

Competency requirements for logistics and supply chain positions: an assessment of the market demand

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Abstract

Purpose – The global logistics and supply chain (LSC) market is experiencing rapid growth, and the Australian industry is following this trend. Given the implications of a potential shortage of LSC talent resulting from the introduction of innovative technologies and changes in the work environment, we aim to identify market demand signals for competencies in LSC positions.

Design/methodology/approach – Following a content analysis of 929 job advertisements, we analysed organisations' signals of competencies in three main LSC positions, namely manager, coordinator and "planner and analyst".

Findings – The results show that the relative importance of competency requirements differs between LSC positions, although similar competencies are demanded across positions. The labour market also demands competencies in all four categories, such as academic and cognitive, personal, workplace, and technical, as well as both hard and soft skills. However, our findings indicate that there is a limited emphasis on technology-specific competency requirements, despite the significant technological advances in the LSC industry. Additionally, we identified clusters of co-demanded competencies across different positions.

Originality/value – Theoretically, this study develops a competency-based framework of LSC competencies, through which the findings offer a comprehensive signal about the requirements of LSC positions. Practically, our findings provide valuable insights for employers, job seekers and educational institutions to align their expectations with the market's signals on evolving competency requirements.

Keywords Competency, Market signal, Supply chain and logistics professionals, Job advertisements

Paper type Research article

1. Introduction

Supply chain management involves managing sourcing, procurement, production, distribution and logistics to achieve efficient and cost-effective flow of goods and services from suppliers to customers (APICS, 2014; Flöthmann and Hoberg, 2017). Effective supply chain management directly influences a company's ability to respond to market demands, manage risks and maintain customer satisfaction (Hazen *et al.*, 2014). As organisations strive to gain a competitive advantage and enhance effective supply chain performance, developing supply chain competencies has become a strategic priority (Campos *et al.*, 2019; Derwik and Hellström, 2017; Flöthmann *et al.*, 2018).



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The global LSC market is growing rapidly reaching US\$1,250 billion in 2024 and projected to hit US\$2,800 billion by 2034 (Emergenresearch, 2025), creating demand for new professionals. Several factors are contributing to the growth of the logistics and supply chain (LSC) profession and the development of new competencies. Firstly, the surge in e-commerce during and after the COVID-19 pandemic led to a significant increase in demand for postal, courier, transportation and logistics services (AIS, 2022). This shift prompted companies to rapidly adapt to manage the higher volume of shipments, particularly as more consumers shifted to online shopping and sought omni-channel delivery options and fast delivery (AIS, 2022; McKinnon *et al.*, 2017). Consequently, the LSC labour market in the distribution and transportation sector experienced significant growth. Secondly, the supply chains are becoming more intricate due to disruptions and uncertainties in global sourcing, multi-tier supplier networks and complex logistics operations; hence, there is an increasing need for competent professionals who can navigate these complexities (MHI and Deloitte, 2024). Thirdly, digital disruptions due to the rise of Industry 4.0 technologies, such as artificial intelligence and blockchain, including digital tools and analytics, further complicate the competency landscape (Dondi *et al.*, 2021). Digital disruptions have introduced new dynamics into LSC competencies, requiring a reassessment of existing competencies and the development of new competencies related to data analysis, automation and digital communication (Sixdegrees, 2025).

In line with the growing global market pattern, Australia's supply chain-related activities are also growing. In 2022, Australia's LSC sector contributed around 8.6% to gross domestic product, employed over half a million people (AIS, 2022). However, the sector is facing an acute talent shortage (AIS, 2022), which began before the outbreak of the COVID-19 pandemic. As of 2024, the industry employs 581,000 people, and its workforce is projected to grow by 9.1% by 2034 (ISA, 2025). Issues such as an ageing workforce, radical changes in job roles due to the technological and digital transformation of supply chains and unplanned talent management strategies are some of the other factors contributing to this skill shortage (AIS, 2022; CIPS/Hays, 2019; MHI and Deloitte, 2019). It is expected to see an increase in LSC jobs over the years for positions such as supply chain manager, supply chain analysts and demand and supply planner (Sixdegrees, 2025).

Competency is a complex combination of knowledge, skills and abilities that are important determinants of a position for hiring talent (Jena and Ghadge, 2021). Empirical evidence also shows that employee competencies affect supply chain performance, and hiring the right people at the right time for the right job is a source for gaining competitive advantage (Campos *et al.*, 2019; Derwik and Hellström, 2017; MHI and Deloitte, 2019). Thus, securing the necessary human capital in the LSC sector is crucial for organisational performance (Jena and Ghadge, 2021; MHI and Deloitte, 2019; Myers *et al.*, 2004).

Effective supply chain operations require professionals across various positions – managers, coordinators, analysts and demand planners – each needing a diverse set of competencies (Asghar *et al.*, 2021). Hence, identification of the key requirements of competencies for various LSC positions is vital. Previous studies were conducted to identify competencies either for supply chain managers or senior-level professionals (Ellinger and Ellinger, 2014; Midgley and Bak, 2021; Sangka *et al.*, 2019), or supply chain planner and analyst (Flöthmann *et al.*, 2018) or graduate-level positions (Lutz *et al.*, 2021; Wong *et al.*, 2014). Many studies also examine only particular competency types, such as soft skills (Bak *et al.*, 2019; Fantozzi *et al.*, 2024), digital or technology skills (Modgil *et al.*, 2023), resilience skills (Asghar *et al.*, 2021) and many do not reflect the actual market demand of competencies. Therefore, categorising competencies, placing them under a competency framework and identifying the sought-after skills under each category that are required in complex supply chain environments can fill existing gaps in the literature.

Despite recognition of LSC competency importance, a clear understanding of labour market demand for competencies needed for LSC positions is limited. The task of finding the right LSC talent with the necessary competencies at all levels of the profession is a global

challenge (CIPS/Hays, 2019; McKinnon *et al.*, 2017) across all industry sectors (Fantozzi *et al.*, 2024; Flöthmann *et al.*, 2018). Driven by the evolving landscape of LSC professionals, the importance of LSC talent requirements and the potential need to upgrade or develop competencies, this study aims to assess the current market trends and critically examine the competency requirements for LSC positions such as managers, coordinators and “planner and analyst”. To attain the objectives of the study, this research will address the following research questions:

- RQ1. What critical competencies are in demand for different LSC positions in the job market?
- RQ2. How does the LSC labour market demonstrate demand patterns for various hard and soft competencies?
- RQ3. How does the job market perceive the demand for LSC competences related to the application of modern technology, particularly in the context of Industry 4.0?
- RQ4. How do job advertisements within the LSC field reveal the co-demand of different critical competencies for various positions?

The remainder of this paper is structured as follows. Section 2 provides an overview of the competency and LSC literature on the competency and LSC competency framework. Section 3 presents the research methodology and design. Section 4 presents the analysis of results, and Section 5 discusses the findings and research implications, while the limitations of this study and future research directions are presented in section 6.

2. Literature review and conceptual background

To comprehend the existing knowledge in the LSC competency domain, we provide an overview of competencies for LSC positions, competency categories, the development of an *a priori* competency framework for the study and the role of job advertisements.

2.1 Competencies for LSC professionals

Competency refers to the ability to apply knowledge, skills and abilities effectively to perform tasks or functions within a defined role (APICS, 2014; Katinienė *et al.*, 2021). Knowledge competency represents the essential “know-how” required for a specific position. Skill is an observable competence reflecting how individuals apply procedures, techniques or learned behaviours in job contexts (Myers *et al.*, 2004). Ability refers to personal aptitudes that enable desirable performance, developed through prior experience and essential for future growth (Le Deist and Winterton, 2005). It encompasses both perceptual and motor attributes that enhance or complement skills through training or experience (Beckett, 2018). Together, knowledge, skills and abilities form the foundation of competency.

When recruiting, organisations seek individuals with demonstrated competencies – knowledge, skills and abilities – along with relevant education (Myers *et al.*, 2004). The LSC literature has long examined these attributes, identifying a diverse set of required competencies (see Supplementary Table A) including soft, hard, cognitive, technical, personal and workplace skills. These competencies were studied in different countries and across different regions. The following sections elaborate on these competencies and their classifications.

2.1.1 Soft and hard competencies. Competencies for managing LSC activities require a mix of soft and hard skills (see Supplementary Table A). Research highlights a shortage of both skill types in the sector (Derwik and Hellström, 2017; Flöthmann *et al.*, 2018; Shou and Wang, 2017).

Soft skills are interpersonal, human or behavioural abilities (Bak *et al.*, 2019) and, in LSC, include management-related capabilities for logistics, supply chain and technical functions

(Rahman *et al.*, 2012). Key soft competencies are *communication, teamwork and collaboration, leadership, customer focus and problem solving* (Deloitte, 2017). Deloitte predicts that soft skill-intensive roles will make up two-thirds of jobs by 2030. Soft skills can be categorised as decision-making, management, behavioural and negotiation skills (Jordan and Bak, 2016) and are transferable across jobs and industries, often referred to as employability skills (MHI and Deloitte, 2019).

Hard skills involve technical expertise and knowledge essential for a job, typically easier for firms to measure (Balcar, 2016). In LSC, hard skills cover technical, logistics and supply chain functions, including competencies developed through occupational experience such as inventory management, transport management and logistics service management (Bak *et al.*, 2019; Derwik and Hellström, 2017; Dobroszek *et al.*, 2019).

2.1.2 Technology-specific competencies. The growing emphasis on digitalisation or technology adoption within supply chains is widely acknowledged in both academic and industry literature (Fantozzi *et al.*, 2024; Lopez-Morales *et al.*, 2023; MHI and Deloitte, 2024; Walter *et al.*, 2025). The expected change in business landscape with the emergence of Industry 4.0 and 5.0 is transforming the skills landscape, increasing demand for a combination of managerial, operational and advanced technical capabilities as automation and intelligent technologies become more embedded in supply chain management (Modgil *et al.*, 2023; Walter *et al.*, 2025).

Accordingly, LSC professionals must integrate technical and analytical expertise with the capability to effectively apply emerging technologies (Modgil *et al.*, 2023). In the context of Industry 5.0, organisations require new talent with technology-specific competencies, including digital literacy, data management, proficiency in software and smart devices for tracking and operational efficiency, predictive analytics, blockchain, cloud computing, control tower analytics and human–AI interaction (ISA, 2025; Lotfi and Walker, 2024; Modgil *et al.*, 2023).

These technology-specific competencies are increasingly critical for LSC professionals seeking to remain relevant and competitive in a digitally enabled supply chain environment (Lopez-Morales *et al.*, 2023; Walter *et al.*, 2025). Many competencies listed in [supplementary Table A](#) fall into this category (technology-specific), such as *computer literacy, data collection and analysis, demand planning, inventory management, analytical thinking, problem solving and ERP proficiency* (Bals *et al.*, 2019; Li *et al.*, 2021; Modgil *et al.*, 2023). Possessing these skills enables LSC professionals to drive digital transformation within supply chains (Li *et al.*, 2021; Modgil *et al.*, 2023). However, there is a need for the literature to more proactively identify the specific technical and digital competencies required for LSC roles to assist in the digital transformation of LSC (Walter *et al.*, 2025).

2.1.3 Cross-regional studies on LSC competencies. Several studies have examined LSC competencies at both regional and cross-regional levels (see [Supplementary File Table B](#)). Within the Asia–Pacific region, Australian survey-based studies by Prajogo and Sohal (2013), Sohal (2013) emphasised communication, teamwork, technological capability and legal knowledge as critical competencies for supply chain managers. In Indonesia, Sangka *et al.* (2019) found logistics competencies were most important for third-party logistics (3PL) managers, followed by management and business-related skills. Similarly, Li *et al.* (2021) highlighted business, logistics, management and digitalisation competencies as essential for maritime executives in Singapore.

In Europe, research conducted in Germany and Denmark by Flöthmann *et al.* (2018) highlighted LSC management knowledge and analytical skills as key for logistics planners and analysts. Studies by Dobroszek *et al.* (2019) and Dobroszek (2020) based on analyses of Polish and German job advertisements for logistics specialist and LSC controller positions revealed variations in emphasis on teamwork capabilities and advanced logistics competences.

Beyond single-region analyses, cross-regional studies have also emerged. Bals *et al.* (2019) examined multi-country procurement and supply competencies with future emphasis on sustainability and digitisation. Likewise, Shou and Wang (2017), proposed five global

competency dimensions for supply chain managers, reflecting the growing convergence of managerial, analytical and strategic skill requirements worldwide.

Overall, these studies demonstrate that prior studies vary in context and data sources (e.g. surveys and job advertisement analyses). However, there remains a lack of recent empirical research within the Asia-Pacific region that systematically investigates current market demand for competencies across different key LSC positions.

2.1.4 Proposed LSC competency framework. A competency framework defines and classifies competency requirements for a job role, guiding career development and helping HR managers hire the right talent (APICS, 2014; Heaslip *et al.*, 2019; Le Deist and Winterton, 2005). Over the past three decades, both scholars and practitioners have proposed frameworks for LSC competencies. One of the earliest frameworks by Murphy and Poist (1991) classified competencies under business, logistics and management (BLM). Mangan and Christopher (2005) introduced a T-shaped framework, emphasising vertical LSC expertise and horizontal cross-functional skills. In other words, LSC managers are expected to develop LSC-focused competencies (vertical) as well as other contextual and cross-functional (horizontal) competencies. Other academic contributions include managerial, technical and cultural competencies (Sangari and Razmi, 2015); functional, behavioural, relational and managerial competencies (Derwik *et al.*, 2016); and five categories covering generic, functional, leadership, industry-specific and senior management skills (Shou and Wang, 2017).

Professional bodies have also developed frameworks. The Chartered Institute of Logistics and Transport (CILT) emphasises four core areas and eight knowledge domains, including supply chain, operations, procurement, logistics systems, transport networks and international trade (CILT, 2018). American Production and Inventory Control Society (APICS) offers a knowledge-skill-ability model covering occupational, professional, workplace, academic and personal competencies (APICS, 2014), aligning closely with both academic and practitioner frameworks (Le Deist and Winterton, 2005; Lutz *et al.*, 2021; Shou and Wang, 2017) and vice versa.

Commonalities exist between academic and practitioner literature, with many competencies overlapping (see Supplementary Table A). However, practitioner frameworks often omit technology-related competencies, position-specific demands and clusters of highly demanded skills. This gap highlights the need for integrated frameworks to identify critical competencies, high-demand clusters and technology-relevant skills, which can be addressed using combined deductive and inductive research approaches.

Based on this review (competency categories proposed by both academia and professional bodies), we developed a unified framework for analysing job advertisements, comprising four competency categories: academic and cognitive, workplace, personal and technical (Table 1). Later, job advertisement content analysis stage, relevant competencies are assigned to each category (Section 3.3).

2.1.5 Co-demand of competencies. Existing research has mainly identified clusters of competency categories and key attributes (Bals *et al.*, 2019; Flöthmann *et al.*, 2018). For example, Flöthmann *et al.* (2018) highlighted six important attributes: analytical and problem-solving ability, interpersonal skills, general management, computer/IT skills, SCM knowledge and industry experience. However, to our knowledge, only a few studies have identified the co-demand of competencies. Shou and Wang (2017) explored competency clusters across industrial sectors, while Tatham *et al.* (2017) emphasised skills such as problem-solving, forecasting and customer/supplier relationship management for supply chain managers.

With evolving market demands, it is necessary to reassess the balance of soft and hard skills – or personal, workplace and technical competencies. Operating and transforming supply chain systems increasingly require diverse skills (De Bruecker *et al.*, 2015). For example, Industry 5.0 demands LSC professionals to integrate digital literacy with human skills like communication and problem-solving (MHI and Deloitte, 2019; Modgil *et al.*, 2023). Consequently, LSC positions demand a blend of competencies, integrating soft and hard skills, technical, personal, workplace and digital competencies.

Table 1. Proposed logistics and supply chain competency framework and dimensions of competencies

Competency dimension	Brief explanation	Examples of competency indicators from the literature	Reference
Academic and cognitive (Soft and hard)	Academic and cognitive competencies are foundation competencies, primarily achieved in an academic setting and include intellectual/cognitive functions	Supply chain fundamentals, operations and enterprise economics knowledge; problem solving, critical thinking, application and knowledge of technology	Gammelgaard and Larson (2001), APICS, (2014), Shou and Wang (2017)
Personal (Soft)	Personal effectiveness competencies are soft competencies, which represent core personal abilities or behaviours and attitudes in the social arena (motives, traits, and interpersonal and self-management styles)	Self-reflection and self-management, interpersonal communication skills and self-management styles	Myers <i>et al.</i> (2004), APICS (2014), Wong <i>et al.</i> (2014), Sangari and Razmi (2015), Bak <i>et al.</i> (2019)
Workplace (Soft)	Workplace competencies are practice competencies which allow individuals to function in an organisational setting and which are related to work environment	Teamwork, leadership, collaboration, negotiation, customer focus, planning and organising	Murphy and Poist (1991), Myers <i>et al.</i> (2004), Murphy and Poist (2007), APICS (2014), Derwik <i>et al.</i> (2016), Shou and Wang (2017), Bak <i>et al.</i> (2019)
Technical (Hard)	Functional or professional or technical competencies are specific to LSC business functions and related application areas, such as sourcing, manufacturing and distribution	Sourcing and supplier management, managing operations, managing inventory, sales and operations planning (S&OP), forecasting and demand planning, continuous improvement (CI) and lean management, transport and warehouse management, project management	Murphy and Poist (2007), APICS (2014), Derwik <i>et al.</i> (2016), Derwik and Hellström (2017), Shou and Wang (2017), Campos <i>et al.</i> (2019)

Source(s): Authors' own work

2.2 Logistics and supply chain management roles

To execute diverse LSC functions, organisations require professionals with varied competencies across different roles (Flöthmann and Hoberg, 2017). However, few studies categorise LSC positions and their roles. McKinnon *et al.* (2017) classified roles by employment level, with managers at the top, planners, coordinators and supervisors in the middle and blue-collar staff at the bottom. For the European markets, Flöthmann *et al.* (2018) examined mid-level roles in Europe, supply chain planners and analysts and found their competency requirements nearly identical, analysing them together. The Australian and New Zealand Standard Classification of Occupations (ANZSCO) similarly identifies comparable roles, including managers (e.g. integrated logistics support manager, logistics manager, supply chain manager, supply chain executive manager) and mid-level positions such as coordinators, analysts and purchasing officers (e.g. inventory controller, logistics coordinator, procurement officer, supply chain officer, supply chain analyst) (ISA, 2025). Following these classifications, this study focuses on three LSC positions: manager, planner and analyst and coordinator.

Managers are senior decision-makers responsible for planning, organising, directing, and controlling supply, storage and distribution (ISA, 2025; McKinnon *et al.*, 2017). Planners handle demand, inventory, supply, production and order management, reporting to managers (Flöthmann *et al.*, 2018). Analysts process and analyse data to support planning, decision-making and strategy development for efficiency and continual improvement (ISA, 2025). Coordinators oversee end-to-end logistics operations, managing on-the-ground activities and stakeholder relationships (McKinnon *et al.*, 2017).

Most studies focus on managerial competencies (Birou and Van Hoek, 2021; Derwik *et al.*, 2016; Jena and Ghadge, 2021; Katinienė *et al.*, 2021; Midgley and Bak, 2021), with fewer examining planners, analysts, logistics specialists or entry-level positions (Dobroszek *et al.*, 2019), supply chain and logistics controllers (Dobroszek, 2020; Dobroszek *et al.*, 2019). No study comprehensively addresses the competencies required across LSC managers, planners and analysts, and coordinators. This has motivated the authors to conduct this research.

2.3 Job advertisement, signalling theory and gathering information on the job competency

Researchers have used various methods to study job competency requirements, including surveys (Campos *et al.*, 2019; Jena and Ghadge, 2021), job advertisement analysis (Barbosa and de Oliveira, 2021; Dobroszek, 2020; Dobroszek *et al.*, 2019; Flöthmann *et al.*, 2018; Shou and Wang, 2017; Wong *et al.*, 2014) and case study interviews (Bals *et al.*, 2019; Birou and Van Hoek, 2021). Job advertisements are considered particularly reliable, as they reflect actual market demands and link required skills to job responsibilities, experience and education (Barbosa and de Oliveira, 2021; Rios *et al.*, 2020).

Signalling theory (Spence, 2002) explains how job advertisements act as signals from employers (signallers) to applicants (receivers) about market demand for competencies, helping job seekers infer organisational expectations (Dunbar *et al.*, 2016). The theory also highlights that signal strength and visibility are key factors influencing how effectively these requirements are communicated and interpreted (Ramaswami *et al.*, 2010).

Compared to surveys, which may not reflect current job demands (Rios *et al.*, 2020), and interviews, which can be subjective or case-specific and may provide reflective or biased views, and cannot offer a large, up-to-date sample of job requirements (Bals *et al.*, 2019; Birou and Van Hoek, 2021), job advertisements provide a large, representative and up-to-date sample of employer expectations (Dobroszek, 2020; Dobroszek *et al.*, 2019; Wong *et al.*, 2014). In addition, advertisements typically list highly desirable skills due to space constraints, though they may not explain the rationale behind each requirement for a role (Barbosa and de Oliveira, 2021; Rios *et al.*, 2020). Despite these limitations, job advertisements are a valuable source for identifying competencies across LSC positions. Increasingly, studies use advertisement content to identify role-specific requirements (Dobroszek, 2020; Dobroszek *et al.*, 2019; Flöthmann and Hoberg, 2017; Wong *et al.*, 2014), making content analysis an effective approach for this research.

3. Research methodology

This study uses content analysis of job advertisements to examine the competencies demanded for different LSC positions. Content analysis allows both qualitative and quantitative investigation (Elo *et al.*, 2014). An abductive approach was adopted, combining deductive and inductive reasoning. The analysis began with a qualitative interpretation of the latent content in job ads, which was then compared with theoretically predicted competency patterns from the literature (see Table 1). Subsequently, a quantitative content analysis was conducted, measuring frequency of competencies, criticality of in-demand skills and clustering competencies using Jaccard's similarity coefficient (Bazeley, 2013). Following Mayring (2015), the content analysis of LSC job advertisements proceeded through the following steps:

- (1) Create an initial LSC job-related competency framework,

- (2) job advertisement selection,
- (3) search, code and analyse relevant contents and
- (4) validation and analysis of results.

3.1 Create an initial LSC job-related competency framework

The first step involved developing an LSC competency framework to guide data collection and analysis. Based on existing literature, we developed an LSC competency framework from existing literature under academic and cognitive, workplace, personal and technical competency categories (see [Table 1](#)).

3.2 Identify job advertisements

We identify and collect LSC job advertisements from “Seek” job sites in Australia. To ensure credibility, we relied on the “seek” given that it is a comprehensive and dedicated website for job advertisements ([Ahsan and Ho, 2024](#)). Seek is by far the largest job board in the Australasian region in terms of job advertisements and number of job seekers. To avoid duplication, we do not consider any other job boards, as recruiters often post the same advertisements simultaneously on multiple websites.

To ensure consistency and rigor in the research process, we refined our job advertisement search strategy using the inclusion and exclusion criteria presented in [Table 2](#). Inclusion criteria required that advertisements: (1) explicitly referenced LSC-related job titles, (2) described functional responsibilities aligned with core LSC activities and (3) demonstrated defined role boundaries within LSC management. Job title identification was guided by established definitions of LSC ([APICS, 2014](#); [Christopher, 2016](#); [Flöthmann and Hoberg, 2017](#)) and role typologies outlined in [Section 2.2](#) ([Fantozzi et al., 2024](#); [Flöthmann and Hoberg, 2017](#); [ISA, 2025](#); [McKinnon et al., 2017](#)).

As a preliminary screening step, we conducted searches on SEEK using LSC-related keywords such as “supply chain management”, “logistics”, “procurement”, “warehouse” and “operations” focusing on industries including manufacturing; transport and logistics; government and defence; and engineering sectors. The focus was on full-time LSC positions, covering managers ([Birou and Van Hoek, 2021](#); [Derwik et al., 2016](#); [Gammelgaard and Larson, 2001](#)), planners and analysts ([Flöthmann et al., 2018](#)), coordinators ([Dobroszek, 2020](#); [Dobroszek et al., 2019](#)), across core supply chain functions such as supply, procurement, logistics, operations, warehousing and distribution ([Fantozzi et al., 2024](#)).

Positions lacking full time and clear supply chain-related responsibilities were excluded. Exclusion criteria were used to remove part-time roles and positions unrelated to LSC management, such as sales manager, retail stock analyst, admin coordinator, project manager, warehouse assistant and forklift operator. This process was repeated weekly to identify new job advertisements from [SEEK.com](#) to account for updates, while carefully screening for and removing any duplicate postings, which were saved as PDFs for further analysis. Each file was named by job title and numbered sequentially. The job search was conducted between 2019 and 2021. This systematic process ensured that the final dataset consisted only of unique and relevant supply chain-related job advertisements. Following this process, we obtained a total of 929 useable job advertisements from Australia, covering the following positions: managers (430), coordinators (218) and “planner and analyst” (281). A detailed breakdown of these positions is provided in [Table 2](#).

3.3 Search, code and analyse relevant contents

NVivo 12 was used to code job advertisement contents. To ensure that the findings were grounded in the data rather than influenced by researcher bias, we followed several

Table 2. Overview of job search and identified job titles

Position	Inclusions of job titles	Exclusions	Identified job advertisement by positions	Total jobs
Manager	• Supply chain manager • Logistics manager • Warehouse manager • Sourcing manager • Procurement manager • Operations manager • Manufacturing and operations management	Part-time jobs, sales manager, project manager	• Supply chain manager (117) • Operations manager (96) • Logistics and transport manager (64) • Procurement and contract manager (91) • S&OP manager (6) • Warehouse manager (56)	430
Coordinator	• Supply chain coordinator • Procurement coordinator • Logistics coordinator • Production coordinator • Inventory coordinator	Part-time jobs, admin coordinator, supply chain administrator, warehouse assistant, transport and logistics accountant, administration support officer and warehouse assistant, public transport coordinator	• Inventory coordinator (12) • Supply chain coordinator (58) • Logistics coordinator (59) • Procurement coordinator (78) • Production planning coordinator (11)	218
Planner and analyst	• Supply chain planner • Demand planner, demand analyst • logistics planner and analyst • Production planner • Inventory planner and analyst • Logistics and supply analysts • Procurement sourcing analysts • Transport logistics analyst	Part-time jobs, stock analyst, SAP system analysts	• Demand planner (63) • Inventory planner (21) • Logistics planner (7) • Procurement planner (22) • Production planner (34) • Supply planner (54) • Demand analysts (4) • Inventory analysts (17) • Logistics and supply analyst (47) • Procurement sourcing analyst (11) • Transport analyst (2)	281
<i>Total</i>				929

Source(s): Authors' own work

confirmability measures. First, we examined and coded the content of each job advertisement and developed the first-order concepts. The second step involved constructing second-order concepts (competencies) through axial coding, which matched first-order codes with the theoretical pattern of competency. In the third step, we grouped the second-order competencies under their respective competency categories (aggregated dimension). The aggregated dimension competencies, presented in [Table 1](#), guided the coding of second-order competencies. Data triangulation in this study was achieved by using multiple sources to validate the second-order competencies derived from job advertisements. In addition to job advertisements as the primary dataset, relevant industry reports ([CIPS/Hays, 2019](#); [ISA, 2025](#); [MHI and Deloitte, 2024](#); [Supply Chain Canada, 2022](#)) and professional competency frameworks ([APICS, 2014](#)) were used to cross-check and corroborate the identified

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competencies, thereby strengthening the robustness and validity of the findings. We calculated the frequency of occurrence of competencies under each competency in relation to each LSC position. Those competencies with a frequency of less than 2% were dropped, as they are rarely representative of the job requirements for the position (Shou and Wang, 2017). An example of codes and corresponding concepts is shown in Table 3.

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3.4 Trustworthiness of research

The trustworthiness of the content analysis was strengthened by clearly documenting the research process and addressing credibility, dependability, confirmability and transferability (Elo et al., 2014), as summarised in Table 4. The coding process was conducted collaboratively by two researchers to enhance the robustness of the analysis. To ensure the reliability of competency data extracted from job advertisements, the first author conducted the initial text-searching and coding in NVivo, which was then randomly and independently reviewed by the

Table 3. Example of codes and relevant concepts

Aggregated competency dimension	Competency (second order concepts)	First order codes (examples of excerpts from job adv)
Technical	Forecasting	generate and maintain an accurate item level forecast; create the baseline forecast, consolidate forecast components across the full 24-month horizon, sense-check values and assumptions to validate the unconstrained demand plan; facilitate cross-functional agreement of volume forecasts for events and market trends; take ownership of forecasting requirements related to demand forecasts, seasonality, promotions and discounts and forecast by coordinating and compiling and maintaining all data input/outputs for their allocated portfolio
Workplace	Leadership	lead and supervise personnel to build team, “inspire, support and motivate others to drive business outcomes”, “providing leadership and guidance to team members in a tough environment”, “driving performance improvement”, “ability to lead by example”, “senior leadership experience” and “supportive leadership”, “ability to facilitate change and to drive and inspire others”, “provide leadership and direction to the logistics and production services team”, “significant supervisory and leadership experience”
Personal	Communication	manage and motivate and work closely with peers and senior management teams, “build and maintain trust and rapport a solid working relationship”, and “organise meetings and/or events with appropriate authority”, “excellent verbal and written communication skills”, “Display clear communication, both written and verbal”, “Great phone manner and communication skills”
Academic and cognitive	Computer literacy	SQL Databases, advanced to intermediate level proficiency in Microsoft Office with complex spreadsheet analysis, and warehouse management system (WMS), Understanding of Computerized Maintenance Management Systems (CMMS) such as Maximo, MEX, Agility & QFM and, “Excellent MS Excel capabilities (Pivot tables, V-lookups)”, “High degree of computer literacy including advanced Microsoft Excel”, “Thorough understanding of technologies like Alteryx and Supply chain applications”, “Solid understanding of AX Dynamics”

Source(s): Authors’ own work

Table 4. Method of ensuring trustworthiness in research process

Trustworthiness criteria	Explanations	How criteria were met in this study
Credibility	Refers to the internal validity of the study and concerns the extent to which the research process accurately represents the phenomenon under investigation	• Job advertisements were sourced from reputable platforms and collected over 2019–2020 to reduce temporal bias • Dataset included ads explicitly focused on LSC roles, with conceptualisation grounded in literature (Introduction and Section 2.2) • Job titles and contents were reviewed for relevance; duplicates and irrelevant ads were removed • Initial coding was informed by the first author's familiarisation with a subset of ads; a second coder cross-verified coding for consistency
Dependability	Refers to consistency and stability of the research process, particularly how researchers interpret the data	• A priori codes from literature (Supplementary file Table A) guided analysis • Intercode agreement ensured coding consistency • Second-order themes were consolidated into aggregate competency dimensions • Transparent description of procedures and links between data and results
Confirmability	The degree to which findings are derived from the data rather than researcher bias, emphasising objectivity and auditable procedures	• Content analysis protocol applied following Mayring (2015), with careful data collection and secure storage • First- and second-order codes explicitly separated; competency framework developed and refined through team discussions • Supplementary file Table A and Table 3 present thematic structure • Interpretations grounded in the data, ensuring objectivity
Transferability	The extent to which findings can be applied or adapted to other settings, based on clear contextual boundary conditions	• Sample selection and research setting described in detail • Content analysis and literature review provided in-depth exploration of supply chain competencies • Competency dimensions and related competencies documented; codes emerged inductively and were validated against literature • Intercode agreement ensured coding consistency • Use of consistent definitions and evaluation approaches (LSC and competency categories) facilitates application to other contexts

Source(s): Authors' own work

second author using the same procedure. In a few cases, differences arose in the interpretation of certain competencies. These disagreements were resolved through discussion, consultation of relevant literature (conceptual framework – [Table 1](#) and [Supplementary Table A](#)) and re-examination of the contested codes until consensus was reached ([Miles et al., 2014](#)).

Coding reliability and validity were ensured through several checks. First, we checked for duplicate advertisements by using a job title search. We further validated the consistency of

any missing data by cross-checking the total number of samples against the total number of jobs (as indicated by job title). This process resulted in an inter-coder agreement (Ahsan and Ho, 2024) of 92%, with concordance achieved on 4,051 out of 4,502 codes, thereby establishing inter-coder reliability and enhancing the overall credibility of the analysis. This multi-researcher approach ensured investigator triangulation, as both researchers independently engaged in coding, thematic analysis and interpretation of the same dataset. Comparing and reconciling their findings helped reduce individual researcher bias and enhanced the credibility and reliability of the overall results (Denzin, 2017).

Furthermore, trustworthiness was strengthened by addressing potential employer signalling biases in job advertisements, such as the overstating or omission of certain skills. This was achieved by analysing a large sample of advertisements across multiple organisations and positions, examining competencies at an aggregated level to identify consistent patterns, and comparing the findings with prior competency studies in Australia and other regions to ensure alignment with existing literature.

4. Analysis of findings

4.1 Demand analysis of competencies for various LSC positions

From 929 job advertisements, competencies were coded under four broad categories (Figure 1). As each advertisement listed multiple competencies, a total of 4,502 competency instances were recorded. Across all three LSC positions, 34 distinct competencies were identified and classified as shown in Table 1 and Figure 1.

A total of 32, 30 and 31 competencies were identified for the positions of manager, coordinator and “planner and analyst”, respectively (Figure 2). The weighted frequency statistics for competency demand showed a mean of 0.154, a median of 0.114, a skewness of 1.21 and standard deviation (SD) of 0.122. As the data are right-skewed, the median was used as the preferred measure of central tendency (Rahman *et al.*, 2019). Competencies were then grouped into three demand levels: *high* (weight $>0.236 = \text{median} + 1 \text{ SD}$), *medium* (0.114–0.236) and *low* (weight <0.114). This method, based on the median and standard deviation, captures typical variability while reducing the influence of outliers and provides a clear representation of competency demand distribution. Figure 2 presents and ranks the competencies and classifies them into high-, medium- and soft-competency categories according to the strength of labour market signals associated with each LSC position.

The results indicate that employers seek a diverse set of skills across all four competency categories for LSC managers, encompassing 32 competencies in total: 6 academic and cognitive, 6 workplace, 4 personal and 16 technical. A similar pattern is observed for the other two positions. For the coordinator positions, 30 competencies were identified as essential, including 6 academic and cognitive, 6 workplace, 4 personal and 14 technical competencies. For the planner and analyst positions, 31 competencies were identified, comprising 6 academic and cognitive, 6 workplace-related, 4 personal and 15 technicals. Figure 2 presents the list of competencies and their respective demand signal for each position.

A key observation from the findings is that most competencies, 28 out of 34, are consistently sought across all three supply chain positions. Of the six that are not, three are shared by two positions: *continuous learning and adaptability* and *process improvement/Six Sigma* for managers and “planners and analyst”, and *awareness of others’ needs* for managers and coordinators. Among the remaining three competencies, each is specific to a single position: *accountability* for the manager position, *locating facility* for the coordinator position and *sustainability* for the planner and analyst positions.

ANOVA analysis shows no significant differences in overall competency demand across the four categories (academic/cognitive, personal, workplace, technical) for LSCM positions, indicating all categories are important. However, competency priorities are position specific. For example, *communication* and *teamwork* show strong demand signals (e.g. in high demand) across all positions, while *leadership* and *operations and enterprise economics* exhibit a strong



Figure 1. Integrated competency framework for LSC positions. Source: Authors' own work

signal only for managers. *Customer focus* is on high demand for coordinators, but in medium demand for other positions. Thus, while similar competencies are sought across LSC positions, their relative importance varies by role.

4.2 Demand trends of soft and hard competencies

The results show that both hard and soft competencies are essential for the LSC positions, but the emphasis differs by position. Managers require all 10 soft competencies listed in Figure 1, while coordinators and “planner and analyst” need eight. *Accountability* and *continuous learning/adaptability* are not frequently demanded for coordinators, and *accountability* and *awareness of others' needs* are not emphasised for “planner and analyst”. *Analytical thinking*, a blend of soft and hard skills, is moderately demanded across all positions. The remaining competencies, 21 for managers and coordinators, 22 for “planner and analyst”, are all hard skills.

For managers, soft competencies are the most in demand: three of the four high-demand competencies (75%) are soft skills, ranking as the top three and appearing in over 40% of job postings (Figure 2). For LSC coordinator positions, the high-demand competencies are evenly distributed between hard and soft skills, highlighting the importance of both for this role. This

High demand	1.Communication (197; 45.81%) 2. Leadership (185; 43.02%) 3. Teamwork and collaboration (178; 41.4%) 4. Operations and enterprise economics (112; 26.05%)	1. Communication (108; 49.5%) 2. Teamwork and collaboration (88; 40.37%) 3. Inventory management (68; 31.93%) 4. Computer literacy (68; 31.93%) 5. Data collection and analysis (56; 25.69%) 6. Customer focus (54; 24.77%)	1. Communication (137; 48.75%) 2. Data collection and analysis (124; 44.13%) 3. Computer literacy (121; 43%) 4. Inventory management (118; 42%) 5. Demand planning (89; 31.67%) 6. Forecasting (84; 29.9%) 7. ERP systems (75; 26.7%) 8. Analytical thinking (73; 25.99%) 9. Teamwork and collaboration (70; 24.9%)
Medium demand	5. Data collection and analysis (101; 23.49%) 6. Warehouse management (96; 22.33%) 7. Computer literacy (92; 21.4%) 8. Safety management (90; 20.93%) 9. Inventory management (89; 20.7%) 10. Analytical thinking (84; 19.53%) 11. Sourcing and supplier relationship (70; 16.28%) 12. CI and lean management (69; 16.05%) 13. Customer focus (69; 16.05%) 14. Negotiation and conflict management (65; 15.12%) 15. Interpersonal skills (62; 14.42%) 16. ERP systems (61; 14.19%) 17. Project management (60; 13.95%) 18. Problem solving (56; 13.02%) 19. Supply chain fundamental (55; 12.79%) 20. KPI setting (50; 11.63%)	7. ERP systems (47; 21.56%) 8. Problem solving (46; 21.10%) 9. Analytical thinking (35; 16.05%) 10. Interpersonal skills (34; 15.97%) 11. Warehouse management (30; 13.76%) 12. Safety management (25; 11.47%)	10. Problem solving (66; 23.49%) 11. S&OP (52; 18.5%) 12. Interpersonal skills (47; 16.73%) 13. Organising and planning (35; 12.46%) 14. Customer focus (33; 11.74%) 15. CI and lean management (32; 11.39%) 16. Negotiation and conflict management (32; 11.39%)
Least demand	21. Strategy development and application (49; 11.39%) 22. Organising and planning (47; 10.93%) 23. Forecasting (41; 9.53%) 24. Continuous learning and adopt with change (39; 9.07%) 25. S&OP (32; 7.44%) 26. Demand planning (31; 7.21%) 27. Transport and distribution (31; 7.21%) 28. International and local regulations (28; 6.51%) 29. Risk management (28; 6.51%) 30. Awareness of the needs of others (23; 5.35%) 31. Process improvement and six sigma (12; 2.79%) 32. Accountability (9; 2.09%)	13. Demand planning (20; 9.17%) 14. KPI setting (20; 9.17%) 15. Transport and distribution (20; 9.17%) 16. Negotiation and conflict management (17; 7.8%) 17. Forecasting (16; 7.3%) 18. CI and lean management (14; 6.42%) 19. Organising and planning (14; 6.42%) 20. Supply chain fundamental (11; 5.04%) 21. Leadership (10; 4.58%) 22. Awareness of the needs of others (10; 4.58%) 23. International and local regulations (10; 4.58%) 24. Locating facility (10; 4.58%) 25. Sourcing and supplier relationship (8; 3.67%) 26. Project management (8; 3.67%) 27. Operations and enterprise economics (8; 3.67%) 28. S&OP (5; 2.29%) 29. Strategy development and application (5; 2.29%) 30. Risk management (5; 2.29%)	17. Sourcing and supplier relationship (29; 10.32%) 18. Supply chain fundamental (28; 9.96%) 19. KPI setting (26; 9.25%) 20. Project management (23; 8.19%) 21. Operations and enterprise economics (21; 7.47%) 22. Safety management (16; 5.69%) 23. Continuous learning and adopt with change (16; 6.9%) 24. Warehouse management (14; 4.98%) 25. Strategy development and application (14; 4.98%) 26. Risk management (14; 4.98%) 27. Leadership (13; 4.98%) 28. Transport and distribution (13; 4.98%) 29. International and local regulations (7; 2.49%) 30. Process improvement and six sigma (6; 2.14%) 31. Sustainability (6; 2.14%)
	Manager (430 jobs)	Coordinator (218 jobs)	Planer & Analyst (281 jobs)

Figure 2. Market demand of LSC position competencies based on the intensity of demand. Source: Authors’ own work

combination enables coordinators to manage complex logistics tasks while maintaining smooth supply chain operations. In contrast, hard competencies dominate “planner and analyst” positions, comprising 70% of high-demand skills (Table 5). Across all positions,

Table 5. Distribution of hard and soft competencies across various LSC job positions

Position	High-demand competencies			Medium-demand competencies			Low-demand competencies			Total
	Hard	Soft	Total high-demand	Hard	Soft	Total medium-demand	Hard	Soft	Total low-demand	
Manager	25%	75%	4	76%	24%	17	67%	33%	12	33
Coordinator	50%	50%	6	71%	29%	7	83%	17%	18	31
Planner and Analyst	70%	30%	10	43%	57%	7	93%	7%	15	32

Note(s): The competency “analytical thinking” is counted in both hard and soft

Source(s): Authors’ own work

however, *communication* – a soft skill – remains the most sought-after competency, appearing in over 45% job postings for each role.

Among the various hard skills identified, *inventory management*, *computer literacy* and *data collection and analysis* are critical across positions, as they are essential for efficient and accurate LSC operations. These three competencies rank among the top five and are in high demand for LSC coordinator, “planner and analyst” positions. For manager positions, however, they fall within the top ten and are in moderate demand. For managers, operations and enterprise economics is the only hard skill classified as high demand (rank 4), appearing in about one-quarter of job postings. This highlights its importance in planning, forecasting and optimising day-to-day operations to meet or exceed customer expectations (APICS, 2014).

4.3 Technology-specific competencies in demand

Based on the literature on technology-specific competencies (Section 2.1.2), high-demand skills for LSC positions include *computer literacy*, *data analysis*, *analytical capacity*, *demand planning*, forecasting, *inventory management* and *ERP proficiency*. Figure 3 summarises these results, with subsequent analysis supported by excerpts from job advertisements.

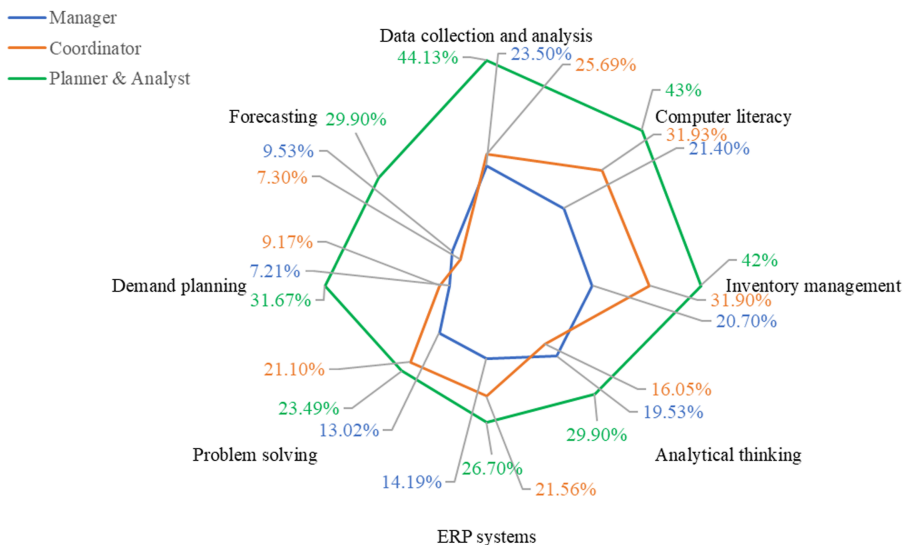


Figure 3. Market demand for technology-specific competencies in LSC positions. Source: Authors’ own work

Computer literacy is a key technology-specific competency across all LSC positions, emphasised in roughly one-third of jobs. This includes proficiency with Microsoft Access, SQL, advanced Excel, Microsoft Office and warehouse systems. The signal strength shows that *computer literacy* is especially critical and widely demanded for planner and analyst (43%) and coordinators (31.9%), while manager positions show medium demand. *Data collection and analysis* is required in over one-quarter of jobs. The labour market signal indicates that this data analysis skill is commonly sought for planner and analyst positions, with 44.1% of job postings mentioned it. This competency involves handling large, diverse datasets across sales, demand, inventory, procurement, production and transportation to predict trends, assess risks, analyse inventory and production, monitor supplier performance, and evaluate transport and procurement data.

Analytical thinking is essential for demand planning, procurement, sales forecasting and inventory management. It is highly demanded for planner and analyst (26%) and moderately for managers and coordinators. LSC professionals need a strong analytical mindset to examine issues, solve problems and present data clearly. Similarly, *ERP system* skill is also frequently demanded for planner and analyst, and moderately for managers and coordinators. Key tasks include managing purchase-to-pay processes, updating MRP data, creating and maintaining master data, automating order and procurement workflows, using warehouse management modules, tracking outstanding deliveries and ensuring accurate planning for smooth operations.

Forecasting and demand planning competencies are also found to be in high demand for planner and analyst positions. However, they are less frequently signalled for both the LSC coordinators and managers. *Forecasting*, which is often supported by technology, includes generating accurate item-level forecasts; consolidating and validating data; coordinating cross-functional volume forecasts⁴ and managing demand inputs for promotions, seasonality and trends. *Demand planning* requires an understanding of supply-demand principles, developing forecasts from patterns and trends, using planning tools and resolving unexpected demand issues in collaboration with stakeholders.

Overall, technology-specific competencies are highly demanded for planners and analysts, moderately for managers and varied for coordinators. Skills related to disruptive technologies, automation, AI, cloud computing, blockchain, 3D printing, are seldom mentioned, indicating limited market demand for Industry 4.0 competencies across all LSC positions.

4.4 Co-demand analysis of competencies

We conducted a cluster analysis in NVivo to examine the co-occurrence of competencies within job advertisements using Jaccard's similarity coefficient (JC) (Bazeley, 2013). JC measures the overlap between two competencies, the proportion of advertisements requiring both relative to those requiring either, ranging from 0 (no co-occurrence) to 1 (complete co-occurrence). JC values are used to create dendrogram clusters (Bazeley, 2013). Following Ahsan and Ho (2024), the highest JC index is used to assess the key strength of demand co-occurrence and identify clusters of co-demanded competencies. The main clusters for managers, coordinators and "planner and analyst" are shown in Figures 4–6.

Co-demand clusters of competencies for the LSC manager position: The key co-demand competency clusters for managers include *analytical thinking* with *problem solving*, *leadership* with *teamwork*, *communication* with *interpersonal skills*, *warehouse management* with *safety management*, *forecasting* with *S&OP* and *operations and enterprise economics* with *CI and lean management* (Figure 4). Several competencies, including *teamwork*, *leadership*, *communication*, *operations and enterprise economics*, and *safety management*, appear across multiple clusters, reflecting the broad, multi-skilled demands of LSC manager positions.

Co-demand clusters of competencies for LSC coordinators: The primary co-demand competency clusters for coordinator position include *data collection and analysis* with

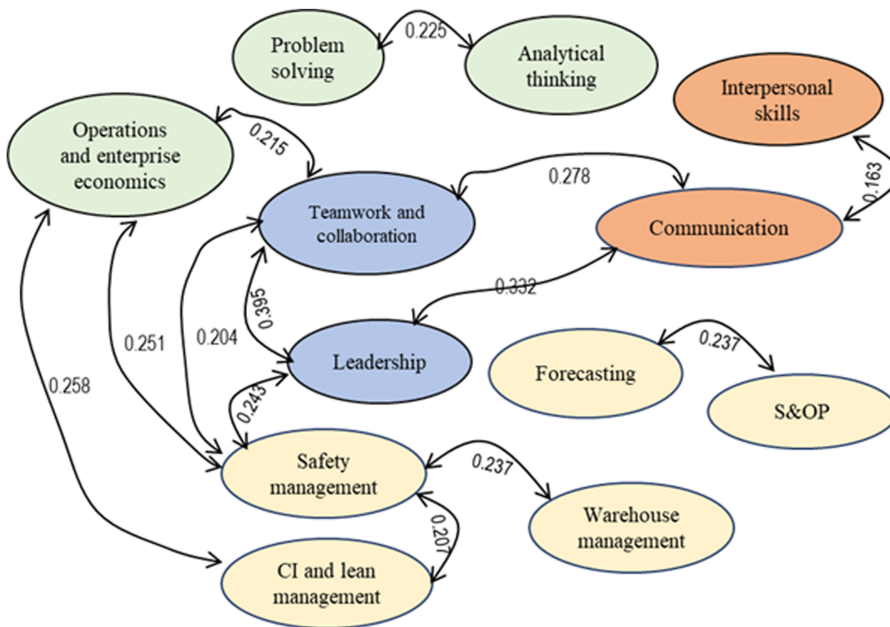


Figure 4. Co-demand of competencies of manager position. Source: Authors' own work

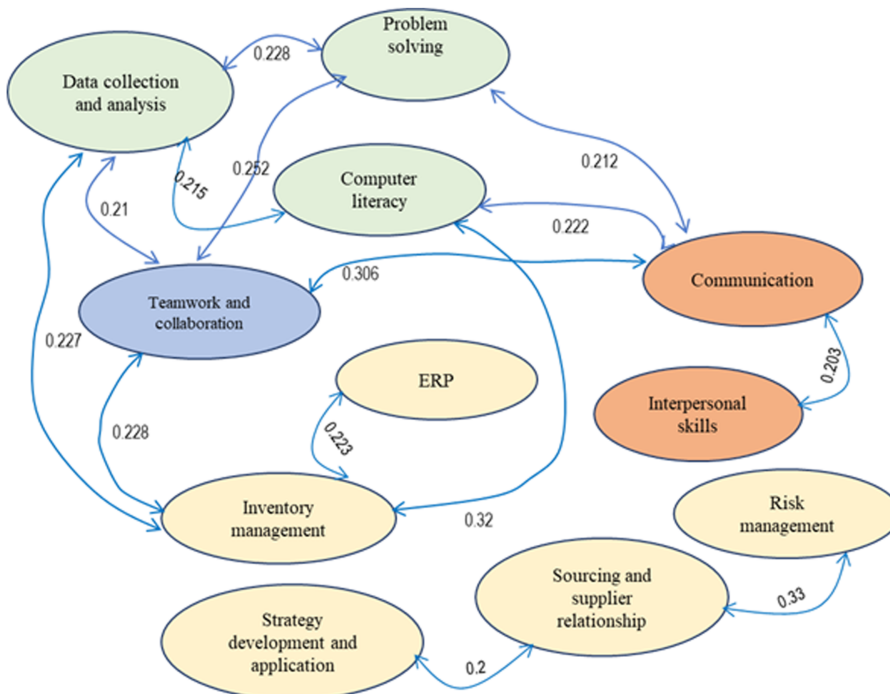


Figure 5. Co-demand of competencies of coordinator position. Source: Authors' own work

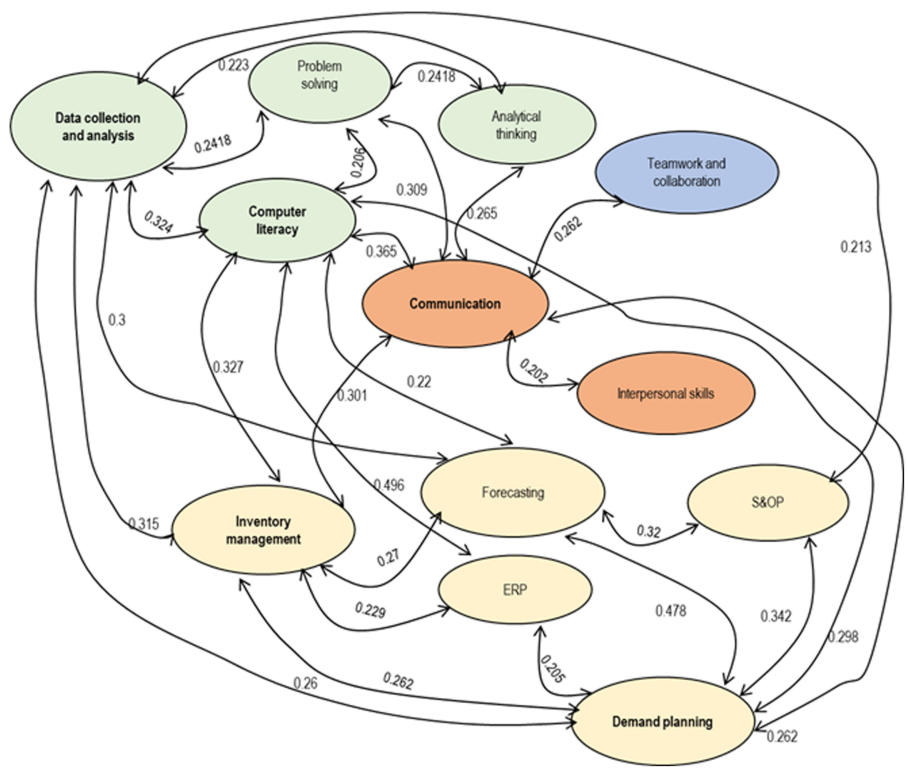


Figure 6. Co-demand of competencies of planner and analyst positions. Source: Authors’ own work

problem-solving, computer literacy, teamwork and inventory management. Teamwork also clusters with problem-solving, inventory management and communication (Figure 5). Among them, several competencies – problem-solving, computer literacy, communication, sourcing and supplier relationships, and inventory management – form multiple clusters, while ERP systems, risk management, strategy development and interpersonal skills form single-competency clusters.

Co-demand clusters of competencies for LSC planner and analyst: Figure 6 presents the main co-demand clusters for planner and analyst competencies. Key clusters include data collection and analysis with computer literacy, teamwork with communication, communication with interpersonal skills and demand planning with forecasting. Some competencies, such as communication and data collection and analysis, appear in multiple clusters with skills like teamwork, inventory management, problem-solving, analytical thinking, S&OP and forecasting.

Overall, the co-demand patterns show that LSC positions require not only individual competencies but also interlinked skills that are often needed simultaneously.

5. Discussion and implications

5.1 Discussion

5.1.1 Key competencies in demand for LSC positions. This study analyses the job advertisements in Australia to identify market signals of competency requirements for three LSC positions – manager, coordinator and “planner and analyst” – across four categories: academic and cognitive, workplace, personal and technical. Drawing on the competency-based

framework and signalling theory, identification and documentation of these competencies enhance the “signal visibility” of expected skills for LSC positions (Ramaswami *et al.*, 2010). The findings indicate that LSC professionals require a balanced mix of competencies across all four categories, consistent with prior research emphasising multi-category skill combinations (Bals *et al.*, 2019; Bughin *et al.*, 2018; Li *et al.*, 2021; Pejic-Bach *et al.*, 2020). While many of these skills are common across LSC positions, their prevalences vary across positions, indicating that competency requirements are role specific. This observation aligns with the principles of the competency-based framework, which suggests that “*competency models refer to collections of knowledge, skills, abilities, and other characteristics (KSAOs) that are needed for effective performance in the jobs in question*” (Campion *et al.*, 2011, p. 226).

Furthermore, the “signal strength”, as defined in signalling theory (Ramaswami *et al.*, 2010), shows the comparative market demand of competencies for each role. While many competencies are common across positions, their relative strength varies by position roles. For instance, the signal strength for *leadership* is strong (i.e. high demand) for managers but weak (i.e. least demand) for coordinators and “planner and analyst”. In contrast, some competencies share the common signal strength across positions. For example, strong signal strength across all positions is found for *communication*, appearing in about half of job postings, reflecting its key role in coordinating supply chain stakeholders (Bak *et al.*, 2019; Murphy and Poist, 2007). Effective communication enables LSC professionals to convey information clearly, coordinate activities, resolve problems and build positive relationships with stakeholders. Similarly, a weak signal is noticed for some technical skills, such as *transport and distribution* and *international and local regulations*, across positions. *Accountability, sustainability* and *process improvement/Six Sigma* are also among the less frequently demanded competencies, with *sustainability* minimally emphasised despite being identified as a future skill in prior research (Bals *et al.*, 2019).

Competencies for managers: The findings indicate that competencies that show strong signal strength, such as *communication, leadership, teamwork and collaboration, and operations and enterprise economics*, are primarily personal and workplace-related categories. This result is consistent with the earlier survey-based studies by Prajogo and Sohal (2013), Sohal (2013) in the Australian context, which also identify that *communication* and *teamwork* are critical for supply chain managers. Similarly, Derwik *et al.* (2016) highlight that LSC managers rely more on business management, general and behavioural competencies than on technical expertise. Our findings reinforce the enduring importance of these skills for supply chain managers and demonstrate that, even after a decade, they continue to be reflected in actual.

Technical competencies, though important, are generally in moderate to low demand; for instance, risk management and KPI setting appear least frequently. In contrast, Prajogo and Sohal (2013) found that the ability to manage supply chain risks was considered the most critical enterprise skill by Australian supply chain professionals. This discrepancy suggests that, although technical skills are critical for performing the job, their importance is not strongly signalled through job postings. These differences are also probably because we used job advertisements as the sole source of signal, while signals come from multiple sources and signal visibility highly depends on the frequency and consistency across various channels (Connelly *et al.*, 2025). Another explanation is that companies may prefer to develop these technical capabilities post-hire through training and education rather than highlighting them in the job advertisement.

Competencies for coordinators: Working at the operational level, coordinators oversee inventory, transportation and compliance to ensure customer satisfaction. Effective communication is essential for liaising with internal and external stakeholders, while problem-solving, attention to detail and accuracy are critical for managing competing priorities. Therefore, the strong signal strength for competencies like *teamwork and collaboration, customer focus, computer literacy* and *data collection and analysis* is not surprising. A synthesis of the logistics specialists’ job advertisement in Poland and Germany,

involving roles comparable to LSC coordinators, Dobroszek *et al.* (2019), similarly highlights communication as a critical competency and one of the two most highly demanded skills for these positions. Interestingly, among the six high demanded competencies, only one (inventory management) is technical. Despite their operational responsibilities, employers appear to priorities personal, workplace, and cognitive skills when recruiting new talent, assuming technical capabilities can be developed through on-the-job training. Consequently, less emphasis is placed on technical competencies during recruitment.

Competencies for planner and analyst: Planner and analyst positions exhibit strong signal strength across a broad range of competencies from all four categories. These findings are consistent with Flöthmann *et al.* (2018), based on an experiment involving hiring managers across Austria, Denmark, Germany and Switzerland, which identified six key competency areas for planners and analysts: analytical and problem-solving ability, interpersonal skills, general management skills, computer/IT proficiency, supply chain management knowledge and industry experience. This finding highlights the technical and analytical nature of planner and analyst positions, which require handling large volumes of data on inventory, demand, lead times and supply chain operations. Beyond technical expertise, “planner and analyst” also require personal (e.g. *communication*), workplace (e.g. *teamwork and collaboration*), and academic and cognitive (e.g. *computer literacy, data collection and analysis*) skills to effectively communicate insights and recommendations to stakeholders. Consistent with prior research (Flöthmann *et al.*, 2018; Pejic-Bach *et al.*, 2020), our study reinforces that in Australian job market LSC-specific technical competencies – such as inventory management, logistics network design and S&OP – along with analytical and problem-solving ability, remain top priorities for these positions.

5.1.2 Discussion on insights into trends of soft and hard competencies for LSC positions. This study develops a competency-based framework for LSC positions, encompassing both hard and soft competencies. Grounded in competency-based theory, such frameworks are generally considered more effective than task-based approaches for capturing the full range of knowledge, skills, and abilities required in professional roles (Hayton and Kelley, 2006). The findings reveal that all LSC professionals need a balanced mix of hard and soft competencies; however, the emphasis varies by position. Soft competencies are particularly critical for managerial positions, whereas both hard and soft competencies are essential for coordinator positions, and hard competencies dominate in “planner and analyst” positions. These patterns suggest that as professionals advance into higher-level positions, greater emphasis should be placed on developing soft competencies that underpin leadership and managerial effectiveness. Some academic literature and industry reports support the view that LSC managers need more soft skills than technical skills (Bak *et al.*, 2019; CIPS/Hays, 2019; Midgley and Bak, 2021).

However, findings using alternative approaches, such as surveys and interviews with LSC professionals, indicate that several hard skills, such as sustainability competencies, are in high demand for current and future LSC managers across various contexts, including Australia (Bals *et al.*, 2019; Prajogo and Sohal, 2013). Our findings indicate that these skills are not yet clearly signalled in job advertisements. This highlights a tension between the importance LSC professionals attribute on hard skills and the extent to which these competencies are communicated in job postings. These discrepancies also suggest that not all competencies considered essential by practitioners are included in job advertisements.

Many hard competencies, for example, *inventory management, data collection and analysis, problem-solving and decision-making, ERP systems, and computer literacy*, are considered important future skills (Pejic-Bach *et al.*, 2020) and are likely to distinguish LSC professionals in the evolving job market. When combined with soft skills, these competencies enable LSC professionals to excel in their roles, effectively managing people, products, information, finances, and technology to coordinate, collaborate, and facilitate supply chain

processes (Derwik and Hellström, 2017). Moreover, soft competencies can play an important role in unlocking the full value of hard competencies (Gratton, 2021).

A well-rounded competency set that integrates both hard and soft skills is therefore essential to meet the evolving challenges of the modern LSC industry (Derwik and Hellström, 2017; Shou and Wang, 2017). While hard competencies provide the technical foundation for managing complex operations, soft competencies enhance their value by supporting collaboration, decision-making, and adaptability in dynamic supply chain environments. Industry reports also reinforce this perspective: automation and artificial intelligence are expected to replace many roles that rely primarily on hard competencies, while occupations requiring strong soft competencies will expand significantly by 2030 (Bughin *et al.*, 2018; MHI and Deloitte, 2019).

5.1.3 Demand for technology-specific competency. We identified market demands for technology-specific competencies and found that the manager positions generally require fewer technology-specific skills compared to positions such as coordinator, planner and analyst. These findings suggest that the planner and analyst positions require the highest level of digital and technology-specific competencies due to their reliance on data-driven and technology-enabled aspects of modern LSC management (Flöthmann *et al.*, 2018; Sixdegrees, 2025). These professionals work with large datasets, digital platforms and advanced analytical tools to optimise supply chain performance. Hence, proficiency in data analytics, ERP systems and advanced planning software, alongside familiarity with emerging technologies such as AI and machine learning, is essential for improving decision-making and operational efficiency. Competence in digital tools for data collection, analysis and visualisation supports key functions like demand forecasting, inventory management and supply chain optimisation. Furthermore, given the real-time nature of modern supply chains decisions, planner and analyst must leverage technology for demand sensing and real-time tracking.

In contrast to our expectations, the results show that the demand for advanced technology-specific competencies, such as Industry 4.0, cybersecurity, cloud computing, blockchain and predictive analytics, remains limited across all LSC positions. One plausible explanation is that many Australian supply chains continue to rely on legacy systems and traditional processes that limit full technological integration. Surveys of Australia's business culture show that firms adopt advanced technologies and AI cautiously and at a slower pace (AIG, 2024; Karanasios, 2025). The slow adoption of advanced technologies, driven by factors such as investment costs, infrastructure limitations, workforce capability and training needs (AIG, 2024), has reduced the demand for these advanced skills. Consequently, organisations continue to prioritise traditional competencies, including operations and enterprise economics and basic inventory management, over high-end technological expertise.

Another potential explanation for this finding is that recruiters in Australia have not clearly signalled the requirements of advanced technology-specific competencies in their job advertisements, even though they recognise the value of these forward-looking skills. Evidence from a survey of professionals in the Singaporean maritime logistics sector shows that Industry 4.0 technologies and access to advanced computational resources have created opportunities for predictive supply chains, blockchain integration and cloud-enabled decision-making (Li *et al.*, 2021). This indicates the value that LSC professionals place on technology-specific skills in other countries and suggests the potential for similar developments in Australia. Since this study relies solely on job advertisements as the source of signals (Connelly *et al.*, 2011), such critical competencies may not be captured in our analysis. However, with ongoing digital transformation (MHI and Deloitte, 2024), the demand for these competencies is expected to grow substantially (Bals *et al.*, 2019; Dobroszek, 2020; Li *et al.*, 2021). As such, the underrepresentation of such technology-focused competencies in the job advertisement may be because firms prefer to build these skills through upskilling or on-the-job development rather than requiring them as a precondition for applicants.

5.1.4 Market demand for critical competency clusters. The investigation of the co-clustering of competencies across various positions shows that the industry demands a diverse,

interconnected range of competencies, often required simultaneously. For instance, *leadership* frequently co-occurs with *teamwork*, *communication* and *safety management*, while *teamwork* often co-demands *operations and enterprise economics*, *leadership* and *communication*. These co-demand clusters combine soft and hard competencies across academic and cognitive, workplace, personal and technical dimensions, reflecting the complex nature of managerial roles. Consistent with Bak *et al.* (2019), our findings emphasise developing behavioural and personal competencies alongside technical skills.

Previous research that investigated the co-cluster analysis of competencies for various LSC positions has also supported our findings. Few studies have examined competency co-demand. For example, Shou and Wang (2017) identified clusters of market demand for competencies in different sectors, and Tatham *et al.* (2017) highlighted problem-solving, forecasting and customer/supplier relationship management as key components for supply chain managers.

LSC professionals often collaborate with finance, marketing and sales, requiring both technical expertise and strong soft skills. Co-demand clusters typically integrate soft and hard skills, personal and technical competencies, or digital literacy and human skills. For example, “planner and analyst” need *ERP* proficiency, *computer literacy* and *data analysis* alongside *communication* and *interpersonal skills*. These patterns suggest that employers increasingly seek well-rounded professionals capable of integrating multiple competencies to navigate the multifaceted challenges of modern supply chains, highlighting the growing complexity of LSC positions and the need for varied competency sets across positions.

5.2 Study implications

5.2.1 Theoretical implications. This study makes several contributions to the literature and theory. First, this research contributes to the competency-based theory by offering a comprehensive competency framework (Figure 1). This framework integrates competency categories (academic and cognitive, workplace, personal and technical) with skill types, including hard and soft skills, for LSC positions. According to Hayton and Kelley (2006), a competency-based framework is superior to traditional job-based analysis in assessing organisational human capital needs as it can result in a better person-organisation fit. Moreover, LSC positions are highly interdependent and rapidly changing with the change of both local and global supply chain scenarios. In such a situation, a competency-based framework is most effective for both job design and selection to ensure that the individual is capable of developing the skills needed by the organisation (Lawler, 1994).

Second, empirically grounded in labour market signals, the framework offers a new perspective on the LSC–human resource literature by providing a structured understanding of the competencies currently in demand by employers for various LSC positions, such as manager, coordinator and “planner and analyst”. We highlight how organisations signal their LSC competency requirements to potential employees through job advertisements. While analysing the signals for competencies, we draw on the theoretical distinction of “signal strength” and “signal visibility”, as proposed by Ramaswami *et al.* (2010) in applying signalling theory. We analyse “signal strength” by examining the demand frequency of all competencies and classifying them in high, medium and least categories for each position, informing the receiver (such as job seekers or educational institutions) about the relative importance of various competencies for the signaller (employers) (Connelly *et al.*, 2011). Our findings clarify “signal visibility” of competencies by analysing their presence across job postings and identifying how they cluster with other competencies, making it easier for users to recognise the key competencies for LSC positions (Ramaswami *et al.*, 2010). Such a theoretically grounded analysis of job advertisements for creating a competency-based framework is a novel contribution of this study. The findings highlights how organisations use job advertisements to signal market demand for competencies directly to (potential) employees, reducing information asymmetry between employers and job seekers

(Spence, 2002), and aligning expectations in the job market (Pernkopf *et al.*, 2020). These signals establish the true and practical nature of LSC competencies for managing supply chains.

Third, this study distinguishes itself by covering multiple LSC positions, while prior research often focused on a specific position, such as supply chain managers (Ellinger and Ellinger, 2014; Gammelgaard and Larson, 2001; Murphy and Poist, 2007; Sangka *et al.*, 2019; Shou and Wang, 2017) or supply chain planners and analysts (Flöthmann *et al.*, 2018), or controller (Dobroszek, 2020; Dobroszek *et al.*, 2019). By focusing on multiple LSC positions, this study provides a comparative analysis of job competencies across roles. Such a comprehensive analysis of LSC positions is lacking in the current LSC–human resources literature. For example, to our knowledge, no studies have been conducted on LSC coordinator competencies for comparison. However, some studies used the coordinator role as a sample for case studies (Derwik *et al.*, 2016; Gammelgaard and Larson, 2001; Heaslip *et al.*, 2019) or surveys (Myers *et al.*, 2004).

Fourth, this study offers timely and unique insights compared to previous Australian survey-based competency studies (Prajogo and Sohal, 2013; Sohal, 2013). While these studies uncovered managers' perceptions of the importance of competencies, our study takes this one step further by exploring how such perceptions are reflected in job advertisements. The inconsistencies revealed in this study, such as the limited emphasis on technology-related competencies and forward-looking hard skills including sustainability and resilience in job advertisements, persist despite these competencies being widely recognised as important in empirical research. The findings highlight a notable gap between managerial perception and labour market signalling.

From a signalling theory perspective, this study contributes by demonstrating that job advertisements do not always fully reflect competencies that are strategically important for future LSC capabilities. Although competencies related to sustainability, accountability, risk management and disruptive technologies are widely recognised in the literature as critical for future competitiveness, they generate comparatively weak market signals in Australian job postings. This suggests a disconnect between the strategic workforce discourse on future capability requirements and the competencies explicitly signalled by employers. This relatively weak signalling of these competencies may be explained by employers' continued emphasis on traditional operational experience, the slower adoption of advanced technologies within Australian industries, assumptions that certain competencies can be developed after recruitment, and the inherent limitations of job advertisements as a signalling mechanism for communicating complex and evolving skill requirements. The study therefore extends signalling theory by showing that organisational recruitment signals are selective, context-dependent and may not fully represent the full spectrum of strategically important competencies emphasised in academic discourse.

Moreover, prior studies, especially studies in the Asia–Pacific region (Li *et al.*, 2021; Sangka *et al.*, 2019), have been limited in scope, often focusing on specific roles such as 3PL managers or maritime executives and identifying or ranking only the most important competencies. Thus, they offered limited guidance on developing a comprehensive competency framework across multiple key LSC roles and paid little attention to capturing market signals or the co-demand of different competency types for these positions. In contrast, this study addresses these gaps by examining competencies across three critical LSC roles and identifying their interrelated demands. Although grounded in the Australian context, the findings have broader applicability, enabling cross-regional comparisons of LSC competency requirements and recruitment patterns. Researchers and practitioners in other regions can replicate the methodology and competency framework to compare results, benchmark global competency trends and inform workforce planning beyond Australia.

Finally, this study is one of the first few that provides specific attention to the demand for fast-growing technology-specific competencies for LSC positions. It also examines competency co-demand patterns. The findings show that critical competencies are not

isolated but form co-demanded clusters. To our knowledge, our study is one of the few studies that have identified the co-demand relationships among competencies in LSC positions (Shou and Wang, 2017; Tatham *et al.*, 2017).

5.2.2 Practical implications. This study provides market-based insights into the competency requirements for LSC positions, such as managers, coordinators and “planner and analyst”, with implications for employers, jobseekers and educational institutions.

For employers and recruitment agencies, the findings can guide the design of job advertisements, candidate selection, career progression planning and training programs. By highlighting competencies, their priorities and co-demand patterns, the study helps set clearer expectations for staff across different LSC roles. Drawing on the Australian job market, where skills shortages exist (ISA, 2025), the results can inform talent management strategies, including targeted training programs that address overlapping and role-specific competencies. Moreover, the identified co-demand competency clusters offer actionable managerial insight into the bundles of competencies most frequently required together. This enables organisations to prioritise training and workforce development initiatives around interconnected skill sets rather than isolated competencies. For example, recognising that the combined demand for leadership, teamwork and communication competencies can help organisations design integrated development programs that reflect the multi-skilled nature of LSC position roles. In addition, these co-demand patterns imply that recruiting organisations should develop recruitment and assessment processes capable of evaluating complementary and interrelated competencies. Although advanced digital technologies are increasingly important for LSC roles, the findings indicate relatively weak signal for advance technology-related competencies in job advertisements. This suggests that organisations should adopt more strategic and future-focused recruitment policies to better align workforce capability development with ongoing digital transformation in supply chains.

For jobseekers and LSC professionals, the findings provide a framework for self-assessment and targeted skill development. Understanding which competencies are prioritised and strongly signalled in the market, as well as how they are co-demanded with other competencies, enables individuals to undertake relevant training and develop the skills needed to perform effectively. For example, coordinators, typically entry-level, require both hard and soft skills; university students aiming for this role should combine academic learning with initiatives to develop interpersonal and workplace skills. Moreover, the study findings can assist current professionals in engaging in self-development to maintain market relevance and career growth.

For educational and training institutions, the findings can guide curriculum design and updates to align with industry needs. The variation in the competency signal strength across managerial, coordinator and “planner and analyst” positions implies that educational and training institutions should design more role-specific curricula rather than a one-size-fits-all approach. For example, for entry-level “planner and analyst” positions, educational programmes should emphasise a balanced mix of hard and soft competencies while integrating modern digital tools and emerging technologies into curricula. Furthermore, the co-demand of various soft and hard competencies for these positions also highlights the value of authentic, collaborative projects that develop communication, interpersonal, analytical and technical skills, including computer literacy, demand planning, forecasting and ERP systems proficiency. In contrast, training programmes for senior supply chain professionals should place greater emphasis on personal and workplace competencies such as leadership, communication and teamwork.

Moreover, our findings reveal weak signalling of advanced technology-specific competencies in job advertisements, highlighting a disconnection between organisational recruitment signals and broader industry discourse regarding the growing importance of advanced technologies in LSC positions. This underscores the need for proactively developing curricula that build emerging digital and technological competencies among LSC graduates, despite their limited representation in current job advertisements. Incorporating these competencies into curricula will ensure that graduates are not only immediately employable but also prepared for ongoing technological transformation in their workplace. As organisations recruit

graduates with stronger digital capabilities, they may become better positioned to transition away from legacy systems and accelerate digital transformation initiatives. This also creates opportunities for stronger university-industry collaboration while addressing broader societal challenges related to workforce adaptability and the development of future-ready skills. In this context, educational and training institutions should adopt a future-oriented approach rather than relying solely on current labour market signals reflected in job advertisements.

6. Conclusion

This study provides a comprehensive overview of the market demand signals for critical competencies in LSC positions, including managers, coordinators and “planner and analyst” addressing RQ1. Grounded in academic and professional literature, a competency-based framework is developed to analyse job advertisements. The framework identifies 34 hard and soft competencies across academic, workplace, personal and technical categories, providing a structured lens for examining labour market signalling of demand. Addressing RQ2, the findings show that both hard and soft competencies are essential across all LSC positions; however, their relative emphasis differs by role. Managerial positions place stronger emphasis on soft competencies, coordinators require a balanced combination of hard and soft competencies, while planners and analysts are more strongly oriented towards hard skills. This highlights the position-specific nature of competency demand. This highlights the position-specific nature of competency signalling within the LSC labour market. In relation to RQ3, technology-related competencies are unevenly signalled across LSC positions, being more evident in planner and analyst positions, moderately present in managerial positions and more varied in coordinator positions. Notably, competencies linked to disruptive technologies (e.g. AI, automation, blockchain, cloud computing, 3D printing) are rarely mentioned, indicating weak labour market signalling for Industry 4.0 capabilities. Addressing RQ4, the results reveal strong co-demand patterns of various competencies, showing that LSC positions require interconnected bundles of competencies rather than isolated skills, reflecting the integrated and multidimensional nature of supply chain work which require constant collaboration across departments, suppliers and executive teams.

Overall, the study contributes to the LSC–human resource and signalling literature by systematically mapping competency demand across job positions, highlighting position-specific differences and demonstrating uneven signalling of future-oriented digital competencies. Theoretically, it shows that labour market signals embedded in job advertisements represent selective and position-contingent signals of organisational capability rather than a complete reflection of strategically important competencies identified in academic discourse. Practically, the findings offer actionable insights for employers, educators and job seekers in aligning competency development with evolving but unevenly signalled labour market expectations.

Future studies could examine why organisations have not yet signalled strong demand for sustainability and technology-specific competencies in job advertisements for LSC positions, despite their strategic importance and the ongoing digital transformation of supply chains. In this regard, it will be interesting to explore how the organisational legacy systems influence the signalling of advanced digital competencies. Further research could also explore how LSC competency requirements are likely to evolve in response to emerging trends such as AI, sustainability initiatives, and digital twin technologies.

While this study contributes to both theory and practice, it also has several limitations that future research could address. First, since the data is based on the Australian market, future studies should expand to other regions to capture potential differences in competency requirements for LSC positions. Second, the data collection period (2019–2021) may limit the findings’ currency, particularly considering the recent rapid digital transformation. Third, future research could explore supply-side perspectives, examining the alignment between the

competencies possessed by LSCM professionals and those demanded in the job market. Research is also needed to assess the gap between the competencies emphasised in tertiary education and professional development programs and those required by the job market. Fourth, the current study remains silent on how gender and diversity influence competency requirements in various LSC positions, which future studies could investigate. Fifth, as supply chains and business environments evolve, ongoing longitudinal research is necessary to track changes in competency demands over time and identify emerging high-demand competencies. Furthermore, job postings may reflect idealised skill wish-lists rather than actual operational requirements. This represents a potential boundary condition of signalling theory. While recognising this limitation, job advertisements remain a widely used method for identifying market signals in research.

Supplementary material

The supplementary material for this article can be found online.

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