Journal of Management Development

Individual competencies in supply chain management from a human resource management perspective

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Received 26 February 2024
Revised 3 December 2024
25 March 2025
31 July 2025
Accepted 27 September 2025

Abstract

Purpose – This paper aims to achieve two main objectives: (1) to categorise the existing literature on individual competencies in supply chain management and (2) to identify research gaps to inform future research on individual competencies in supply chain management.

Design/methodology/approach – A systematic literature review methodology was applied to collect and analyse data. A total of 92 relevant articles on individual competencies in supply chain management, published between 1991 and 2024, were reviewed. Content analysis was conducted to categorise research streams, establish a conceptual framework and lay the groundwork for future investigations.

Findings – The review identified three primary research streams: (1) the types of individual competencies, (2) the impacts of individual competencies on supply chain performance and (3) the development of individual competencies through education and training. A comprehensive framework is presented, showcasing the influence of individual competency areas on other dimensions of supply chain management. Additionally, five key recommendations for future research are provided: (1) exploring relationships between various competency types within the supply chain, (2) developing strategies to build and enhance competency groups, (3) examining the interplay between individual and organisational competencies, (4) fostering the development of individual competencies among employees and (5) creating an assessment framework for evaluating individual competencies.

Research limitations/implications – In conducting this SLR, we recognise certain limitations inherent in our methodology. Our analysis focuses solely on individual competencies, excluding related topics such as organisational competencies within the supply chain domain. While our findings provide valuable insights, they would benefit from further validation and expansion by independent researchers. Future studies could diversify the publication sets, select larger and more varied samples, utilise alternative databases or adopt different methodologies, such as qualitative case studies or qualitative comparative analysis, to deepen our understanding and explore connections across diverse research areas.

Practical implications – From a practical standpoint, the framework presented (see Figure 5) and the identified competency groups offer valuable guidance for human resource departments in developing future competency strategies, potentially leading to a competitive advantage. By leveraging this framework and focusing on the key competency groups as strategic assets, organisations can cultivate a more adaptable, skilled and innovative workforce. This approach is likely to improve supply chain management, enhance the ability to meet customer needs and contribute to overall firm performance.

Originality/value – This paper offers a structured synthesis of existing literature on individual competencies in supply chain management. By introducing a comprehensive framework, it provides fresh insights to enrich the field and identifies actionable directions for advancing research. In addition, this study extends the scope of prior systematic literature reviews and offers supplementary insights.

Keywords Systematic literature review, Individual competencies, Supply chain management, Competencies, Human resource strategy

Paper type Literature review

Journal of Management Development
Emerald Publishing Limited
e-ISSN: 1758-7492
p-ISSN: 0262-1711
DOI 10.1108/JMD-11-2023-0345

1. Introduction

Supply chain management (SCM) has gained critical importance in today's globalised and highly competitive business environment (Hohenstein *et al.*, 2014; Gámez-Pérez *et al.*, 2020). The rapid acceleration of globalisation has amplified the complexity and competitiveness of traditional supply chains for many organisations (Nguyen *et al.*, 2018). To achieve sustainable growth, firms must prioritise rapid, efficient, and adaptive strategies to navigate the dynamic landscape of supply chain operations (Newaz *et al.*, 2020). Maintaining competitiveness and sustainability requires organisations to focus on operational efficiency, build a strong reputation, and consistently meet evolving customer expectations (Mishra *et al.*, 2018).

Human resources play a pivotal role in the supply chain, serving as a key driver of competitiveness in an ever-changing environment (Kitchot *et al.*, 2021; Ellinger and Ellinger, 2014). As SCM has evolved into a strategic function, expectations for supply chain professionals have also shifted. Scholars such as Luoyi and Guang (2018) and Flöthmann *et al.* (2018) highlight the growing demand for individuals with strategic insight and advanced capabilities. Hult *et al.* (2007) further emphasised the importance of equipping supply chain professionals with the necessary knowledge, competencies, and attributes to excel in their roles, underscoring the critical interplay between human capital and supply chain success.

Enhancing human resources within the supply chain is essential for establishing a core competency that is unique, distinctive, and challenging for competitors to replicate. This capability enables organisations to excel in global supply chain operations and management (Barnes and Liao, 2012; Derwik and Hellström, 2017). Individual competencies encompass a combination of an individual's knowledge, skills, and attributes, which are reflected in their workplace behaviours (McClelland, 1973; Sanghi, 2016). These competencies are integral to shaping key human resource management practices, including recruitment criteria, performance appraisal standards, training priorities, and annual incentive structures (Sanghi, 2016). A deeper understanding of critical individual competencies benefits both employers and employees by fostering better alignment between job-related skills and role requirements, thereby enhancing overall workforce effectiveness (Flöthmann *et al.*, 2018).

Extensive research underscores the critical role of human competencies in supply chain success. Patrucco *et al.* (2022) found that 90% of the most effective corporate leaders appoint supply chain experts to lead supply chain functions and prioritise hiring highly skilled individuals. While advanced information systems and efficient information sharing are key enablers of successful supply chain integration (Jin *et al.*, 2014; Teller *et al.*, 2012), it is equally vital that employees across the supply chain possess the right competencies to collaborate effectively within and across departments (Flöthmann *et al.*, 2018; Lissillour and Ruel, 2023). Ultimately, it is the people who comprise the supply chain, and their ability to work together determines the success or failure of integration efforts (Lissillour and Ruel, 2023; Kafa *et al.*, 2023).

For instance, in the Thai automotive industry, employee competence plays a pivotal role in both upstream and downstream supply chain operations. In upstream processes, SMEs depend heavily on workforce capabilities due to their reliance on low-technology production methods (Turner *et al.*, 2016). In downstream operations, manager competencies are crucial for developing strategies to meet customer demands effectively (Turner *et al.*, 2016).

The competencies of employees significantly influence the overall success of the supply chain (Asghar *et al.*, 2021; Jena and Ghadge, 2021). However, identifying and recruiting the right talent to manage the complex flows of information and goods, while creating value for the entire supply chain, remains a significant challenge (Flöthmann *et al.*, 2018; Mentzer *et al.*, 2001). Addressing this issue requires a targeted focus on identifying individual competencies specific to various functions within organisations, ensuring the right people are placed in the right roles (Salman *et al.*, 2020).

Prior research has conducted systematic literature reviews (SLRs) on individual competencies in supply chain management. For instance, Hohenstein *et al.* (2014) examined the impact of human resource competencies on supply chain performance, while

Derwik and Hellström (2017) reviewed supply chain competencies, providing a broad overview that included elements of individual competencies. Despite their contributions, these earlier reviews have become dated due to rapid development in the field. Individual competencies in the supply chain have evolved significantly alongside the dynamic changes in supply chain management practices (Bernon and Mena, 2013; Derwik and Hellström, 2017). Therefore, an updated review is crucial to incorporate recent advancements, offer a more accurate and contemporary perspective, and identify fresh opportunities for future research.

To address these gaps, this study conducts an updated SLR focusing specifically on individual competencies within the supply chain domain. This research not only provides a comprehensive and current synthesis of recent developments but also identifies emerging trends and unexplored areas. The study is guided by two key research questions.

(1) How can the literature on individual competencies in supply chain management (1991–2024) be categorised into distinct research themes?

(2) Based on the findings of the systematic literature review, what research gaps remain to guide future studies on individual competencies in supply chain management?

These two questions allow us to review systematically the literature on individual competencies in supply chain management, identify distinct research streams within this field, develop a comprehensive framework that illustrates how individual competency areas impact other dimensions, and propose directions for future research.

The subsequent sections detail the methodology for the SLR, including the selection criteria, databases utilised, and the classification framework for the reviewed studies. This is followed by a discussion of the findings, highlighting key insights and implications for future research. The paper concludes with a summary of the review, emphasising the primary contributions and the value of this updated perspective.

2. Methodology

This study employs a SLR approach, which provides researchers with a structured and transparent method to identify, evaluate, and interpret existing literature (Fink, 2014). The SLR methodology also helps highlight critical areas for further research (Cooper, 2015). This approach was selected because it enables the extension of existing knowledge on individual competency issues within the supply chain domain. The methodological steps follow established guidelines for conducting SLRs in the context of individual competencies in supply chain management (Derwik and Hellström, 2017; Hohenstein *et al.*, 2014). Additionally, this review adheres to the PRISMA framework to ensure methodological rigour (Figure 1).

The preliminary search criteria required that articles included in the review be published between 1991 and 2024. The starting point of 1991 was chosen because this was the year the topic of individual competencies in supply chain operations and management was first explored (Murphy and Poist, 1991). The cutoff year of 2024 ensures that the review captures the most recent academic contributions. Although previous reviews, such as those by Derwik and Hellström (2017) and Hohenstein *et al.* (2014), have provided a broad overview of competency, they did not exclusively focus on individual competencies within the supply chain management domain. By narrowing its scope to this specific area, this study addresses potential gaps and ensures a more comprehensive review of relevant literature that may have been overlooked in earlier works. Finally, we have still included pre-2010 references in this paper because we aim to present a broader perspective for future research, offering more diverse insights than previous studies.

To analyse and categorise the body of literature on individual competencies in the supply chain domain, a systematic search was conducted across multiple online databases. These included Emerald, ProQuest, ScienceDirect, Taylor & Francis, Springer, and SCOPUS, all of

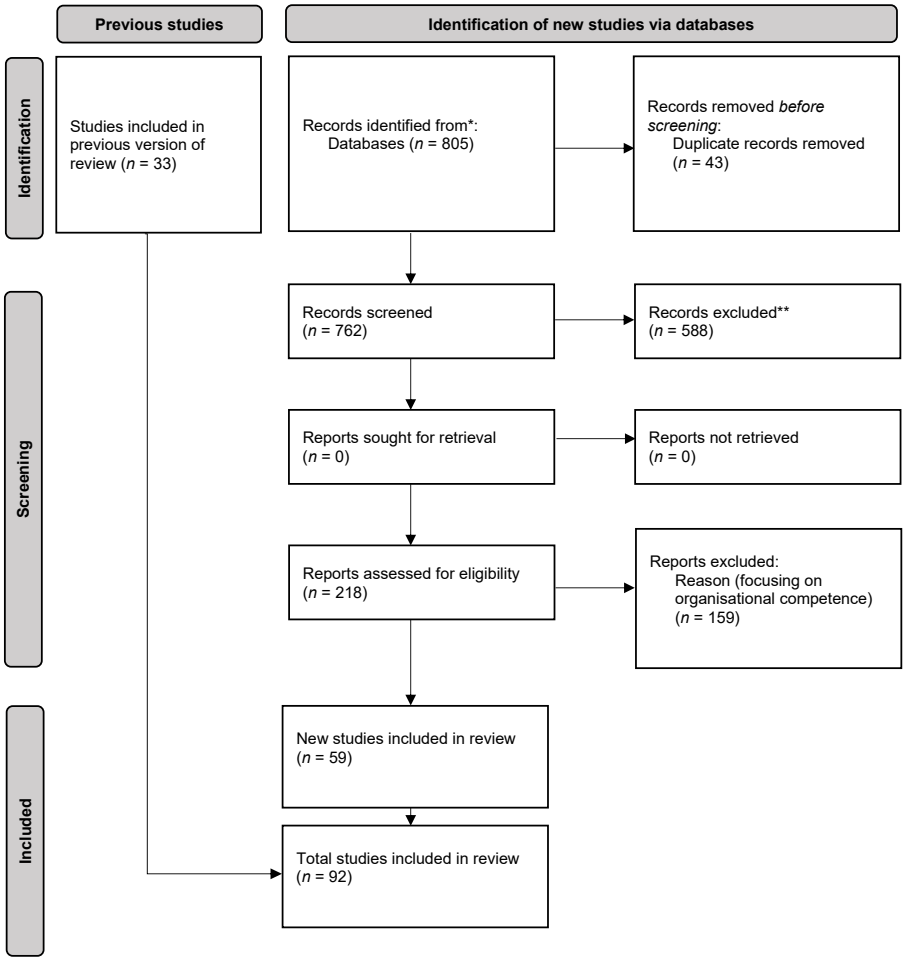

Figure 1. Process of screening, classifying, and including related studies. Source: Authors' own work

which are widely utilised in supply chain competency research (Derwik and Hellström, 2017; Giunipero *et al.*, 2008). Following the approach outlined by de Araújo *et al.* (2017), the initial search employed a variety of keywords tailored to the topic to ensure broad coverage across these databases.

The terms *competence*, *competences*, *competency*, and *competencies* are often used interchangeably to denote similar concepts, as they share common elements and purposes (Salman *et al.*, 2020). However, slight distinctions exist. *Competence* typically refers to overall ability or capacity in broader, more abstract terms, while its plural form, competences, indicates multiple abilities (Salman *et al.*, 2020). *Competency*, on the other hand, is used to describe a specific skill or attribute, although its singular form is less commonly used than the plural, *competencies*. The term *competencies* are prevalent in organisational and management literature, particularly when referring to sets of skills required for job roles, leadership, or professional development. It is the most appropriate term when discussing multiple specific skills or capabilities that require development or measurement (Salman *et al.*, 2020). Overall,

competence refers to a broad, general meaning. However, our work focuses on individual competencies, which specifically address the particular competencies that exist within an individual.

To ensure comprehensive coverage of relevant literature, this review selected keywords based on highly cited articles on individual competencies in supply chain research, such as Derwik and Hellström (2017). The set of primary keywords includes variations such as *competence*, *competences*, *competency*, *competencies*, and their combinations with "individual" (e.g. *individual competence*, *individual competencies*). We included the terms *competence*, *competences*, *competency*, and *competencies* in our literature review search because, in the past, there was no clear distinction between these terms. Earlier researchers often used them interchangeably, so we needed to include all variations in our search. Additionally, the review employed a broader search strategy incorporating related terms such as *skill*, *abilities*, *capabilities*, and *knowledge*.

Given the need to focus specifically on supply chain management, these generic terms were paired with the phrase supply chain in the search process. For example, the search included combinations such as *supply chain competence*, *supply chain competences*, *supply chain competency*, *supply chain competencies*, *supply chain individual competence*, *supply chain individual competences*, *supply chain individual competency*, *supply chain individual competencies*, *supply chain skill*, *supply chain abilities*, *supply chain capabilities*, and *supply chain knowledge*. To further refine the search, keywords related to specific supply chain functions, such as *purchasing*, *procurement*, *production*, *manufacturing*, *warehouse*, *logistics*, *distribution*, and *transportation*, were also included.

The initial search, using these keywords and the selected time period, yielded 805 articles. Since multiple databases were used, there were duplicate entries, including papers that overlapped with previous reviews. After removing 43 duplicate papers, the sample was narrowed down to 762 unique articles.

Second, we focused exclusively on published journal articles to ensure quality control, following the approach recommended by David and Han (2004). To establish robust inclusion and exclusion criteria, we adopted the method outlined by Igarashi *et al.* (2013). The criteria used in this study are summarised in Table 1 and include the following requirements for articles.

(1) *Language:* Articles must be published in English.

(2) *Publication type:* Only peer-reviewed journal articles were considered.

(3) *Keyword relevance:* Articles must include the specified search keywords in the title or abstract.

(4) *Exclusions:* Books, book chapters, reports, short surveys, notes, and conference papers were excluded.

Table 1. Inclusion and exclusion criteria

Criterion	Inclusion	Exclusion
Timeline	From 1991 till November 2024	1990 or earlier
Language	English	Non-English
Literature type	Peer-reviewed journal	Books, book sections, reports, short surveys, note and conference papers
Field of research	Individual competencies in the supply chain area	Organisational competencies in the supply chain area, individual and organisational competencies in other areas
Quality	AJG category 2 or higher, ABDC category C or higher, SCI category Q3 or higher	AJG category 1, ABDC category D, SCI category Q4

Source(s): adapted from Igarashi *et al.* (2013)

(5) *Topic relevance:* Articles must focus on individual competencies within the supply chain domain, excluding studies on organisational competencies or those addressing competencies in other fields.

(6) *Journal quality:* Journals were selected based on widely recognised rankings, applying a relatively low threshold to ensure a minimum quality standard. Specifically, the study followed the British Research Excellence Framework's recommendation of including articles from journals ranked AJG category 2 or higher. For journals not listed in AJG, those ranked ABDC category C or higher were considered. If journals were not included in AJG or ABDC, we included those in the SCI Q3 category or higher.

The titles and abstracts of all articles were reviewed to ensure compliance with these criteria. This rigorous screening process led to the exclusion of 588 articles, reducing the sample to 218 articles for further analysis.

Third, the researchers thoroughly reviewed all 218 articles. Each article was carefully examined, with attention given to sections such as the research aim, methodology, definitions of key terms, and their relevance to individual competencies and the supply chain. Irrelevant papers were excluded from the analysis. For instance, 159 articles focused on organisational competencies within the supply chain domain and, due to their lack of connection to individual competencies, were excluded. This process ultimately narrowed the selection to 92 peer-reviewed academic journal articles, published between 1991 and 2024, that met all the inclusion criteria for this SLR.

Drawing inspiration from content analysis (Seuring and Gold, 2012; Derwik and Hellström, 2017), the selected publications were organised using descriptive, thematic, and cross-study categorisation techniques. In the descriptive analysis, we recorded key details for each article, including the author(s), year, journal, industry, country, and methodology. For the thematic analysis, we employed an interpretative synthesis approach, considering the primary content of each publication and the research questions that guided the studies. We identified cross-study themes and grouped them into categories, drawing on established frameworks from the literature. This approach allowed us to synthesise findings from multiple qualitative studies, though replicability could be a challenge, as the coding process is subjective. To ensure consistency, we held cross-coding meetings to resolve any discrepancies. Disagreements were addressed through discussions and interactive sessions, ultimately leading to a consensus. Finally, the data were analysed and interpreted to effectively categorise the research stream.

3. Results

The literature on individual competencies in the supply chain domain is diverse and multifaceted. The following section provides an overview of the research streams identified in the literature, the trends in the number of publications over time, and the methodological approaches employed in these studies.

3.1 Research streams

The final sample of 92 journal articles on individual competencies in the supply chain was thoroughly analysed. From this analysis, we identified and classified the individual competency research into three distinct streams, as illustrated in Figure 2.

Research stream 1. Types of individual competencies and their attributes

This research stream focuses on the specific knowledge, skills, motivations, and behaviours that individuals in the supply chain must possess to perform tasks effectively and contribute to the success of their roles and functions. For supply chain activities to be successful, human

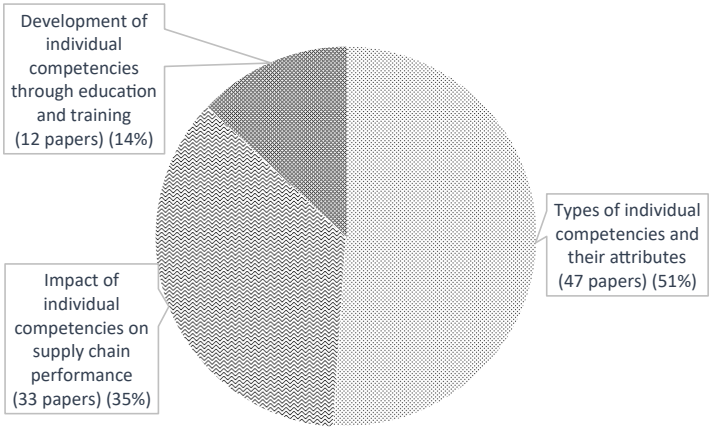

Figure 2. Research streams identified from the SLR. Source: Authors' own work

resources across the entire supply chain must have competencies that align with their specific responsibilities (Meindl and Chopra, 2015). Individuals with high-level competencies can become strategic assets, providing organisations with a competitive advantage.

For example, Flöthmann *et al.* (2018) examine the competency requirements for supply chain planners and analysts, while Karttunen (2018), Kern *et al.* (2011) and Giunipero and Pearcy (2000) review the individual competencies necessary for purchasing professionals. The competencies required for third-party logistics managers are explored by Sangka *et al.* (2019). Additionally, studies by Murphy and Poist (1991), Gammelgaard and Larson (2001), and Derwik *et al.* (2016) focus on the competencies essential for supply chain managers. Weerasombat *et al.* (2024) found that soft skills constitute essential work competencies that enable workers to adapt and succeed in the business environment.

A significant portion of the selected publications in this research stream centres on manager competencies. Previous studies in the supply chain field, such as those by Luo *et al.* (2018) and Scheibe and Blackhurst (2018), emphasise a critical shortage of qualified managers, highlighting the need for further research on the individual competencies required for managerial roles. Of the 47 studies in this stream, 24 primarily focus on better understanding the individual competencies of managers in specific supply chain areas.

Research stream 2. Impact of individual competencies on supply chain performance

This research stream explores the critical role of individual competencies in driving supply chain performance. Numerous studies have established a positive relationship between the competencies of individuals and overall supply chain effectiveness.

For instance, Huo *et al.* (2016) highlight that the competencies of managers and employees are strongly linked to internal integration, which, in turn, enhances external integration with suppliers and customers. Similarly, Jin *et al.* (2010) demonstrate that a firm's manufacturing flexibility largely depends on the competencies of its managers and workers.

Further reinforcing this perspective, Schorsch *et al.* (2017), in their review of Sweeney (2013) and Derwik *et al.* (2016), identify individual competencies as a cornerstone of supply chain performance. Collectively, these studies underscore a growing recognition of individual competencies as a critical factor in creating an effective and efficient supply chain. This increasing interest reflects the strategic importance of developing and leveraging individual competencies to achieve superior supply chain outcomes.

Research stream 3. Development of individual competencies through education and training

This research stream emphasises the importance of developing instructional curricula that address the critical individual competencies required in the supply chain field. Given the rapid growth in supply chain-related job opportunities, employers have expressed concerns about the preparedness of graduates and the availability of skilled talent (Lutz and Birou, 2013). Consequently, the collaboration between the industry and the education sector has intensified to bridge this gap.

A notable example is the work of Gámez-Pérez *et al.* (2020), who developed a model for international university-industry collaboration aimed at training and assessing student competencies. The model comprises three key phases: initiating collaboration, implementing training programs, and evaluating competence development. This model was applied in partnership with one of Mexico's largest retail companies, involving both students and employers. The employers reported high satisfaction with the model's effectiveness and expressed strong interest in continuing their participation in subsequent research phases.

Similarly, Luoyi and Guang (2018) conducted a systematic review of 73 articles published since 2000 to identify key competencies and skills for supply chain and logistics professionals. Their analysis uncovered five core competencies encompassing 49 specific skills. Additionally, they examined 42 educational courses and teaching methodologies, providing insights into how the education sector can better equip students with these essential competencies.

This stream highlights the critical role of education and training in preparing supply chain professionals to meet industry demands and underscores the value of collaboration between academia and industry to enhance the competency development process.

3.2 Number of publications over time

The review revealed a growing trend in research on individual competencies within the supply chain domain. Figure 3 illustrates the number of publications from 1991 to 2024. Between 1991 and 1999, only one publication was recorded. However, starting in 2000, the publication rate began to rise. While the number of studies remained modest in the early 2000s, it demonstrated steady and continuous growth over the years.

This upward trajectory in research publications suggests a sustained and possibly increasing interest in individual competencies within the supply chain field. It also highlights the growing recognition of their importance in addressing contemporary challenges and opportunities in supply chain management.

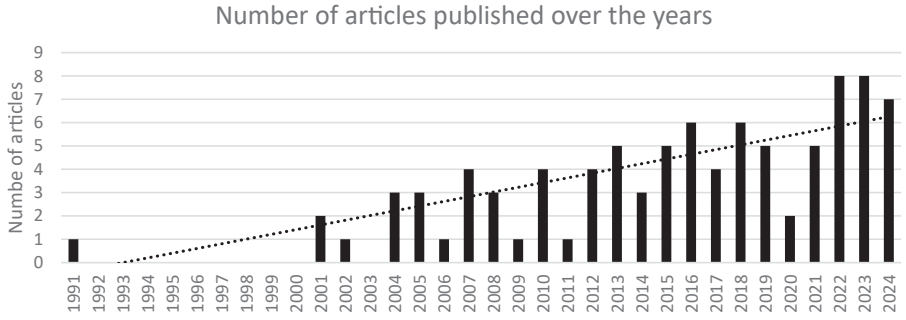

Figure 3. Number of publications over time. Source: Authors' own work

3.3 Methodologies used in individual competency research

We analysed the methodological approaches employed in the literature on individual competencies in the supply chain domain and found a diverse range of methodologies. These include quantitative and qualitative methods used independently, mixed-method approaches, and conceptual studies. This diversity reflects the multifaceted nature of research in this field.

The selected publications primarily adopt quantitative methodologies. As illustrated in Figure 4, 16 studies utilise sampling techniques to map and measure the importance of various competencies. Additionally, six studies apply statistical comparisons. For instance, Murphy and Poist (2007) compare their 1991 findings with their 2007 study, identifying shifts in the skills and knowledge required by senior logisticians. Similarly, Sangka *et al.* (2019) compare manager competencies of third-party logistics service providers serving local companies versus multinational corporations in Indonesia. Furthermore, 31 studies employ hypothesis testing with conceptual models to examine relationships between variables, such as the link between individual competencies and supply chain integration (Huo *et al.*, 2016).

Qualitative methodologies are also well-represented, with 12 case studies providing in-depth insights into individual competency development across various supply chain contexts. These studies primarily collect data through interviews, observations, and focus groups. Meanwhile, 14 publications are conceptual, developing models grounded in existing literature on individual competencies in the supply chain field.

Lastly, 13 studies use mixed-method approaches, combining surveys and interviews to provide a more comprehensive analysis. This broad range of methodologies highlights the dynamic and evolving nature of research on individual competencies in supply chain management.

Overall, this review reveals that most research on individual competencies in the supply chain field has predominantly employed quantitative methods. In contrast, qualitative research, particularly those utilising case study approaches, remains relatively limited in number.

4. Discussion

Building on the insights from the three research streams, we developed a comprehensive model of individual competencies (see Figure 5). This model offers researchers and practitioners a clear framework for understanding how individual competencies influence various dimensions within supply chain management.

For example, research indicates that organisational-level competencies largely depend on individual-level competencies. This reliance is particularly evident in fields such as

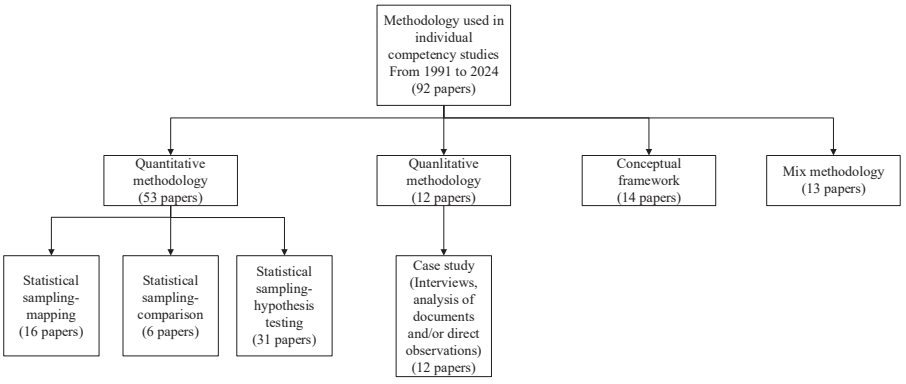

Figure 4. Methodologies used in individual competency studies. Source: Authors' own work

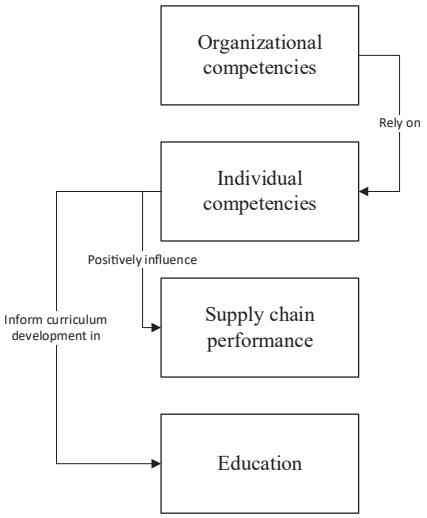

Figure 5. The connection between individual competency area and various other aspects. Source: Authors' own work

information and communication technology (ICT), as noted by Barnes and Liao (2012) and Derwik and Hellström (2017). Organisational competencies in ICT, including robust IT systems (software, hardware, and internet), information sharing, and material flow management, require individuals with the necessary skills to operate and manage these systems (Jin *et al.*, 2014). Similarly, competencies in procurement management are also rooted in individual abilities (Karttunen, 2018). Individual competencies in the supply chain have evolved significantly alongside the dynamic changes in supply chain management practices (Derwik and Hellström, 2017)

Additionally, existing research underscores a positive relationship between individual competencies and supply chain performance. Multi-skilled managers and employees, for instance, have been found to enhance supply chain integration (Huo *et al.*, 2016) and improve overall performance (Koulikoff-Souviron and Harrison, 2010; Teller *et al.*, 2012). Jin *et al.* (2010) can confirm that a firm's manufacturing flexibility depends mainly on managers' managerial competency group and workers' functional competency group. Koulikoff-Souviron and Harrison (2010) also sympathise with the notion that human competency has a vital role in improving integration among different functions within firms. In other words, human resource competencies are the main drivers of the supply chain (Teller *et al.*, 2012). Managing the behavioural competency group explicitly should be a central theme in any supply chain performance (Schorsch *et al.*, 2017). These findings demonstrate the strategic value of developing individual competencies to achieve operational excellence.

Moreover, individual competencies serve as a critical foundation for designing instructional curricula in education (Sangka *et al.*, 2019). Beaulieu *et al.* (2024) identify two key competencies for effective collaborative research: (1) boundary-spanning—the ability to bridge academic and practitioner contexts, and (2) reflexivity—the capacity to learn from research experiences to enhance collaboration. These competencies can help elevate research quality and impact in the education sector. Gámez-Pérez *et al.* (2020) researched and developed an international university-industry collaboration model to equip students with the competencies needed for working in companies. By acting as a cornerstone of organisational operations, identifying the specific competencies required for various roles within the organisation becomes crucial for recruiting and retaining the right talent (Salman *et al.*, 2020).

In summary, individual competencies help companies enhance efficiency and productivity, ultimately contributing to organisational competencies. Additionally, they play a key role in reducing lead times and improving overall efficiency, leading to better supply chain performance. Moreover, usually education plays a crucial role in equipping prospective employees with these competencies. At the same time, workplace experiences and the competencies required in professional settings can help shape educational curricula, ensuring that students develop the necessary skills for the industry.

After analysing 92 articles, we propose six categories of individual competencies within the domain of supply chain management. These categories are functional, social/behavioural, relational, managerial, cognitive, and meta-competencies. It is important to note that these competencies in supply chain management are not defined by any single element in isolation but emerge from the interplay of multiple components (see Table 2). The six competency groups are described as follows.

(1) *Functional competencies:* This category includes the knowledge and skills required to perform specific tasks within a profession, enabling individuals to meet the standards expected in their roles effectively.

(2) *Social/Behavioural competencies:* These pertain to behaviours and abilities that facilitate effective interaction and collaboration with others in social or organisational contexts.

(3) *Relational competencies:* This group involves skills essential for building and supporting teams to achieve organisational goals, emphasising teamwork and relationship management.

(4) *Managerial competencies:* These include a combination of skills and knowledge related to general management functions, such as planning, organising, and decision-making.

(5) *Cognitive competencies:* This category focuses on skills required for processing and understanding information, critical thinking, logical reasoning, and analytical abilities.

(6) *Meta-competencies:* These refer to an individual's mindset and approach to learning and curiosity, reflecting a strong intrinsic motivation to explore and master new knowledge or skills.

These competency categories provide a comprehensive framework for understanding the diverse skill sets and abilities that contribute to effective supply chain management.

5. Research gaps

The analysis of the current state of research, combined with a comprehensive model of individual competencies, highlights several directions for future investigation in the domain of individual competencies in supply chain management. We identify five key research gaps that warrant further exploration, which are outlined as follows.

Research gap 1. Relationships between individual competency groups in the supply chain area

The significance of these competency types has been acknowledged in most of the reviewed publications. However, there has been limited exploration of the interconnections or synergies among these individual competency types. Derwik *et al.* (2016) argue that competencies should not be viewed as isolated or factor-based elements. Their findings reveal that managers often use combinations of competencies, creating synergies that enhance performance. For example, problem-solving is not confined to problem-solving skills alone. It also involves

Table 2. Example of elements in competency types

Competency group	Example of elements	Exemplary literature
Functional competency group	Technological skill and knowledge, Document management, Basic knowledge on PSM role and processes, Quality assurance, Language, Oral and written communication, Listening, Product knowledge, Resilience, Strategic awareness, Commercial awareness, Industrial experience, Ethics awareness, planning and control of transport operation, planning and control of operations, skill to do statistical analyses, supply chain awareness, information handling, hardware and software knowledge	Murphy and Poist (1991), Murphy and Poist (2007), Bals *et al.* (2019), Bölsche *et al.* (2013), Campos *et al.* (2019), Derwik and Hellström (2017), Gammelgaard and Larson (2001), Giunipero *et al.* (2005), Gunasekaran *et al.* (2017), Sangka *et al.* (2019), Li *et al.* (2023), Modgil *et al.* (2023), Mangan and Christopher (2005)
Social/Behavioural competency group	Self-management, Empathy, Integrity, Openness, Open-minded, Emotional control, Emotional intelligence, Responsibility, Cultural awareness	Derwik and Hellström (2017), Derwik *et al.* (2016), Dubey and Gunasekaran (2015), Ellinger and Ellinger (2014), Flöthmann *et al.* (2018), Weerasombat *et al.* (2024), Foltynowicz *et al.* (2024)
Relational competency group	Information sharing, Communication and Teamwork, Negotiation	Flöthmann *et al.* (2018), Gammelgaard and Larson (2001), Giunipero *et al.* (2005), Gunasekaran *et al.* (2017), Harvey and Richey (2001), Trentin *et al.* (2019), Fantozzi *et al.* (2024), Weerasombat *et al.* (2024), Foltynowicz *et al.* (2024)
Managerial competency group	People management Business management, Project management, Time management	Murphy and Poist (1991), Murphy and Poist (2007), Prajogo and Sohal (2013), Rosenzweig and Roth (2007), Sangka *et al.* (2019), Sharif and Irani (2012), Shet and Pereira (2021), Li *et al.* (2023)
Cognitive competency group	Analysis and decision making, Problem solving, Critical thinking, Strategic thinking	Thai and Yeo (2015), Trentin *et al.* (2019), Gámez-Pérez *et al.* (2020), Jim Wu *et al.* (2013), Jordan and Bak (2016), Luoyi and Guang (2018), Rahman and Qing (2014), Fantozzi *et al.* (2024), Weerasombat *et al.* (2024)
Meta competency group	Self-motivation, Continuous learning, Enthusiasm, Learning to learn, Learning attitude, Zest, Grit	Campos *et al.* (2019), Derwik and Hellström (2021), Murphy and Poist (1991), Murphy and Poist (2007), Dubey and Gunasekaran (2015), Kwon (2017), Noe *et al.* (2017), Flöthmann *et al.* (2018), Gammelgaard and Larson (2001), Harvey and Richey (2001), Kayakutlu and Büyüközkan (2010), Kotzab *et al.* (2018), Fantozzi *et al.* (2024), Kafa *et al.* (2023), Foltynowicz *et al.* (2024)

Source(s): Authors' own work

information and knowledge gathering, as well as leveraging organisational experience to devise more efficient and effective solutions (Derwik *et al.*, 2016). This insight underscores that practical competence operates at a more integrated level than the scope typically addressed in prior research on individual competencies in the supply chain.

Derwik *et al.* (2016) advocate for a shift in research focus towards studying competencies as interconnected systems, emphasising the importance of analysing combinations of competencies rather than optimising individual competencies in isolation. Despite this recommendation, from 1991 to 2024, only the works of Derwik and Hellström (2017) and Derwik *et al.* (2016) have explicitly examined relationships between competencies. Other studies have largely overlooked this critical aspect.

Understanding the relationships among individual competencies is crucial, as it clarifies the underlying mechanisms for developing and enhancing these competencies. Notably, there has been a lack of frameworks in the existing literature to explain the types of relationships between competency groups. To address this gap, this study introduces a framework aimed at elucidating the connections between individual competency groups in the supply chain domain.

For instance, components within the meta-competency group, such as a learning-oriented attitude, may facilitate the development of functional and managerial competencies (Derwik and Hellström, 2021). The emergence of meta-competency as a distinct category reflects a growing recognition that long-term success in supply chain (SC) management requires more than just functional or managerial skills. Instead, it depends significantly on personal attributes such as a learning-oriented attitude, grit, and zest for learning—traits that drive continuous growth and adaptability. Components within this category, as noted by Derwik and Hellström (2021), actively support the development of other competency areas by enabling individuals to better acquire and apply functional and managerial knowledge. For instance, their interviews with managers from large international companies with strong SC orientation found that meta-competencies are not only essential to becoming successful but also to remaining successful. These professionals were consistently described as open-minded, enthusiastic, humble, and motivated to improve. One manager emphasized, "In our business, attitude wins seven days a week," highlighting the value placed on mindset over technical skill during recruitment (Derwik and Hellström, 2021).

Such characteristics align emphasis on grit as a driver of sustained professional development (Kwon, 2017), as well as with findings that highlight a positive relationship between zest and informal learning in workplace settings (Noe *et al.*, 2017). A vivid example shared by an interviewee illustrates this further: "To run 5 kilometres, well, that I know I can do. Next time I want to run a little bit longer, or divide into intervals combined with stairs to challenge myself." (Derwik and Hellström, 2021) This mindset represents a meta-competency—an internal motivation to constantly challenge and develop oneself—which differentiates successful SC professionals from their less successful peers. As Palmer (2005) notes, such learning is an active, effortful process, where attitude plays a pivotal role in how individuals engage with development opportunities.

Thus, meta-competency serves not only to complement existing competency classifications by acting as a catalyst for growth but also establishes a foundational layer that supports continuous learning and sustained performance in dynamic supply chain (SC) environments. A strong meta-competency base is likely to foster more resilient functional and managerial competencies. Nevertheless, the interrelationships among the various competency groups remain underexplored, highlighting a valuable direction for future research. This paper presents a preliminary framework (Figure 6) intended to support further investigation into these competency linkages.

The proposed framework in Figure 6 provides new perspectives that can significantly enrich the study and application of individual competencies within the supply chain domain. By offering a holistic view, this framework aids in developing a deeper understanding of individual competencies, serving as a foundation for future research and practical application. Companies seeking to improve their performance can leverage this framework to identify and cultivate key competencies at the individual level. Furthermore, the framework underscores the critical link between ground-level competencies and their direct impact on organisational performance, fostering a more integrated approach to competency development and strategic alignment in supply chain management.

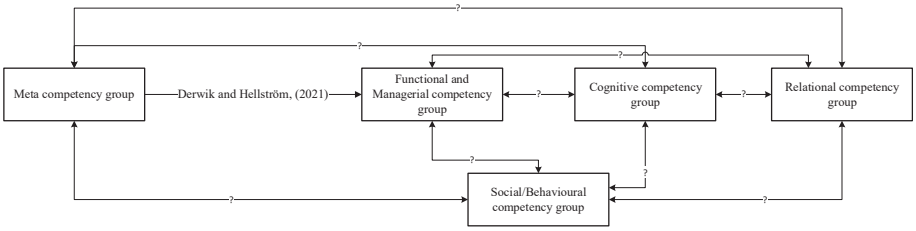

Figure 6. A proposed framework of relationship between individual competency groups. Source: Authors' own work

Research gap 2. Ways to establish and improve the efficiency of competency groups.

The current focus on individual competencies within the supply chain domain emphasises the identification of specific knowledge, skills, motivations, and behaviours necessary for individuals to perform tasks and ensure the effectiveness of their roles (Modgil *et al.*, 2023; Fantozzi *et al.*, 2024). However, this approach may be too narrow. Future research should also explore methods or factors that foster the development of individual competencies or enhance the performance of competency groups as a whole. For instance, some employees may possess low levels of meta-competency, which can affect their functional and managerial competencies. Managing compensation, for example, could be a potential way to boost meta-competency levels. On the other hand, employees may have high meta-competency but face challenges in achieving functional competency if their company's training program is ineffective. In such cases, developing more efficient training programs is crucial, as they help impart skills and enhance knowledge (Turkmenoglu and Cicek, 2020).

Therefore, future research should focus on methods that support the effectiveness of interactions between competency groups. Potential questions for future investigation in this area could include the following.

(1) How does compensation impact meta competency?

(2) How can a company arrange or set training to support and acquire meta, functional, managerial, social/behavioural, cognitive, and relational competency?

Research gap 3. Relationship between individual and organisational competencies

In addition to exploring the relationships among individual competencies, a promising area for future research is examining the interplay between individual and organisational competencies. Barnes and Liao (2012) argue that a firm's competitiveness is closely tied to enhancing its human capital by developing employees' competencies and fostering unique, distinctive, and difficult-to-imitate core competencies. Human capital, as defined by the Oxford English Dictionary, refers to "the skills the labour force possesses, regarded as a resource or asset" (Goldin, 2024). Consequently, it is essential to transfer individual competencies to both intra-organisational and inter-organisational levels (Derwik and Hellström, 2017).

A recent study by Derwik and Hellström (2021) identifies learning attitude as a key mechanism for understanding individual competencies and influencing organisational competencies. However, organisational competencies span a wide range of aspects and dimensions. Investigating which facets of individual competencies impact various dimensions of organisational competencies would be valuable. Despite its importance, research in this area remains limited. Such studies could assist human resource departments in refining their management practices.

As Ferguson and Reio (2010) suggest, human resource management can strengthen a firm's strategic direction. By enriching human capital, firms can improve their performance (Fantozzi *et al.*, 2024). Effective human resource management practices enhance skills, abilities, and motivation (Delaney and Huselid, 1996), which in turn contribute to improved firm performance (Osman *et al.*, 2011). Therefore, future research should explore the relationship between individual competencies and organisational competencies, expanding knowledge within the supply chain domain and its implications for human resource management and firm performance.

Research gap 4. Individual employee competencies in supply chain area

The review highlights that individual competencies in the supply chain have evolved alongside changes in supply chain management (Bernon and Mena, 2013) and will continue to evolve (Derwik and Hellström, 2017). Individual competencies can be considered a source of sustained competitive advantage (Barney, 1991). However, sustainable competitive advantage depends not only on human resource practices but also on the composition and capabilities of the workforce itself, which forms the foundation for achieving this advantage (Wright *et al.*, 1994). Human resources contribute to value creation through the development of products and services by allocating their competencies and time. Furthermore, skilled labour is considered a scarce resource, as studies show that competencies tend to follow a normal distribution across the population (Wright *et al.*, 1994). Thus, organisations must ensure alignment between an individual's competencies and the job requirements, a concept known as "person-job fit" (Caldwell and O'Reilly, 1990).

While the focus of research on individual competencies has primarily centred on managers, particularly within specific domains, this perspective is insufficient. Competencies at various functional levels of an organisation significantly impact overall performance (Van Esch *et al.*, 2018; Otoo and Mishra, 2018). Despite this, few studies have investigated employee competencies within specific areas of the supply chain. In fact, the success or failure of a supply chain often hinges on the competencies of employees working within functional departments (Jin *et al.*, 2019). According to Ellinger *et al.* (2010), individual employee competencies are crucial to creating value and driving effective interactions within the supply chain. While managers typically focus on strategic and supportive tasks, employees handle the more practical, operational aspects (Boudreau *et al.*, 2003). As a result, employees often possess the specialised skills needed to manage day-to-day operations more effectively than managers (Boxall and Steeneveld, 1999; Huo *et al.*, 2016).

Developing standardised, holistic models of individual employee competencies across different sectors and industries can encourage researchers to explore complementary areas beyond their usual focus. These models could be particularly beneficial for manufacturing small and medium enterprises (SMEs). Given their limited resources, manufacturing SMEs often prioritise workforce utilisation over investing in advanced technologies (Turner *et al.*, 2016). Additionally, research has shown that many SMEs fail to implement supply chain management practices due to a lack of knowledge (Kitchot *et al.*, 2021). Employees are a vital driving force behind the successful implementation of supply chain management, as their coordination of internal functions is essential for efficiency (van Hoek *et al.*, 2010). Therefore, developing competency models can improve human resource management, which is crucial for enhancing supply chain management in manufacturing SMEs. Future research should focus on investigating employee competencies in specific supply chain areas, particularly in manufacturing SMEs, to help these organisations strengthen their human resource management practices.

Research gap 5. Development of assessment framework for individual competencies in supply chain area

Among the 92 studies included in this SLR, 53 employed quantitative methodologies to explore the relationship between individual competencies and supply chain performance.

However, it is important to recognise that individual competencies within the supply chain domain encompass many subjective, unobservable, and immeasurable aspects. The positivistic approaches used in these studies may oversimplify the complexities of competency development (Sandberg, 2000). As a result, there has been limited opportunity to gain a deeper understanding of the nuanced levels at which individual competencies are assessed.

Future research could broaden the knowledge base on individual competencies by developing a comprehensive assessment framework. Such a framework would assist organisations in improving the competency levels of their employees. To create an effective assessment tool, we recommend that researchers employ qualitative methods to capture the diverse interpretations of competency levels and emphasise the contextual significance of each level. In-depth qualitative research could provide valuable insights into the assessment of individual competencies. Therefore, we advocate for future studies that focus on qualitative approaches to enhance our understanding in this area.

6. Conclusion

6.1 Theoretical contributions

This study offers three key contributions to academic research. First, it introduces a comprehensive model of individual competency areas, derived from three distinct research streams (see Figure 5). This model serves as a critical resource for scholars. This model underscores the importance and role of individual competencies from multiple perspectives, including their impact on supply chain performance and their interdependence with organizational competencies. In other words, it serves as a foundational reference to explore the impacts of individual competencies more deeply. It builds on earlier work, such as Schorsch *et al.* (2017) and Derwik *et al.* (2016), which emphasised the importance of individual competency area in driving supply chain performance. Additionally, we have categorised the types of competencies that are crucial for supply chain professionals, highlighting the qualifications necessary for success in this field. This extension of previous research, including studies by Luoyi and Guang (2018) and Flöthmann *et al.* (2018), underscores the essential role individual competencies play in supply chain management.

Secondly, our findings encourage further exploration into individual competencies within the supply chain domain, opening avenues for new academic inquiry and advancing the field. In conclusion, this research significantly enhances the understanding and development of individual competencies in the context of supply chain management.

Thirdly, this paper updates the review on individual competencies in supply chain management, building upon the previous works of Hohenstein *et al.* (2014) and Derwik and Hellström (2017). While these earlier reviews provided a broad overview that included elements of individual competencies, they are now considered outdated. The field has evolved significantly in response to the dynamic changes in supply chain management practices (Bernon and Mena, 2013; Derwik and Hellström, 2017). Therefore, an updated review is essential to reflect recent advancements, provide a more accurate and contemporary perspective, and identify new opportunities for future research.

6.2 Practical contributions

From a practical standpoint, the framework presented (see Figure 5) and the identified competency groups offer valuable guidance for human resource departments in developing future competency strategies, potentially leading to a competitive advantage. By leveraging this framework and focusing on the key competency groups as strategic assets, organisations can cultivate a more adaptable, skilled, and innovative workforce. This approach is likely to improve supply chain management, enhance the ability to meet customer needs, and contribute to overall firm performance.

6.3 Limitations and further research

In conducting this SLR, we recognise certain limitations inherent in our methodology. Our analysis focuses solely on individual competencies, excluding related topics such as organisational competencies within the supply chain domain. While our findings provide valuable insights, they would benefit from further validation and expansion by independent researchers. Future studies could diversify the publication sets, select larger and more varied samples, utilise alternative databases, or adopt different methodologies, such as qualitative case studies or Qualitative Comparative Analysis, to deepen our understanding and explore connections across diverse research areas.

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