Information Management and Business Review (ISSN 2220-3796)
Vol. 16, No. 2, pp. 36-43, SI(2) 2024

Measuring the Unmeasured: Exploring the Concept of "Supply Chain Quotient" [SCQ]

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Abstract: The concepts of intelligence quotient (IQ) and emotional quotient (EQ) have long been recognized as essential indicators of cognitive and emotional capabilities. However, the field of supply chain management lacks a standardized measure to assess the competencies required for successful supply chain operations. This article aims to fill this gap by introducing the concept of Supply Chain Quotient (SCQ) as a novel measure of supply chain competence. The SCQ framework expands beyond traditional intelligence and emotional factors, considering the unique skills and characteristics required in the complex world of supply chains. Drawing from existing literature on supply chain management, human resources, and cognitive psychology, this research explores the key dimensions and components that comprise the SCQ. The paper also examines potential methodologies and approaches for assessing and quantifying the SCQ, including self-assessment tools, case studies, and behavioral assessments. By introducing the SCQ, this research contributes to the understanding and evaluation of supply chain competence, providing organizations with a framework to identify, develop, and leverage talent in their supply chain functions. Additionally, it opens avenues for future research and practical applications to enhance supply chain performance and improve overall organizational outcomes.

Keywords: *Supply Chain Quotient (SCQ), Competence, Supply Chain Management, Assessment, Talent Development.*

1. Introduction

In the field of supply chain management, assessing the competence and capabilities of professionals has long been a topic of interest (Al Doghan & Sundram, 2023). While standardized measures such as intelligence quotient (IQ) and emotional quotient (EQ) have provided insights into cognitive and emotional abilities, the domain of supply chain management lacks a standardized measure to evaluate the unique competencies required for effective supply chain operations (Munir et al., 2018). This research paper aims to address this gap by introducing the concept of Supply Chain Quotient (SCQ) as a novel measure to assess supply chain competence and performance.

The SCQ framework expands beyond traditional intelligence and emotional factors, incorporating the specific skills and characteristics necessary in the complex world of supply chains. It seeks to provide organizations with a comprehensive measure to identify, develop, and leverage talent within their supply chain functions (Razak et al., 2015; Sivan et al., 2022). By exploring the dimensions and components of the SCQ, this research aims to provide insights into the assessment and quantification of supply chain competence, contributing to the overall understanding of the concept.

To begin exploring the concept of SCQ, it is important to review existing literature on supply chain management, human resources, and cognitive psychology. Understanding the foundational theories and research related to supply chain competence will help establish a solid basis for the development and validation of the SCQ framework. Additionally, examining assessment methodologies and approaches utilized in other fields can provide insights into potential strategies for measuring and quantifying the SCQ.

2. Literature Review

A. Underpinning Theories

The underpinning theory for the Supply Chain Quotient (SCQ) study draws upon several established theories and frameworks from various disciplines, including supply chain management, human resources, cognitive psychology, and leadership literature. Here's an outline of the key theoretical foundations:

Resource-Based View (RBV) of the Firm: The RBV posits that a firm's competitive advantage stems from its unique bundle of resources and capabilities (Barney, 1991). In the context of the SCQ study, this theory suggests that assessing and developing the competencies of individuals within the supply chain can contribute to the firm's overall competitive advantage. By identifying and leveraging the specific competencies required for effective supply chain management, organizations can enhance their ability to create value and achieve superior performance.

Dynamic Capability Theory: Dynamic capability theory (Teece et al., 1997) emphasizes an organization's capacity to adapt and innovate in response to changing market conditions. Within the SCQ framework, this theory underscores the importance of non-cognitive abilities such as adaptability and collaboration. Supply chain professionals with strong dynamic capabilities are better equipped to navigate uncertainties, respond to disruptions, and drive innovation within the supply chain ecosystem, thereby enhancing the organization's resilience and competitive advantage.

Social Cognitive Theory: Social cognitive theory (Bandura, 1986) emphasizes the interaction between individuals, their environment, and their behavior. In the context of the SCQ study, this theory underscores the role of observational learning and social modelling in shaping supply chain professionals' competencies. By providing opportunities for mentorship, peer learning, and cross-functional collaboration, organizations can facilitate the development of key competencies such as leadership, communication, and collaboration within the supply chain workforce.

Goal Setting Theory: Goal setting theory (Locke & Latham, 1990) suggests that setting specific and challenging goals can enhance individual motivation and performance. Within the SCQ framework, this theory highlights the importance of strategic thinking and goal orientation in supply chain management. Supply chain professionals who can set clear objectives, anticipate future trends, and formulate effective strategies are better positioned to drive organizational success and achieve supply chain excellence.

Complexity Theory: Complexity theory (Holland, 1995) posits that complex systems, such as supply chains, exhibit emergent properties that cannot be fully explained by analyzing individual components in isolation. In the SCQ study, complexity theory underscores the interconnectedness of various dimensions of supply chain competence and the need for a holistic approach to assessment and development. By considering the interactions between cognitive abilities, non-cognitive factors, and personal qualities, the SCQ framework provides a comprehensive understanding of supply chain professionals' capabilities and their impact on organizational performance.

By incorporating these specific theories into the SCQ study, researchers can provide a more nuanced understanding of the mechanisms underlying supply chain competence and performance, informing both theory development and practical applications within the field.

B. Past research studies

Assessing and measuring the competence and capabilities of professionals in the field of supply chain management has been a subject of interest for researchers and practitioners alike (Sundram, Rajagopal, Nur Atiqah, Atikah, Appasamy, & Zarina, 2018). While standardized measures such as intelligence quotient (IQ) and emotional quotient (EQ) have provided valuable insights into cognitive and emotional abilities, the domain of supply chain management lacks a standardized measure specifically tailored to evaluate the unique competencies required for effective supply chain operations (Sundram et al., 2017; Sundram et al., 2016).

To address this gap, this research aims to introduce the concept of Supply Chain Quotient (SCQ) as a novel

measure to assess supply chain competence and performance. To establish a foundation for the development and validation of the SCQ framework, it is essential to review existing literature on supply chain management, human resources, and cognitive psychology.

In the realm of supply chain management, Lambert and Cooper (2000) highlight the critical issues and challenges faced in managing supply chains effectively. Their work emphasizes the importance of competencies such as strategic planning, collaboration, and coordination across various stakeholders (Sundram, Rajagopal, Atikah & Subramaniam, 2018). Understanding these key dimensions of supply chain management competence is crucial in developing a comprehensive measure like the SCQ.

Within the broader context of human resources, Nembhard and Edmondson (2006) shed light on the significance of psychological safety and inclusive leadership in promoting improvement efforts in teams. Their findings suggest that fostering an inclusive and psychologically safe environment enables individuals to contribute their ideas and capabilities more freely. Incorporating such dimensions into the SCQ framework can help capture the interpersonal and leadership competencies required for effective supply chain management.

The field of positive psychology also offers insights relevant to measuring supply chain competence. Luthans, Avolio, Avey, and Norman (2007) introduce the concept of positive psychological capital (PsyCap), which encompasses individuals' positive psychological resources such as self-efficacy, hope, optimism, and resilience. Considering these positive psychological dimensions within the SCQ can provide a holistic view of supply chain professionals' capabilities and their potential to navigate complex and dynamic supply chain environments.

Examining successful supply chain practices can also inform the development of the SCQ framework (Muhammad, Naidu, Sundram, Hussain, Chew & Amirrudin (2023). Ferdows, Lewis, and Machuca (2004) discuss the concept of rapid-fire fulfillment, highlighting the importance of responsiveness, agility, and speed in supply chain operations. Integrating these operational dimensions into the SCQ can help assess professionals' abilities to effectively manage supply chain processes and drive customer satisfaction.

Furthermore, drawing insights from the leadership literature, Goleman (1998) identifies key leadership competencies, including emotional intelligence, visionary thinking, and relationship-building skills. Incorporating these dimensions into the SCQ framework can provide a comprehensive assessment of supply chain professionals' leadership capabilities and their potential to drive innovation and collaboration within the supply chain ecosystem (Muhammad, Naidu, Sundram, Hussain, Chew, Pillai & Ibrahim (2023).

In conclusion, the review of the literature highlights the need for a specialized measure to assess supply chain competence and performance. By synthesizing existing knowledge from supply chain management, human resources, cognitive psychology, and leadership literature, the development of the SCQ framework can capture the multidimensional nature of supply chain professionals' capabilities. The subsequent sections of this research paper will delve into the specific dimensions and components of the SCQ and propose methodologies for its assessment and quantification.

3. Methodology

As a conceptual paper, this research does not involve empirical data collection or analysis. Instead, the methodology focuses on the conceptual development and exploration of the Supply Chain Quotient (SCQ) framework. The following steps outline the methodology employed in this study:

Literature Review: A comprehensive review of existing literature on supply chain management, human resources, cognitive psychology, and related fields was conducted. This review aimed to identify key concepts, theories, and empirical studies relevant to supply chain competence assessment and performance measurement. The literature review formed the basis for the conceptual development of the SCQ framework.

Conceptual Framework Development: Building upon the insights gathered from the literature review, a conceptual framework for the SCQ was developed. This involved identifying and defining the key dimensions and components of the SCQ, which encompass the unique competencies and capabilities required for effective

supply chain management. The conceptual framework was designed to capture both cognitive and non-cognitive factors, incorporating elements such as strategic thinking, problem-solving abilities, leadership skills, adaptability, and collaboration.

Framework Refinement and Validation: The initial conceptual framework was refined through iterative discussions and feedback from experts in the field of supply chain management and related disciplines. This feedback helped ensure the conceptual soundness and applicability of the SCQ framework. While empirical validation is beyond the scope of this conceptual paper, future research should focus on validating the SCQ framework through empirical studies, such as surveys, interviews, or case studies.

Case Examples and Illustrations: To enhance the practical understanding and applicability of the SCQ framework, illustrative examples and case studies of supply chain professionals and organizations were examined. These examples were selected to demonstrate how the SCQ framework can be utilized to assess and enhance supply chain competence and performance. The case examples served to provide real-world context and showcase the potential benefits of adopting the SCQ framework in various supply chain settings.

Discussion and Implications: The methodology also involved a critical discussion of the implications of the SCQ framework for supply chain management practices and talent development strategies. By exploring the potential applications and benefits of the SCQ, this research aimed to stimulate further discussion and research in the field of supply chain competence assessment and performance measurement.

It is important to note that as a conceptual paper, the methodology focuses on the theoretical development and exploration of the SCQ framework. Empirical validation and testing of the SCQ framework should be pursued in future research to enhance its practical relevance and reliability.

4. Conceptual Framework

Conceptual Framework: Supply Chain Quotient (SCQ)

The conceptual framework for the SCQ aims to capture the unique competencies and capabilities required for effective supply chain management. It encompasses both cognitive and non-cognitive factors, incorporating elements such as strategic thinking, problem-solving abilities, leadership skills, adaptability, and collaboration. The framework consists of the following dimensions:

Cognitive Abilities:

- Strategic Thinking: The capacity to analyze complex supply chain dynamics, anticipate future trends, and formulate effective strategies to achieve organizational goals.
- Analytical Skills: The ability to gather, interpret, and analyze data to make informed decisions and optimize supply chain processes.
- Problem-solving: The aptitude to identify and address supply chain challenges and devise innovative solutions.

Non-Cognitive Abilities:

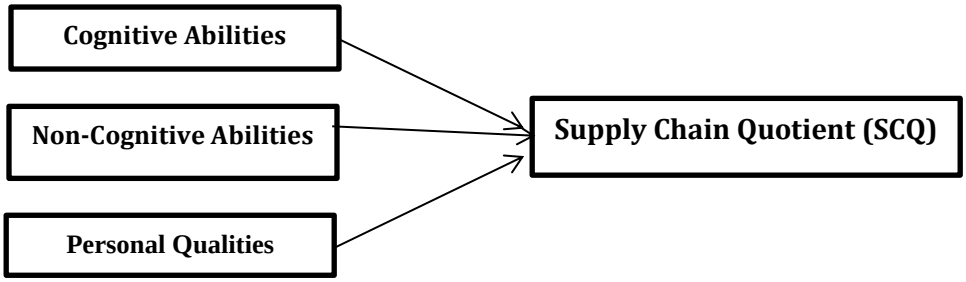
- Leadership: The capability to inspire and influence others, foster collaboration, and drive positive change within the supply chain ecosystem.
- Adaptability: The willingness and ability to respond to changing market conditions, technological advancements, and unforeseen disruptions.
- Communication: The proficiency to effectively convey information, ideas, and expectations across diverse stakeholders within the supply chain network.
- Collaboration: The capacity to work collaboratively with internal and external partners, leveraging collective strengths to achieve supply chain objectives.

Personal Qualities:

- Resilience: The capacity to bounce back from setbacks, navigate uncertainties, and maintain

composure in challenging supply chain environments.
- Ethical Conduct: The adherence to moral and ethical principles, fostering trust and integrity in supply chain relationships.
- Continuous Learning: The commitment to ongoing professional development, seeking new knowledge and skills to stay updated with industry trends and practices.

Figure 1: Conceptual Framework



The conceptual framework provides a holistic view of the dimensions and components that contribute to the SCQ. It emphasizes the importance of considering both cognitive and non-cognitive abilities, as well as personal qualities, in assessing and developing supply chain professionals' competence and performance. The SCQ framework can serve as a basis for evaluating individuals' supply chain capabilities, identifying skill gaps, and designing targeted training and development programs. It can also guide organizations in talent acquisition, performance evaluation, and succession planning within their supply chain functions.

5. Implications of the Study

A. Theoretical Implication

The introduction of the Supply Chain Quotient (SCQ) framework holds significant theoretical implications for the field of supply chain management. Firstly, it contributes to the advancement of competency assessment in supply chain management by addressing the lack of a standardized measure tailored specifically for this domain. By synthesizing concepts from supply chain management, human resources, cognitive psychology, and leadership literature, the SCQ framework offers a multidimensional approach to evaluating supply chain professionals' competence and performance. This integration of diverse theoretical perspectives enriches the understanding of the complex skills and characteristics required in supply chain operations. Secondly, the SCQ framework extends the traditional focus on cognitive abilities, such as IQ, by incorporating non-cognitive factors and personal qualities. This expansion acknowledges the importance of interpersonal skills, adaptability, ethical conduct, and continuous learning in supply chain management, aligning with contemporary theories emphasizing the holistic nature of competence. Theoretical models, such as positive psychological capital (PsyCap) and inclusive leadership, provide a theoretical basis for understanding the role of non-cognitive factors in fostering resilience, collaboration, and innovation within supply chains. Additionally, the SCQ framework highlights the interconnectedness of various dimensions of competence and their impact on supply chain performance. This systems-oriented perspective aligns with theoretical frameworks emphasizing the complex, dynamic nature of supply chains as interconnected networks of relationships and processes. By conceptualizing supply chain competence as a multifaceted construct, the SCQ framework contributes to theoretical discussions on talent management, organizational behavior, and performance improvement in supply chain contexts.

B. Managerial Implication

The introduction of the SCQ framework carries significant implications for supply chain management practices and talent development strategies within organizations. Firstly, the SCQ framework provides a structured approach for assessing and developing supply chain professionals' competence. Organizations can use the SCQ framework to identify talent gaps, evaluate individuals' strengths and weaknesses, and tailor training and development initiatives accordingly. By aligning individuals' competencies with specific supply chain roles and responsibilities, organizations can enhance workforce effectiveness and efficiency. Secondly, the SCQ

framework enables organizations to make more informed decisions in talent acquisition, performance evaluation, and succession planning. By incorporating cognitive abilities, non-cognitive factors, and personal qualities, the SCQ offers a comprehensive assessment of supply chain professionals' capabilities beyond technical expertise. This holistic approach to talent management can result in improved employee engagement, retention, and overall organizational performance. Additionally, the SCQ framework can guide organizations in creating a culture of continuous learning and development within their supply chain functions. By emphasizing the importance of adaptability, communication, and collaboration, organizations can foster an environment that encourages innovation, agility, and resilience. This proactive approach to talent development can position organizations to respond effectively to evolving market conditions, technological advancements, and supply chain disruptions.

C. Policy Implication

The introduction of the SCQ framework has implications for policy development in the areas of education, workforce development, and industry standards. Firstly, policymakers can use the SCQ framework to inform curriculum design and competency standards in supply chain management education and training programs. By integrating the dimensions and components of the SCQ into educational curricula, policymakers can ensure that supply chain professionals are equipped with the skills and qualities needed to succeed in the field. Secondly, policymakers can incentivize organizations to adopt the SCQ framework as part of their talent management practices. This may involve offering tax incentives, grants, or other forms of support to organizations that demonstrate a commitment to assessing and developing supply chain competence using the SCQ framework. By promoting the adoption of best practices in talent management, policymakers can enhance the overall competitiveness and resilience of supply chains within their jurisdictions. Additionally, policymakers can facilitate collaboration between industry stakeholders, academic institutions, and professional associations to promote the adoption and refinement of the SCQ framework. This collaborative approach can help ensure that the SCQ remains relevant and responsive to evolving industry needs and challenges. By fostering a supportive ecosystem for talent development and competency assessment, policymakers can contribute to the long-term success and sustainability of supply chains in their regions.

Discussion: The development and exploration of the Supply Chain Quotient (SCQ) framework provide valuable insights into the competencies and capabilities required for effective supply chain management. The conceptual framework incorporates both cognitive and non-cognitive dimensions, along with personal qualities, to comprehensively assess supply chain professionals' competence and performance. This discussion focuses on the implications and potential applications of the SCQ framework in the field of supply chain management.

Firstly, the SCQ framework recognizes the importance of cognitive abilities in supply chain management. Strategic thinking, analytical skills, and problem-solving capabilities are essential for effectively managing complex supply chain dynamics. Higher levels of cognitive abilities are expected to positively influence supply chain performance, as individuals with strong cognitive skills can analyze data, identify patterns, and make informed decisions. By acknowledging the significance of cognitive abilities, organizations can prioritize the development and enhancement of these skills through targeted training programs and recruitment strategies. Secondly, non-cognitive abilities play a crucial role in supply chain performance. Leadership, adaptability, communication, and collaboration are vital competencies for building and maintaining effective supply chain relationships. Leaders who possess these non-cognitive abilities can inspire teams, foster collaboration among stakeholders, and navigate uncertainties in the supply chain landscape. Organizations that emphasize the cultivation of non-cognitive abilities can create a culture of collaboration, innovation, and agility, resulting in improved supply chain outcomes.

Furthermore, the SCQ framework acknowledges the importance of personal qualities in supply chain competence. Resilience, ethical conduct, and continuous learning are personal qualities that contribute to supply chain professionals' effectiveness. Resilience enables individuals to bounce back from setbacks, adapt to changing circumstances, and maintain performance in challenging environments. Ethical conduct fosters trust and integrity within supply chain relationships, leading to enhanced collaboration and long-term sustainability. Continuous learning ensures that supply chain professionals stay updated with industry trends, best practices, and emerging technologies.

The hypothesized relationships within the SCQ framework provide a basis for further empirical research and testing. Validating these relationships can contribute to the refinement and practical applicability of the SCQ framework. Through empirical studies, researchers can investigate the associations between the dimensions of the SCQ and objective measures of supply chain performance. Additionally, gathering feedback from supply chain professionals and organizations can help refine the SCQ framework and ensure its relevance and usability in practice.

Implementing the SCQ framework in organizations has several potential benefits. By assessing and quantifying supply chain competence, organizations can make more informed decisions in talent acquisition, performance evaluation, and succession planning. The SCQ can assist in identifying skill gaps, designing targeted training programs, and aligning individuals' competencies with specific supply chain roles and responsibilities. Furthermore, the SCQ framework can guide organizations in creating a talent development strategy that cultivates a comprehensive set of skills and qualities required for effective supply chain management.

In conclusion, the Supply Chain Quotient (SCQ) framework offers a comprehensive approach to assess and enhance supply chain competence and performance. The incorporation of cognitive abilities, non-cognitive abilities, and personal qualities within the SCQ framework provides a holistic view of supply chain professionals' capabilities. By understanding and leveraging these dimensions, organizations can improve their supply chain effectiveness, efficiency, and overall competitiveness. Future research and empirical studies should focus on validating and refining the SCQ framework, thereby contributing to the advancement of supply chain management practices.

Acknowledgment: We extend our heartfelt gratitude to the Malaysian Ministry of Education and the Institute of Research Management & Innovation (IRMI), UiTM Shah Alam for their invaluable support in making this study possible. This research project was made possible through the Strategic Research Partnership Grant (SRP) awarded by the UiTM Selangor [Project code: 600-RMC 5/3/SRP (059/2022)].

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