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Knowledge Transformation in Purchasing and Supply Management: A Process Perspective

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ABSTRACT

To succeed in the face of constantly changing business challenges, Purchasing and Supply Management (PSM) needs to develop strong knowledge management (KM) mechanisms to equip individuals with accurate, reliable, and up-to-date knowledge and has, therefore, become a significant factor in building competence in this area. Although inter-organizational processes within the context of supply chains and supplier development have previously been studied, little is known about the transformative nature of the PSM function itself. Following a process perspective and drawing on the SECI model of knowledge creation, we contextualize the construct of knowledge assets in PSM and conceptualize mechanisms behind their conversion. Based on thirty-four interviews with PSM practitioners, we show how PSM knowledge is curated and study the applications of KM dynamics within the PSM practice. Our work also highlights barriers to this process and provides recommendations for improving PSM practices and strengthening learning capabilities.

1 | Introduction

Knowledge Management (KM) is the processes and activities (Alavi and Leidner 2001) that allow organizations to generate, develop, codify, store, transfer, share, and use knowledge (Zaim 2006) to generate competitive advantage (Cepeda and Vera 2007) and enhance organizational innovation capabilities (Migdadi 2020). KM is also viewed as a set of methods for collecting, combining, and transferring knowledge assets (Bandera et al. 2017), whether in the form of human (i.e., tacit knowledge, skills and competencies, attitudes and behaviors), structural (i.e., explicit and procedural knowledge and organizational culture) or relational (i.e., networks and reputational) capital (Handa et al. 2019). KM requires organizations to harness their knowledge assets, which are expertise, lessons learned, policies and procedures, data, and knowledge documents (Freeze and Kulkarni 2007). The key role of assets generates the question of where these are located, i.e., being a mix of intra-organizational knowledge sharing and application, external knowledge acquisition (Andreeva and Kianto 2011) and requires a Supply Chain Management (SCM) perspective to be adopted.

Supply chains are the alignment of firms that bring products or services to their respective markets (Lambert et al. 1998) and produce value for the ultimate consumer (Christopher 1992). The management of these supply chains or networks (SCM) can be seen as philosophical, i.e., a systems approach to viewing the supply chain as a single entity (Mentzer et al. 2001) and sets of management processes and activities to implement this approach, involving the management of relationships, knowledge and information, and materials flow across organizational borders (La Londe and

Masters 1994). Following the so-called unionist perspective (Larson and Halldórsson 2002), while being part of the overall SCM field, Purchasing and Supply Management (PSM) focuses on the upstream part of the supply chain, e.g., on managing buyer–supplier relationships and supply networks (Spina et al. 2013). Looking at the SCM literature, the current KM focus is on the broader supply chain with foci such as achieving competitive advantage (Lewis et al. 2010) and organizational performance (Wong and Wong 2011), building resilience (Ali et al. 2023), using Industry 4.0 technology (Sartori et al. 2022) and satisfaction (Wagner and Buko 2005), but there has been far less attention given to individual-level PSM KM processes (Kassaneh et al. 2021). For PSM, KM plays a vital role in certain aspects of supplier development, i.e., network mapping (Choi et al. 2020), visibility (Finkenstadt and Handfield 2021), managing risk (Kilpatrick and Barter 2020), environment knowledge (Sambasivan et al. 2009), and see Chen et al. (2015) for an overview of the links between KM and supplier development. These activities are complex and knowledge-intensive, and PSM success is dependent on accurate, reliable, and up-to-date knowledge. Positive effects of inter-organizational KM on supply chain performance have been reported in the literature (e.g., Chen et al. 2013; Lewis et al. 2010; Wagner and Buko 2005). Prior studies have also looked at the impact of PSM KM on cost and strategic performance (Schütz et al. 2020) and how specific capabilities from a knowledge-based view, such as analytics, can be further developed (Öhman 2021). Given the growing digitalization and adoption of big data in PSM and within the wider context of SCM (Prasad 2018; Wehrle et al. 2022), together with the increasing focus on supply chain flexibility and agility (e.g., Blome et al. 2014; Holsapple et al. 2015), there is a need to better understand the relationship between KM and PSM for identifying and exploiting new opportunities.

To address this gap and build on the work of Giunipero and Pearcy (2000), Stek and Schiele (2021) and Tassabehji and Moorhouse (2008), we examine the transformation process of how PSM knowledge is created, shared, and utilized. PSM knowledge is contextualized and viewed from the perspective of assets, i.e., experiential (shared tacit knowledge and know-how), conceptual (articulations of explicit knowledge), systemic (packaged explicit knowledge), and routine (embedded in actions and practices) (Nonaka et al. 2000). Knowledge assets differ from knowledge resources in that they are specific pieces of intellectual value rather than capabilities or organizational practices. Examples include intellectual property, patents, trademarks, databases, documented processes, customer insights, and the skills and expertise of employees. These are indispensable to the PSM knowledge transformation process and essential for creating organizational value, gaining a competitive advantage, and driving innovation (He and Wang 2009).

Our study is guided by the following research questions:

1. What constitutes knowledge assets in PSM settings?
2. How do KM knowledge conversion modes apply to PSM knowledge?
3. How is the process of knowledge transformation achieved within a PSM context, and what are the associated barriers?

The contribution of our work is twofold. First, we develop an integrated framework of PSM knowledge assets, looking at how experiential, systemic, conceptual, and routine types influence the development of intra-organizational PSM knowledge. Second, through the application of the SECI model, we show how PSM knowledge is created and transformed, extending current relational paradigms and providing further insight into the barriers to the PSM knowledge transformation process.

The paper is structured as follows. First, we position knowledge assets and review the transformative nature of KM from a process perspective. We then present our methodology, together with details of our research design, sampling, and coding framework. This is followed by the findings, a discussion of our contributions, and associated theoretical and practical implications. Finally, we conclude with future research opportunities and limitations associated with our study.

2 | Knowledge Assets

KM requires and leverages knowledge assets to achieve increased organizational performance (Freeze and Kulkarni 2007). The knowledge-based view of the firm considers knowledge to be the most strategically significant resource. It posits that if a knowledge resource is valuable, rare, inimitable, and nonsubstitutable, then an organization can establish a competitive advantage (R. M. Grant 1996) and lead to success in achieving organizational objectives (Germain and Iyer 2006; Rodríguez et al. 2004; Safizadeh et al. 1996). KM, as the art of creating value from the organization's intangible assets (Sveiby 1997), provides a mechanism to explore, exploit, and share knowledge. This supports the learning process both from within and externally, as individuals learn how to grow intellectually and developmentally.

Knowledge assets refer to all intellectual resources an organization has access to that it may use, invest, and leverage for growth and encapsulate the knowledge, skills, and abilities of PSM professionals and can consist of expertise, lessons learned, policies and procedures, data, and knowledge documents (Freeze and Kulkarni 2007). KM provides a systematic mechanism for managing such resources principally through processes related to developing, structuring, organizing, retrieving, sharing, and assessing a company's intangible assets (Hong et al. 2008). Arguably, an organization's capabilities are underpinned by its owned knowledge assets (Li and Tsai 2009), as they represent the foundation of a company's capabilities (Marr et al. 2002). The ownership of specific knowledge also provides organizations with particular learning capabilities (Leonard-Barton 2003; Prahalad and Hamel 1990), and new concepts to identify, classify, and manage the knowledge resources of organizations have been developed, allowing for a less abstract and more operational way of conceptualizing knowledge (Marr et al. 2004). Nonaka et al. (2000) identify four categories of knowledge assets, as shown below. We use this typology to assess PSM knowledge later in the paper.

Experiential knowledge assets are shared tacit knowledge and know-how developed and accumulated via hands-on

individual experience and contact between employees, for example, in developing an understanding of how a supplier relationship management or category strategy development process works as individuals engage in these activities and work with colleagues.

Conceptual knowledge assets are explicit knowledge articulated through images, symbols, and language. Unlike other tacit knowledge-based asset types, these take a tangible form and are, therefore, easier to grasp than experiential knowledge assets, although individual perceptions of these may vary. For example, clearly defined standard operating procedures and guidelines can be used as a source of knowledge to inform PSM activities, such as savings reporting or conformance to other relevant key performance indicators.

Systemic knowledge assets are represented by systematized and packaged explicit knowledge, such as explicitly formed supply category cards containing supply contact, contract, and pricing details, or negotiation toolboxes with the tools and techniques individuals can use in their PSM activities.

Routine knowledge assets consist of the tacit knowledge that is routinized and embedded (i.e., in actions and practices), such as PSM professionals using communication skills or common sense in their day-to-day activities.

Reflecting our focus on the PSM context, Schütz et al. (2020) establish the important role of knowledge in achieving cost savings and strategic performance, reaffirming the position of PSM as a knowledge-transforming function. Hult et al. (2000) show how organizational learning can translate into business agility by positively influencing, for example, the cycle time of the purchasing process. As knowledge assets vary across different contexts and face disparate competitive realities (Rothberg and Erickson 2017), it is essential to describe clearly how they can be conceptualized within a PSM setting. In addition, the implicit nature of some knowledge assets tends to mean they can be hidden (Wickramasinghe and Davison 2004), so explicitly uncovering them is a necessary and worthwhile first step in harnessing them more effectively. According to Chou and He (2004, 148), knowledge assets are the basis of knowledge-creating processes and provide a framework through which to better understand knowledge-converting activities, and it is to this processual, i.e., transformation aspect, that this paper now turns.

3 | The Knowledge Transformation Process and Associated Barriers

The mechanisms by which knowledge is managed, shared, and converted can be viewed from a process perspective, adopting an Inputs-Transformation-Outputs (ITO) approach. This allows us to see knowledge assets as both the inputs (i.e., ingredients) and outputs (i.e., products) of the KM transformation process.

At this point, it is essential to highlight that most organizational knowledge is tacit (Smith 2001), i.e., multidimensional, context-specific, and challenging to share (Kogut and Zander 1992). However, from a KM point of view, it is crucial that tacit knowledge can be converted into explicit so that it can be stored in repositories and accessed organization-wide rather than held by a few individuals (Dalkir 2017). It is also equally crucial that explicit knowledge can be converted into tacit knowledge so that individuals can hone their skills and practice what they have learned to perform their tasks. To enable the conversion between tacit and explicit knowledge, considerable research has been undertaken, with the SECI model being one of the most commonly cited approaches Nonaka and Takeuchi (1995). As part of SECI, the concept of 'Ba' has also been proposed to emphasize the importance of providing the right conditions for knowledge transformations to occur (Nonaka and Konno 1998). Indeed, studies have shown that it is paramount to provide shared physical, virtual, and mental space (or any combination of them) so that the SECI processes have the necessary environment to be effectively maintained and developed (Choo and de Alvarenga Neto 2010; Oyemomi et al. 2016).

As these conditions or 'space' are critical to the KM process, the literature identifies several factors that can limit and impede the space that is required for the knowledge transformation process to take place. Zhou and Nunes (2016) suggest a high-level categorization of barriers related to communication, interpersonal and managerial characteristics, which we utilize when coding and analyzing our data. Discrete factors include a lack of time, awareness of benefits, and limited interaction, compounded by poor communication skills and demographic differences (Riege 2005). Also, issues such as information hoarding (Wasko and Faraj 2005) and a lack of trust (Goh and Sandhu 2013) have also been identified. In the PSM field, research has looked at knowledge-sharing barriers within and across supply chains (e.g., S. B. Grant 2017; Kembro et al. 2017; Nazam et al. 2020); for example, the role of culture in knowledge sharing (Möller and Svahn 2004), time pressures (Thomas et al. 2011), the lack of intrapersonal traits (Stek and Schiele 2021), formal and informal socialization mechanisms (Lawson et al. 2009), and broader engagement with other stakeholders (Meehan and Bryde 2014), all being significant contributors to sustainable PSM activity (Kassaneh et al. 2021). Similarly, the SECI model has previously been discussed in the PSM literature, e.g., in new product development (Richtnér and Åhlström 2010; Tyagi 2016), inter-organizational development and use of tools and activities (Samuel et al. 2011) and critical success factors at different conversion stages (Wu 2008). However, there seems to be less coverage of the internal dynamics of PSM KM, which this study seeks to address. A notable exception is Englyst et al. (2008), who found that knowledge sharing is a crucial motivator for cooperation within commodity teams. As the mechanics and drivers of knowledge transformation in internal PSM settings are not yet fully known, this study makes use of SECI to provide a richer understanding of the conversion process in a PSM context.

4 | Methodology

To validate and elaborate on KM theory, a qualitative data collection approach was deemed most suitable. Data was based

on 34 semi-structured interviews conducted with PSM practitioners working across chemical, automotive, food, pharmaceutical, and construction industries. This was to ensure coverage of a wide spread of PSM job roles and KM activities. Table 1 provides an overview of the participants, along with their unique identifiers and company references. All companies represented are large (over €5bn in turnover) with heavy dependence on supply chain networks. All industries had at least three interviewees to triangulate the data. All interviews were conducted via telephone and recorded and transcribed as soon as practical after they had taken place.

The interview guide covered both individual and organizational aspects, e.g., exploring how interviewees were onboarded into

TABLE 1 | Interviewee Information Overview.

Interview ref.	Interviewees	Industry	Company ref.
I1	Vice President Corporate Purchasing	Automotive	AUTO1
I2	Head of Direct Purchasing	Automotive	AUTO1
I3	Process Expert	Automotive	AUTO1
I4	Head of Education	Automotive	AUTO1
I5	Process Manager	Automotive	AUTO1
I6	Senior Vice President	Automotive	AUTO1
I7	Process Expert	Automotive	AUTO1
I8	Vice President, Logistics Purchasing	Automotive	AUTO1
I9	Education employee	Automotive	AUTO1
I10	Project Purchasing Manager	Automotive	AUTO1
I11	Procurement Manager	Automotive	AUTO2
I12	Director Corporate Services	Chemical	CHEM1
I13	Global Senior Procurement Manager for IT and Energies	Chemical	CHEM1
I14	Vice President, Strategic Procurement	Chemical	CHEM2
I15	Head of Procurement Controlling & Strategy	Chemical	CHEM2
I16	Vice President and Head of Indirect Procurement	Chemical	CHEM2
I17	Vice President, Procurement—Chemicals	Chemical	CHEM2
I18	Head of Operational Indirect Procurement	Chemical	CHEM2
I19	Vice President, Procurement—Logistics & Packaging	Chemical	CHEM2
I20	Head of Corporate Supply Management	Construction	CONST
I21	Category Manager Indirect	Construction	CONST
I22	Head of country procurement	Construction	CONST
I23	Global Transformation Manager	Food	FOOD
I24	Vice President Commercial Europe	Food	FOOD
I25	Vice President Commercial Europe & Eurasia	Food	FOOD
I26	Senior Director, Strategic Operations in Europe	Food	FOOD
I27	Director Commercial Operations Europe	Food	FOOD
I28	Procurement Service Centre Director – Europe	Food	FOOD
I29	Junior Sourcing Manager	Food	FOOD
I30	Director Global Talent & Learning	Food	FOOD
I31	European Sourcing Director	Food	FOOD
I32	Head of Capital Investments, Procurement Region EMEA – Director	Pharmaceutical	PHARM
I33	Head of Purchasing	Pharmaceutical	PHARM
I34	Head of Procurement Governance & Solutions—Senior Director	Pharmaceutical	PHARM

their jobs initially, where, and how they would find out what and how they need to do in their jobs. This approach allowed us to capture what knowledge individuals need and how their organizations are set up to facilitate KM. A full list of the interview questions can be found in Appendix 1.

The data analysis process followed an abductive approach as per that of Bingham (2023), which synthesizes a process of qualitative analysis rooted in both deductive (a priori categories) and inductive (developed during the course of the analysis) strategies. Having a priori categories provides the framework for 'internal' inductive analysis, as first-order codes are derived from the data through a line-by-line analysis of the transcripts. Codes were then grouped by similarity until saturation was reached, when no new first-order codes were found. To ensure and increase the inter-coder reliability, the researchers initially coded three "test" interviews to get accustomed to the approach. These researchers then participated in a detailed review meeting to discuss the "test" transcripts and how they coded them to identify individual differences, further enhancing the consistency of the coding process and ensuring a transparent and traceable qualitative data analysis approach (as per Bazeley 2013). The interviews were then split between two coding pairs of researchers to ensure broad node coverage and enhance the coding process's reliability. Appendix 2 summarizes how each research quality requirement was addressed across the range of data collection and analysis activities. For example, transferability was fostered by all interviewers adopting a common approach, and confirmability was enhanced by the interview questions being checked by individuals not involved in interviews as part of a wider project team basis.

Our coding framework was developed using relevant literature covering knowledge assets (Nonaka et al. 2000), the different modes of knowledge creation (Chou and He 2004; Nonaka and Takeuchi 1995; Richtnér and Åhlström 2010; Wu 2008), as well as communication, interpersonal, and management-related barriers to knowledge transformation (Zhou and Nunes 2016). The main ex-ante nodes and their definitions are shown in Table 2.

5 | Findings and Discussion

5.1 | Knowledge in PSM Settings

The data identifies how PSM knowledge is contextualized as a collection of assets. Experiential PSM assets are a mixture of commodity and more general process-based knowledge. This type of knowledge is used to better understand the needs/requirements of the organization, internal and external customers, as well as the wider supply chain context. Conceptual PSM assets relate to the business context in the form of understanding the wider strategy and underlying approaches, such as 'lean philosophy' (Garcia-Buendia et al. 2021), which are often less tangible in nature. Systemic PSM assets set expectations in the form of aspirations and provide knowledge about how adherence to the requirement can be measured. In addition, they guide PSM KM activities in the form of training, toolboxes (e.g., for negotiations), and packaged information, such as category cards. Routine PSM assets exhibit a mixture of *PSM*-specific skills and capabilities (e.g., negotiation, supplier management, and sourcing) complemented by a range of underlying factors, such as business acumen, critical and analytical thinking, and common sense. This provides useful insights into the hybrid nature of PSM competence, requiring both 'hard' and 'soft' skills.

Although the study does not seek to measure direct impact, systemic and routine PSM assets were found to outweigh conceptual; this highlights a pattern of more exploratory and less codified forms of knowledge being used. This is common across most PSM settings where tacit knowledge remains routinized in complex business structures, often not aptly articulated, posing risks in capitalizing on new knowledge and materializing efficiency improvements. Figure 1 provides a breakdown of what constitutes PSM knowledge from an asset perspective, depicting relevant interviewee quotes.

5.1.1 | Knowledge Conversion in PSM

The effectiveness of knowledge-driven work is directly related to the creation of new knowledge (Sveiby 1997) and the sharing of useful existing knowledge through the interaction between tacit and explicit knowledge (Nonaka and Takeuchi 1995; Sveiby 1997). Figure 2 shows a high-level picture of how different modes of knowledge conversion are applied in PSM.

For PSM, the conversion of knowledge takes place in a variety of forms and formats. Socialization was particularly prevalent in the data through in-person collaborative meetings, including those of a managerial nature, e.g., with direct reports, peers, and relevant suppliers. PSM-focused category communities were also seen as "dedicated sessions where people share their life on the job, their successes and the problems they find managing a category" [I28]. There was a mix in terms of scale, from global to smaller team meetings, as well as frequency, from 'once a week' to 'twice a year'. Besides the various types of meetings, we also found a range of support mechanisms, differentiated as interactions between peers (buddying) and different job role levels (coaching and mentoring). The more informal, peer-to-peer approach was often referred to as buddying or 'godchild system' [I28, I29], whereas formal activities were found to be introduced primarily as part of onboarding. In addition to the primarily face-to-face socialization activities, electronic platforms of varying degrees of sophistication, from "corporate Facebook" [I27] to more traditional SharePoint-type systems, were also found to be used. Externalization in a PSM context was mainly evident in the development of a range of documents that could be shared, such as category cards and supplier contracts. This knowledge also fed into the development of specific processes, guidelines, and operating procedures mostly related to bidding. Combination was found to involve collecting different aspects of explicit knowledge and then combining, editing, and processing them to form new, systemized, packaged explicit knowledge. We found examples of this in the creation of more complex and multi-faceted sets of knowledge, such as large knowledge repositories, e.g., SAP, or wider collections of externalized knowledge, such as management handbooks where processes are described. Finally, internalization was

TABLE 2 | Main Ex-Ante Coding Nodes in the Coding Reference Document.

Code	Description	Literature
Knowledge Assets		
Experiential	Shared tacit knowledge that is built through shared hands-on experience among the members of the organization	Nonaka et al. (2000)
Conceptual	Explicit knowledge articulated through images, symbols, and language	
Systemic	Systematized and packaged explicit knowledge	
Routine	Tacit knowledge that is routinized and embedded in the actions and practices of the organization	
Knowledge Creation		
Socialization	Process of converting existing tacit knowledge to new tacit knowledge through shared experiences, observation, interaction, imitation, and practice, and creating tacit knowledge, e.g., sharing knowledge and experiences with internal peers, customers, suppliers, and competitors.	Nonaka et al. (1996); Richtnér and Åhlström (2010); Wu (2008); Chou and He (2004)
Externalization	Articulating tacit knowledge into explicit knowledge. Knowledge is crystallized and can then be shared with others, e.g., codified via manuals, contracts, training materials, policies,	
Combination	Converting explicit knowledge into more complicated and systematic sets of explicit knowledge. Combing different kinds of explicit knowledge, e.g., into data-based knowledge systems	
Internalization	Embodying explicit knowledge as tacit knowledge, e.g., revealed by individual usage of documents and processes.	
Barriers to Knowledge Transformation		
Communication	Ways in which knowledge is communicated between individuals	Zhou and Nunes (2016)
Interpersonal	Individuals having the necessary skills and capabilities to share knowledge	
Management	Structures in terms of roles, responsibilities and workplace organization that hinder the development and sharing of knowledge	

prevalent through exposure to practice-based training, e.g., learning the job of buying through the job. Figure 3 summarizes how knowledge manifests itself within a PSM context, showing the links between PSM activities and knowledge conversion modes.

5.1.2 | PSM Barriers to the Knowledge Transformation Process

The conversion of different types of PSM knowledge is associated with several barriers that act to inhibit the overall knowledge transformation process. The main barriers identified through the analysis were interpersonal, i.e., motivational in nature. Cognitive barriers, such as the perceived gap between training and reality or gaps in the training itself, were also evident. From a behavioral perspective, a recognition that PSM is continually evolving using new technologies, for example, means a receptiveness to change and a need to respond to ambiguity, i.e., "Feel[ing] comfortable to make decisions if you only know 60% of what could be known" [I20], were also identified. This was further underlined by a requirement for a continuous learning mindset to embrace the challenges of possible changes in working practices and a managerial need for relevant systems that facilitate the ongoing use of knowledge, such as having continuous monitoring of the performance to generate improvement steps. This mix of both interpersonal and managerial barriers highlights that even with effective KM in place at an organizational level, there is also an individual, behavioral element that can, if not considered, risk any PSM knowledge enhancement initiatives. Figure 4 shows a high-level categorization of PSM barriers as evidenced by participants.

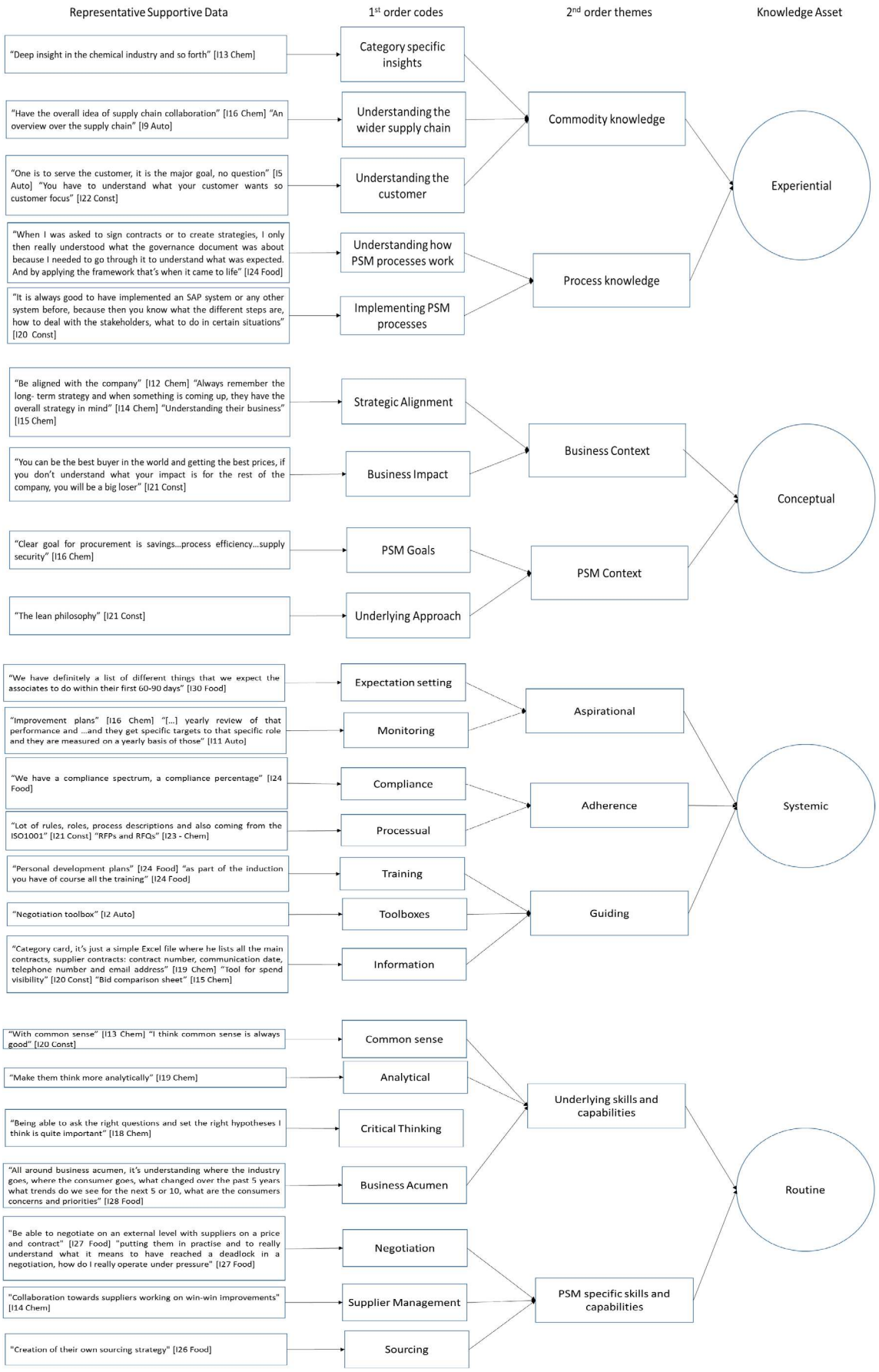

FIGURE 1 | PSM-Specific Knowledge Assets.

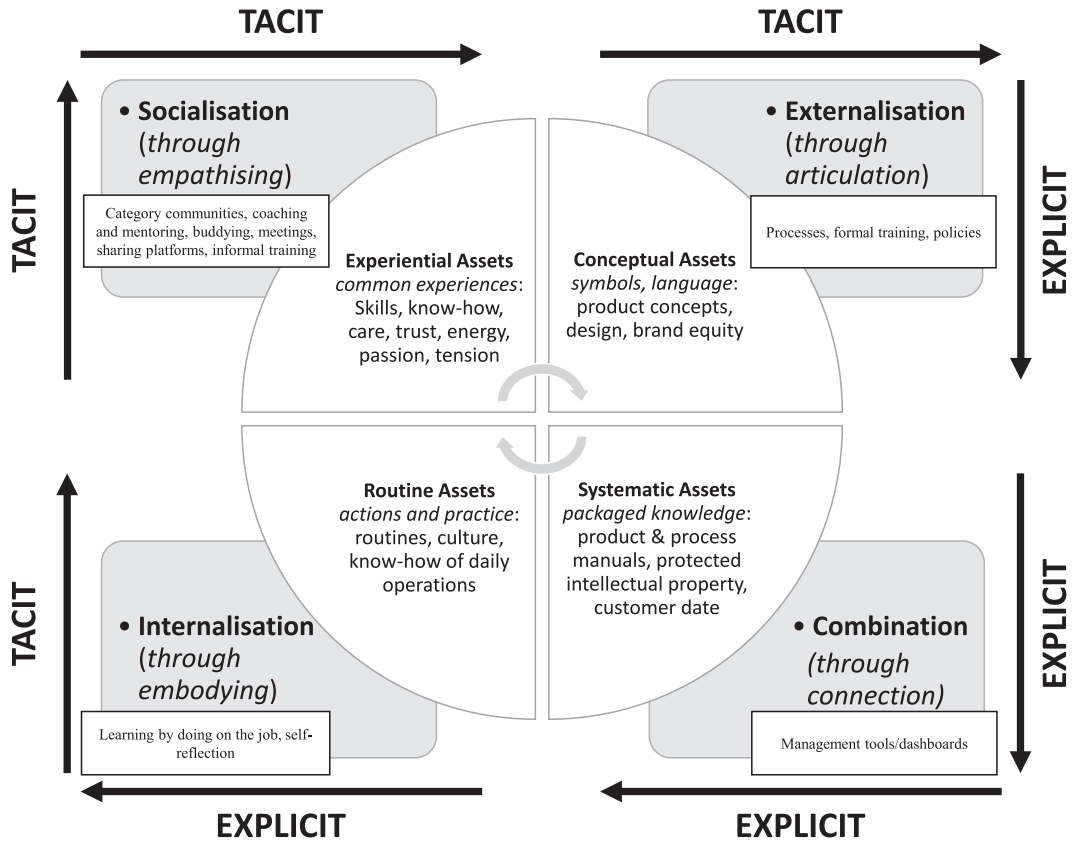

FIGURE 2 | Application of SECI to the PSM context.

5.2 | Contributions and Implications for Research and Practice

Our research identifies the complexity of modern PSM practices by showing the interrelationships between different KM dimensions. As far as we are aware, this is the first such attempt to adopt a processual approach to the transformation of PSM knowledge assets. Our findings have generated several research and practice contributions complementing the literature on inter-organisational KM (e.g., Samuel et al. 2011; Schoenherr et al. 2014). By contextualizing the key SECI factors (i.e., describing the modes of knowledge conversion in PSM terms), the identified knowledge assets can help companies tailor their KM offering, and the identified barriers offer clarity on how to address knowledge transformation and improve PSM KM. This is of particular importance in showing how KM dynamics are changing within the PSM function. Skills deficit and personal factors are now more important than workload and information flow, and characteristics such as experience, knowledge, and a continuous learning mindset highlight the strategic importance of intrapersonal character traits (e.g., holistic thinking, curiosity, dealing with ambiguity, self-reflection) in the application of professional skills and knowledge.

The novel integration of PSM practice into an elaborated SECI model shows the linkages to KM and the potential for a more potent utilization and application of knowledge (Kassaneh et al. 2023). Through identifying specific PSM barriers, PSM practitioners are assisted in designing and implementing context-specific KM solutions, specifically developing individual competencies and fostering employee engagement (reducing interpersonal barriers), improving technical and process infrastructure (reducing communication barriers), and improving management practices (reducing managerial barriers). This may be especially relevant for organizations designing a KM System as part of a digitalized approach that is reliant on AI or knowledge-driven technologies such as Big Data Analytics. Our work also highlights how important meta-routines are for continuous improvement. This requires cross-functional KM and the importance of engaging in different modes of knowledge conversion. There is also a need to invest in unified and accessible structures and processes, with clear roles and responsibilities to facilitate the management, participation, and dissemination of knowledge documentation, linking PSM capabilities to improvements in digitalization, IT competency, and supply chain integration (Liu et al. 2016). At the individual level, changing environments and demands indicate that existing competencies may not reflect PSM knowledge requirements. Hence, these should be reviewed regularly and revised as necessary.

6 | Future Research Directions

Although beyond the scope of our study, data did suggest that overarching KM processes, such as continuous improvement, would make a sustainable contribution to an organization's ability to share knowledge. These meta-processes can function as a catalyst for learning by regularly facilitating knowledge

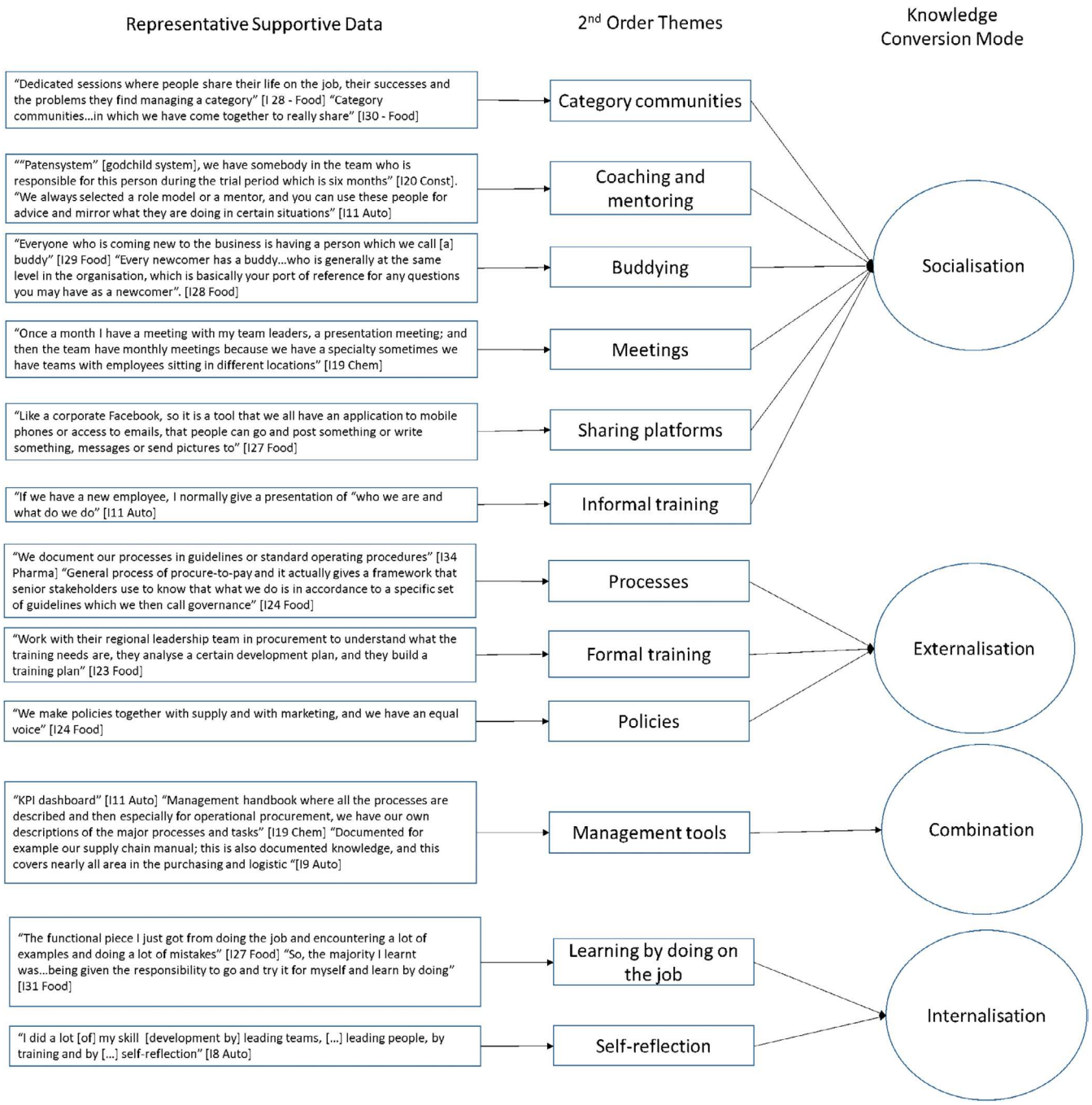

FIGURE 3 | SECI modes of knowledge conversion in PSM.

conversion. Interestingly, in our data, this was primarily related to the individual level, so future research could help explore institutionalized activities and interrelationships more fully. Moreover, having identified the key knowledge assets in PSM, future research could follow the approach of other fields (e.g., Li and Tsai 2009), categorizing them according to their impact on competitive advantage, i.e., by asking if they are valuable, rare, easily imitated by competitors, or easily substituted. Also, quantitative research methods could identify which knowledge assets have a greater (or lesser) impact on organizational performance and which are likely then to be considered more valuable and adopted by high-performing PSM functions.

From a theoretical perspective, future research could explore whether socialization can support the generation of new knowledge in shorter timeframes in radically changing working environments, with an increased reliance on home working and digital methods of communication. It is suggested that socialization and internalization might be more long-term oriented, while externalization and combination support short-term knowledge creation and sharing. Therefore, from a managerial perspective, strategies to allow remote methods of knowledge creation need to be more thoroughly investigated, as the reliance on socialization becomes more challenging in disruptive situations.

Barrier Dimensions	Communication		Interpersonal		Management	
2nd Order Themes	Strategic Alignment	Information Flow	Skills deficit	Personal factors	Workload	Organisational structure
1st Order Codes and representative supporting data	**Misalignment with organisational aims/objectives** "Always has a link to the overall company objective and it always links into consumers or customers" [I24 Food]	**Communication Systems** "Making sure that the information is structured in the right way with the right people can see" [I11 Auto] **Feedback processes** "Going to someone and saying: 'ok, what was good what was bad?" [I11 Auto]	**Lack of knowledge** "They sometimes lack general purchasing knowledge" [I7 Auto] **Lack of experience** "They have never been in a strategic role before" [I20 Const] **Continuous learning mindset** "want to learn, they are eager to learn and improve" [I32 Pharma]	**Response to ambiguity** "Feel comfortable to make decisions if you only know 60% of what could be known" [I20 Const] **Receptiveness to change** "if you only wait long enough in the business, tools, then they will go away" [I30 Food] **Overadherence to job scope** "That is a specific culture here, they are afraid of employees that say 'this is not in my job description, that's why I am not going to do that'" [I20 Const]	**Documentation** "We have so many manuals onboard that you can read them 100 pages day by day and you will not finish it after 20 years being responsible in purchasing" [I8 Auto] **Allocated time** "Had the time…to work on process improvements, to write and implement SOPs and implement process improvements" [I34 Pharma]	**Relevant systems** "not having the place to basically archive the knowledge" [I28 Food] **Relevant training** "This company is especially showing an inability to use these tools to manage the knowledge" [I30 Food **Relevant job roles** …to find the right balance between functional deliverables and administrative work" [I24 Food]

FIGURE 4 | Summary of PSM Barriers to Knowledge Transformation. [Colour figure can be viewed at wileyonlinelibrary.com]

Data Availability Statement

Authors elect not to share data, as the participant consent forms signed by the interviewees require anonymity etc.

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Appendix 1

Interview guide excerpts

Interview Guide Part	Introductory text
1. General Data	*"At first, we need some general data about the company and the participants of this interview. We need this information to evaluate if certain knowledge is related to specific industries or roles within PSM. We will now list the data for the recording."*
2. Organizational structure & performance	*"Now we would like to get some information about the PSM organisation and performance measurement. We need this information to evaluate if certain knowledge is related to specific roles within PSM. Also, performance measures give an indicator of the knowledge that is needed to perform accordingly."*
3. Current knowledge requirements	*"The following section deals with the knowledge that you apply when performing the individual tasks of your job. This helps us to evaluate which knowledge to include in the curriculum."*
4. Learning in and for PSM	*"The following section deals with the training program and knowledge management system provided by your company for PSM. Getting information on this helps us to identify the efforts of your organisation to either train specific skills or capture specific knowledge."*
5. Future skill requirements	*"The following section deals with challenges in PSM that might also become more evident in the future. We try to evaluate the knowledge that is needed to cope with these challenges in the future."*
6. Is there anything you would like to add or emphasize?	*Is there anything you would like to add or emphasise? (...)* *"Thank you again that we were able to record the interview to facilitate the analysis. To comply with research ethics, we also need that in written format. Therefore, we sent in advance the consent form. This is just about the recording. The results are treated confidentially, as mentioned."*
7. Can we get back to you if clarification is needed?	"Can *we get back to you if clarification needs should arise? (...)"* *"Thank you very much for your valuable input and your time!"*

Appendix 2

Research Quality Assurance, adapted from Yin (2018); Strauss and Corbin (1994); Maxwell (1998).

Phase	Construct validity	Internal validity	External validity	Reliability
Preparation *Research design, methodology, development of interview guide, case selection*			• Using extant theory on competencies, knowledge conversion, barriers, assets, and knowledge	• Decision approach for research design • Selection of interviewees according to considerations of industry sectors (external depth of company value-add)
Data collection *Contacting participants, conducting interviews, and documenting interviews*	• Transcription of interviews (only English to English) • Check of transcripts/ clarifications with interviewees		• Pre-test of the interview guide	• Semi-structured interview guide • Common approach of interviewers • Recording of interviews (all in English) • All data organized in NVivo
Data analysis *Analysis of interview transcripts and additional data*		• Coding system in NVivo • Regular peer discussion of evaluation results • Had probing counter-check (audit) by someone outside of the coding team • Consideration of rival explanations		