampers organizational growth and agility, emphasizing the need for restructuring and alignment with best practices in taxonomy management.

Sourcing roles and team structure: the analysis underscored the dynamic nature of sourcing roles and the importance of flexible team structures within Organization X. Team members specialize in core portfolios while maintaining flexibility for diverse category management, facilitating effective workload management. Creating category teams based on internal stakeholder structures is identified as a strategy to enhance decision-making processes and improve overall sourcing efficiency.

## 7.2 Research Questions Addressed

The thesis aimed to find an answer to the questions addressed in this subsection which will one-by-one address each research question and the main findings associated.

*How can the structure of a spend taxonomy (ST) be optimized to support development of an effective sourcing strategy?*

In Organization X, the spend taxonomy (ST) is categorized into direct and indirect sourcing at the highest level, with master categories such as RM, CM, PM, and SC falling under direct sourcing. However, differences should exist between a ST and how sourcing responsibilities are divided within the organization. While both spend taxonomies and category management teams play vital roles in strategic procurement, it's essential to recognize that a ST should remain detached from internal influences that are part of creating CM teams. ST need to support effective analytics and decision-making.

When organizations align their ST with internal sourcing responsibility, they may create it according to mirror CM teams, potentially hindering analytics. Non-overlapping categories within the ST can be assigned facets for analysis purposes when needed. For instance, while contract manufacturing categories align closely with sales categorizations, such as type of cuisine, the ST should in turn not be created by type of cuisine to which the food product belongs to.

STs organize spending data to streamline procurement processes and identify cost-saving opportunities, while category management teams leverage data-driven insights to develop and execute strategic sourcing initiatives. Although both entities involve cross-functional collaboration, a concise ST assists organizations in optimizing resource usage and developing informed supply strategies, emphasizing the insight phase of the category management process. However, it's crucial to ensure that the ST and CM teams do not mirror each other to avoid redundancy and inefficiencies in the sourcing strategy.

*How is the existing ST structured within the case organization?*

The existing ST is structured with elements of a polyhierarchical taxonomy. The reason for this is because the basis for categorization is inconsistent meaning that one category might be categorized based on material composition, the other on production process and the third on material consistency. Many spend areas are uncategorized resulting in a lack of visibility, inefficient resource allocation, missed opportunities for cost reduction, and heightened compliance and risk concerns.

For the RM category in general, there is a lack of consistency, with some categories being broad while others are more specific, making it challenging to compare spending effectively. Additionally, some categories appear to overlap or duplicate each other's contents potentially causing redundancy and confusion. Ambiguity is also present in certain categories, as some lack clear naming conventions. To enhance the taxonomy, it is advisable to standardize categories for consistency, eliminate duplicates or overlaps, clarify ambiguous categories with precise definitions, and include any missing categories relevant to procurement needs or create categories for items not having any. Similar findings can be made from the CM category in which the naming convention is vague and undescriptive with categories also overlapping.

*What type of framework can organizations utilize to create a suitable ST to manage the supplier base more efficiently and organize their sourcing function?*

Given the cyclical nature of the CM process, the construction of a ST should also mirror this iterative approach. As organizations continuously evolve and adapt to shifting consumer preferences, the nature of sourced items also undergoes changes. Mergers and acquisitions further necessitate revisions to spend taxonomies to incorporate the categories of newly acquired organizations. Ultimately, a ST is designed to serve the specific needs of the organization it is tailored to. In this regard, sourcing professionals within the organization are best positioned to construct and refine the ST, leveraging their understanding of the organization's procurement processes and strategic objectives. Based on the findings from this thesis, Organizations can consider the framework in Figure 9.

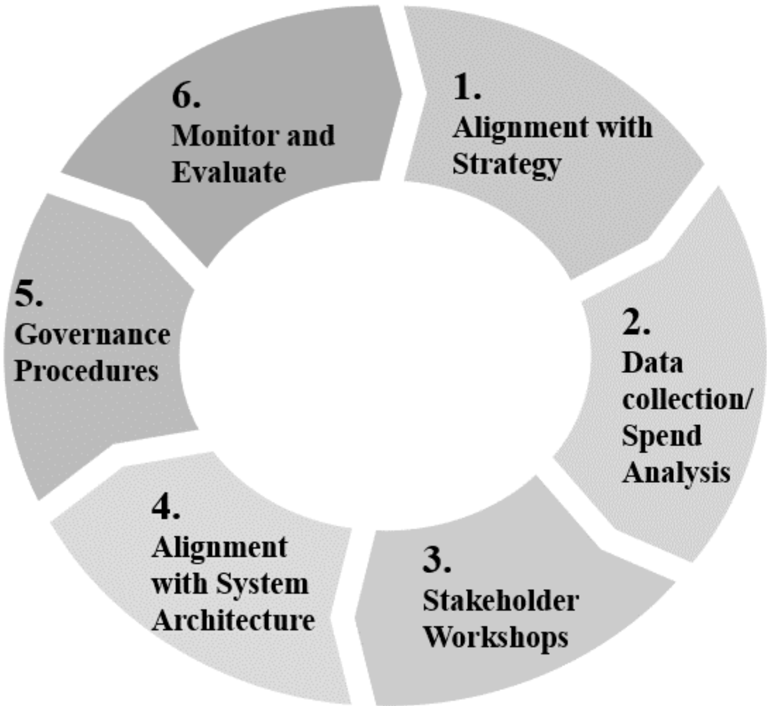


Figure 9: Spend Taxonomy Framework

**Alignment with strategy**: in recent years, Organization X has undergone acquisitions, leading to inconsistencies in its ST, thereby hindering efficient spend analysis. As Organization X continues to pursue growth opportunities, it becomes imperative to establish governance procedures ensuring the consistency of the ST, especially amidst the expansion of sourced items. To address these challenges, an analysis of the ST was initiated while focusing on areas in the taxonomy further hindering Organization X in scaling the categories.

In general, if an organization's strategy emphasizes cost optimization, the taxonomy may prioritize categories related to high-spending areas or identify opportunities for consolidation and negotiation with suppliers. On the other hand, if the strategy focuses on sustainability, the taxonomy may include categories that track spending on eco-friendly products or suppliers with sustainable practices. Ultimately, alignment with strategy ensures that the ST is tailored to the organization's specific needs and enables more targeted and effective procurement strategies.

**Data collection/spend analysis**: to build a taxonomy, it is important to understand what the items sourced are and what types of categorizing attributes are assigned to them. This should be used as a basis to continue the discussions with stakeholders. This task was also done in this thesis by collecting spend data from Organization X's data lake.

**Stakeholder Workshops** are important as they aid organizations in gaining a comprehensive understanding of the specific requirements and preferences of different sourcing categories or business units. This input helps tailor the ST to meet the diverse needs of stakeholders effectively. Moreover, stakeholders, including finance, procurement, and category heads, provide valuable input on relevant expenditure types, categories, and subcategories, ensuring that the taxonomy accurately reflects the organization's spending landscape. Additionally, stakeholder interviews help ensure that the ST remains aligned with the organization's strategic objectives by incorporating current business priorities and supporting decision-making processes. By involving stakeholders throughout the taxonomy development process, organizations can identify challenges early, gain buy-in, and ultimately create a taxonomy that is both relevant and effective in driving procurement and financial strategies.

**Alignment with System Architecture**: consistent alignment between the ST and system architecture (ERP's, product lifecycle management software etc.) enables interoperability between different software applications and platforms, reducing the risk of data discrepancies or inconsistencies. Having accurate master data streamlines reporting and visualization capabilities, allowing stakeholders to access relevant spend data in a structured and user-friendly format. Ensuring alignment between the ST and system architecture optimizes the organization's ability to leverage data-driven insights for strategic supply management.

**Governance Procedures** surrounding spend taxonomies are crucial for ensuring the accuracy, consistency, and effectiveness of expenditure data management within organizations. These procedures establish clear guidelines, standards, and protocols for the creation, maintenance, and utilization of spend taxonomies, defining roles, responsibilities, and accountability for various stakeholders involved in the process. Additionally, governance procedures facilitate alignment with organizational objectives and strategies, ensuring that the ST accurately reflects the organization's operations, and strategic priorities.

**Monitor and Evaluate** (re-evaluate) can be considered a subtask to governance procedures. Regular reviews, audits, and updates of the taxonomy are also essential components of governance procedures to accommodate changes in the business environment and evolving procurement needs. By adhering to robust governance procedures, organizations can enhance data integrity, reliability, and usability, thereby enabling informed decision-making, strategic planning, and performance management based on accurate and comprehensive expenditure insights. It is important to include elements of ST review into the annual strategy review of supply and sourcing strategy annually or bi-annually.

## 7.3 Conclusions

In conclusion, this thesis has conducted a thorough analysis of Organization X's current ST and its relationship with category management, focusing on the structure, challenges, and potential areas for improvement of the ST. The empirical findings have revealed various aspects of the organization's sourcing processes, shedding light on the complexities of managing a diverse supply base and item portfolio across multiple categories. Building upon the work conducted by Lambe (2007), Weinberger (2007), Stewart (2008), and Broughton (2017) on taxonomies, this study applies their insights in a procurement context, clarifying the structuring of a ST for a medium-sized food and beverage organization.

Analysis of Organization X's current situation has uncovered a ST characterized by inconsistencies, overlaps, and gaps, bringing challenges in data analysis, strategic decision-making, and resource allocation. While the organization's sourcing function operates within a centralized framework with elements of decentralization, challenges such as inconsistent taxonomy structure have been identified as hurdles to efficient procurement practices.

The findings highlight the significance of stakeholder engagement, data alignment, and governance procedures in the development and maintenance of an effective ST. Stakeholder workshops offer valuable insights into the specific requirements and preferences of different sourcing categories, ensuring alignment with organizational objectives.

Governance procedures surrounding spend taxonomies play a large role in ensuring accuracy, consistency, and effectiveness in expenditure data management. Clear guidelines, roles, and responsibilities establish accountability and compliance with regulatory requirements, promoting alignment with organizational objectives and strategies. Regular monitoring and evaluation are imperative to adapt to changes in the business environment and ensure the taxonomy remains relevant and responsive to evolving procurement needs.

Moving forward, it is recommended that Organization X focuses on harmonizing its ST, enhancing stakeholder engagement, and strengthening governance procedures to enable more effective procurement practices. Addressing the identified challenges and implementing the proposed recommendations will streamline procurement processes, optimize resource allocation, and drive value creation across procurement activities.

This thesis contributes to the understanding of ST development and governance practices, offering insights and recommendations for enhancing procurement efficiency and strategic alignment within Organization X. Building upon the research by Heikkilä and Kaipia (2009; 2018), Schiele et al. (2015), Ates (2014), and Hesping and Schiele (2015), this study provides valuable contributions to the field by addressing key gaps and advocating for further exploration of methods to align procurement spend and the supply base with competitive priorities in diverse business environments.

Limitations of the study relate to limited generalizability as the findings and recommendations may be specific to Organization X and may not be directly applicable to other companies or industries due to differences in organizational structures, procurement processes, and industry dynamics. The study also focused primarily on the internal processes and challenges of Organization X, without considering external factors or industry benchmarks that could provide additional context or insights into best practices. The use of semi-structured interviews and analysis of spend analytics data, may also have inherent limitations in terms of data collection, interpretation, and generalizability.

Some further research areas would be to conduct a comparative analysis of spend taxonomies and procurement practices across different industries to identify common challenges, best practices, and industry-specific nuances. This research could provide valuable insights into how organizations in various sectors can optimize their procurement processes and spend taxonomies. Additionally, exploring the role of technology, such as artificial intelligence, machine learning, and data analytics, in optimizing spend taxonomies and procurement practices should be considered. This research could assess the effectiveness of technology solutions in automating data analysis, improving data accuracy, and enhancing decision-making in procurement processes. Lastly, further research on how category management teams are to be formed within organizations should be addressed.

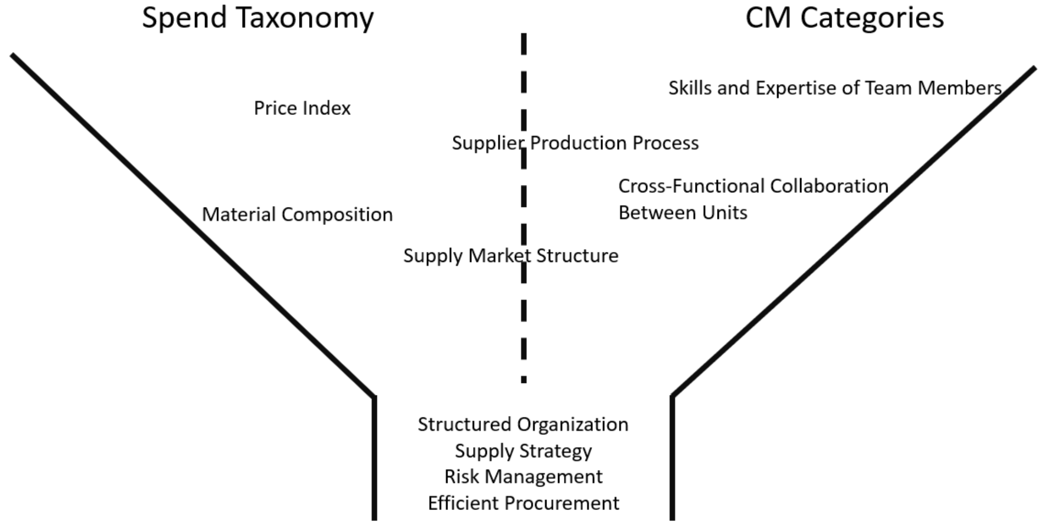


Figure 10: Factors Influencing ST and CM

Figure 10 illustrates the essential differences between structuring a ST and organizing CM teams, while also highlighting their similarities. The ST primarily focuses on addressing organizational needs for spend analysis, whereas CM teams prioritize managing supplier markets and ensuring efficient internal communication. Despite these distinctions, both the ST and CM teams share commonalities influencing their formation. Ultimately, striking a balance between these factors is crucial for organizations when structuring their ST and CM teams.

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# Appendices

## Appendix 1: Interview Frame

### Organizational Structure

- What kind of sourcing and procurement organization does the organization have?
    - Would you describe it as centralized/Centralized/Hybrid?
    - Sourcing categories?

### Strategy

- How would you describe the role of sourcing and procurement at the organization? What is sourcing trying to achieve at the organization?
- How would you define successful sourcing at the organization?
- How would you describe the most common difficulties for sourcing?
- How is the sourcing strategy created?
    - What functions are involved in developing a sourcing strategy?
    - What factors most influence the sourcing strategy?
- How is the link between overall organization strategy and sourcing strategy created?

### Category Management

- What is a sourcing category?
    - How have the current sourcing categories been constructed? What kinds of products are divided into categories?
    - What are we attempting to achieve by creating sourcing categories?
    - Are some groups more important than others/less important than others? What is the defining characteristic? What is the difference from a sourcing perspective between more important and less important categories?
    - What kinds of challenges does the organization face in creating sourcing categories?
- What is the need for sourcing to divide sourced items into groups and by what basis are sourced items grouped?
- How are sourcing category roles divided between sourcing managers (by what basis)?
- How is a category sourcing plan/strategy created?

- By what basis are categories and their subcategories formed?
- What are the main challenges in sourcing categories and subcategories?
- What do you see are challenges in the future?
- Do you see category management bringing the value to the organization? What would you see should be done to better this?

**Supply Base**

- How large is the supply base?
- What does managing the supply base mean to the organization?
- How do we utilize the supply base or how would you describe this?
- What could we do differently in managing the supply base if anything?

**Analytics**

- What kinds of analytics solutions do you use nowadays?
- How are they serving procurement?

**General**

- What does a spend taxonomy mean to you?
- What is a spend taxonomy used for at the organization?

Anything to add?