Article

The Capacity Conundrum and Its Strategic Insights

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A. Maragathamuthu[1] and P. Thillai Rajan[2]

Abstract

This article offers a thorough review of the literature on product- and service-based supply chain (SC)-based capacity management (CM) solutions for the services industry. The primary objective is to address the research deficit concerning CM within SC operations, particularly given the escalating trend of SCs integrating service provision. The study aims to delineate the foundational principles and methodical approaches required for efficient capacity increase by synthesising knowledge across the disciplines of operations management, manufacturing SCs, services marketing and industrial engineering. The analysis indicates that CM is frequently underrepresented in SC literature, particularly as it relates to the burgeoning service economy. Crucially, research gaps exist concerning the evolving network-based SC systems prevalent in underdeveloped economies. The study affirms that building capacity, defined as enhancing the knowledge, skills and expertise of individuals and organisations, is critical for modern SC management (SCM). Effective capacity expansion is essential for improving operational efficiency, reducing costs, and providing customer value amidst intensified globalisation and technological change. This research proposes a value delivery technique utilising capacity management systems (CMSs) to effectively mitigate SC risks (SCRs) and enhance overall business performance.

Keywords

Supply chain, capacity management strategies, supply chain risk management (SCRM), services supply chains (SSC), capacity augmentation, value delivery framework

[1]Department of Management Studies, Madurai Kamaraj University, Madurai, Tamil Nadu, India
[2]Department of Business Administration, Thiagarajar College, Madurai, Tamil Nadu, India

Corresponding author:
A. Maragathamuthu, Department of Management Studies, Madurai Kamaraj University, Madurai, Tamil Nadu 625021, India.
E-mail: arunagirimaragathamuthu@gmail.com

The increasing proportion of consumer spending allocated to services has underscored their growing significance, leading to the assertion that services are relevant across all business sectors.

Introduction

Enhanced supply chain (SC) performance is positively correlated with greater resilience to risk, and the mitigation of process and demand risk directly impacts SC performance. The SC literature frequently categorises its focus into three main areas: managing 'capacity', managing 'demand' and SC collaboration.

Specifically, the relationship between SC risks (SCRs) and organisational agility is mediated by the reconfiguration of resource capacity (Ambulkar et al., 2015). A deficit in SC capacity impedes service provision, and end-user flexibility is consequently influenced by sourcing flexibility and flexible capacity. Moreover, organisational flexibility demonstrates a positive association with just-in-time (JIT) procedures (Youssef et al., 2015). Effective management of SC flexibility can ultimately enhance overall organisational performance.

Capacity Investment and Capacity Management Systems (CMSs)

Although it may appear counterintuitive, competing service providers may strategically advantage by investing in service capacity ahead of projected demand. They are highly motivated if these capacity investments lead to increased demand and the preservation of market share. Managing demand variation requires the application of CM strategies. An evaluation of the structural features and language employed in earlier studies indicates that CM alternatives, rather than CMSs, dominate the topic.

Study Objectives and Contribution

This work aims to give a comprehensive overview of evolving strategies in capacity planning and the application of CMSs. This is achieved through the following specific objectives:

1. Analyse the current state and progression of CMS research across various study themes and the application of CMSs in product-based and service-based SCs, particularly material relevant to SC systems.
2. Examine the scholarly interest in CM research across diverse geographical regions and the research methodologies that are employed.
3. Delineate the value proposition that the CMS delivers to the end-user and the research contribution provided by this system.

As a foundational study, this research offers a solid basis for subsequent empirical investigations and the assessment of the impact of CMS on business performance. This review is highly relevant for both academic researchers and SC management

(SCM) professionals across the manufacturing and service sectors, and effectively bridges the divide between theoretical research and contemporary operational practice.

Review Methodology

Research Questions (RQs) and Methodology

1. RQs

This study was designed to address the following five primary RQs concerning the application of CM within SC operations:

a. *RQ1*: What is the current status of research regarding the function of CMSs in SC operations across the identified thematic areas?
b. *RQ2*: How has the development of the CM application evolved across the entire SC structure?
c. *RQ3*: What is the structure of CM research aimed at capacity regulation within global SCs?
d. *RQ4*: What are the dominant research methodologies employed for CM in SC operations?
e. *RQ5*: What is the current research's contribution toward demonstrating the benefits of utilising CM strategies?

Review Methodology

To provide clarity regarding the search and evaluation procedures specific to this field, a literature review methodology was employed. This approach is grounded in the foundational review frameworks established for analysing CM research.

The overall review process comprised two main phases:

1. *Methodological identification and literature mapping*: This involved locating, examining and evaluating the validity and applicability of research related to the study.
2. *Gap analysis and future directions*: This focused on identifying critical research gaps and proposing recommendations for future studies based on the review findings.

Stage 1 of the procedure is detailed in Review Methodology, which covers the data extraction process, the analysis framework utilised, and the established search criteria and selection procedure.

Manuscript Search and Selection Methodology

The search and selection procedure were conducted in four sequential steps.

1. Search and screening process

In Stage 1, a total of 6,328 items published between 1980 and 2025 were identified. This initial identification was performed using keyword searches in selected online catalogues, which were chosen based on their repository relevance and depth.

Subsequently, in Stage 2, the co-authors screened and reviewed 664 manuscripts based on an analysis of their abstracts and article contents. Stage 3 involved a further refinement, where 565 articles remained after the elimination of those that exclusively addressed service quality within a business-to-consumer (B2C) context.

The final selection, Stage 4, yielded 133 publications from peer-reviewed journals. This selection was based on the articles' research contributions to the study's theme, focusing on: the applicability of product-related research findings to the realms of services, post-sale support and general service scholarship. A key observation was that the majority of these publications originated from the fields of production, operations, logistics and transportation management within the broader SC discipline, rather than specifically from SC systems literature.

Role and Benefits of CM in SCs

The implementation of CM within SCs is intrinsically linked to two primary areas:

1. *Risk mitigation*: Addressing risks associated with unexpected delivery quality, inadequate service capacity, and demand variability and unpredictability.
2. *Resource optimisation*: Utilising CM strategies to modulate capacity effectively during both lean and peak demand periods.

Three distinct advantages are derived from the application of CM.

Core Advantages of CM

CM, especially within SCs, provides the following key benefits:

1. Cost optimisation and increased profitability

Effective capacity planning ensures an optimal balance between resource utilisation and demand. This leads to:

   a. *Avoiding underutilisation (overcapacity)*: Minimising the costs associated with idle resources, equipment and personnel, reducing unnecessary capital expenditure.
   b. *Avoiding overutilisation (undercapacity)*: Preventing costly issues like excessive overtime, expedited shipping fees (rush orders) and the financial losses resulting from missed sales opportunities (stockouts).

c. *Efficient resource allocation*: Making data-informed decisions about when and how to invest in scaling up or scaling down resources, which directly supports higher profit margins.

2. Enhanced operational efficiency and resource utilisation

By aligning current resources with forecasted demand, CM streamlines operations:

a. *Bottleneck reduction*: Proactively identifying and eliminating constraints (bottlenecks) in production or service delivery processes that hinder workflow.
b. *Improved throughput*: Maximising the output from existing assets, including machinery, infrastructure and human capital, ensuring that resources are used to their fullest potential.
c. *Data-driven decision-making*: Providing clear visibility into resource availability and workloads, enabling managers to schedule production, allocate staff and sequence projects more effectively.

3. Improved customer satisfaction and service reliability

A well-managed capacity allows a business to consistently meet customer expectations:

a. *Consistent delivery*: Ensuring that products and services are delivered on time and at the agreed-upon quality, which prevents customer frustration and builds trust.
b. *Meeting demand fluctuations*: The ability to quickly adapt capacity to changes in market demand (such as seasonal peaks) means fewer stockouts and reduced wait times, leading to a better overall customer experience.
c. *Increased agility and responsiveness*: Capacity planning strategies (like the lead, lag or match strategies) give the organisation the flexibility to respond to unforeseen events or shifts in the market more swiftly than competitors.

Analysis Framework

This section describes the structured analytical framework developed for the systematic review of the literature, employed to address the study's RQs (*RQ1–RQ5*).

Analytical Framework Design

To systematically assess the literature and answer the exploration questions, a detailed analytical framework was constructed. The review proceeded by chronologically recapitulating the research progression within the literature and conducting cross-categorical analyses.

The Framework Utilised Several Distinct Ordering Criteria for Analysis

1. Thematic and terminological orders: Analysis is focused on major motifs, languages and core terminology used in the CM literature.
2. *SC focus (P-S-G)*: Studies were categorised based on their primary domain:

    a. (P)roduct-based: Manufacturing SCs.
    b. (S)ervice-based: Service SCs.
    c. (G)eneric: Integrated or generalised SC concepts.

3. *Structural dimensions (scope of analysis)*: Research was classified by the organisational boundary of the SC studied:

    a. Whole network (WNW): The entire end-to-end network.
    b. Upstream network (UNW): Flow from supplier to manufacturer/service provider.
    c. Downstream network (DNW): Flow from manufacturer/service provider to the end consumer.
    d. Duo: A two-party relationship (dyadic exchange).
    e. Chain: A linear sequence or set of dyadic relationships.

4. *Element of exchanges (EOEs)*: The nature of the resources exchanged was analysed, encompassing means (financial/physical resources), information, expertise/knowledge and relationships.

Positional and Categorical Coding

1. *Classification matrix*: The methodology applied the structural analysis approach recommended by Croom et al. (2000), classifying research within a two-dimensional matrix defined by the SC Structural Dimension (Line of Analysis) and the EOEs. The reviewed studies were examined for the explicit or implicit inclusion of these dimensions.
2. *Temporal and environmental coding*: Studies were encoded and distributed into three chronological terms to track evolution. They were further categorised by their environmental focus: (P)roduct, (S)ervice and (G)eneric.

Research Methodology (RM)

To understand the evolution of research approaches, studies were coded according to their primary RM.

Furthermore, geographic region codes were applied, or author location codes for region-independent studies. The designation Americas encompassed the North, South and Central USA. The code transcontinental (Tc) was assigned to studies that spanned multiple distinct geographic divisions, allowing for an examination of the compiled study's geographic region and its dominant methodological approaches.

Data Extraction

Data Extraction and Coding

To establish a comprehensive record of the decision-making process and create a data repository, established data extraction forms recommended by Tranfield et al. (2003) for systematic literature analysis were employed. The primary fields coded during the extraction process included the major subject, sub-themes, critical issues, key terminology, level of analysis (LOA), EOEs, RM and geographical region.

Scope and Thematic Focus

This literature overview concentrates on two overarching themes:

1. SC research.
2. Diverse CMS alternatives have been examined within the literature.

The CMSs value delivery methodology considers three distinct relationships between CMS implementation and overall business performance.

Classification and Reliability Measures

Thematic Categorisation and Consensus

The collected research was categorised and classified independently by each co-author. Any resulting disagreements were resolved through an iterative process that involved discussions, the potential addition of new themes or issues, and/or subsequent reclassification. Different themes, along with their associated sub-themes and specific issues, are detailed in Strategies for CM.

Each article was coded using binary indicators ('Y', 'N' or 'covered'/'not covered') to denote the presence of the theme or sub-theme. The complete coding scheme for the identified themes and sub-themes across the selected studies is presented in the Annexure.

Inter-author Reliability and Validity

A three-decade span of literature was examined to ensure the dependability of the review. To mitigate bias of the author, peer review among the authors was conducted at every critical stage, including the search and selection, framework development and data extraction processes. The use of an iterative content analysis procedure combined with disagreement resolution through peer review and discussion ensured inter-author trustworthiness.

Outline of the Remaining Sections

This framework was used for the RQs in the following phase of the literature review.

1. Strategies for CM discusses the themes and terms employed in the literature study.
2. Results of CMS Implementation presents the study of these categories as content matrices, which include a discussion of RQs *RQ1* through *RQ5*, as well as analysis across geographies and research methodologies and topics.
3. Conclusions presents a CMS value delivery methodology for using a CMS to reduce SCRs and accomplish performance goals.
4. Declaration of Conflicting interests presents the findings of the literature analysis, which include the article's distinctive contribution, theoretical and managerial implications, gaps identified and opportunities for further study.

Background Research and Theory Development

The terminology utilised, as well as the main themes, business procedures and important issues examined in the application of CMSs, are analysed in this section. This analysis focuses on RQ1 (themes) and RQ2 (terminologies) in the subsections under "Strategies for CM."

Encompassing of Studies Under Various Terms and Conditions

Academic Classification of SC Capacity Research

This passage classifies the existing body of SC research into three categories based on their primary focus regarding capacity and service provision (Figure 1).

1. Product-based SCs (manufacturing focus)

This category focuses on conventional manufacturing SCs and the operational challenges inherent in producing tangible goods.

a *Core concepts*: Research centres on:

i. The bullwhip effect
ii. The persistent issues
iii. Customer quality

b. *Key strategies*: Within these SCs, strategies involve:

i. Sharing information concerning capacity and demand planning and scheduling.
ii. Utilising excess capacity during lean periods to buffer against peak demand.
iii. Deriving benefits from SC integration (SCI).

2. Services-based SCs (service operations focus)

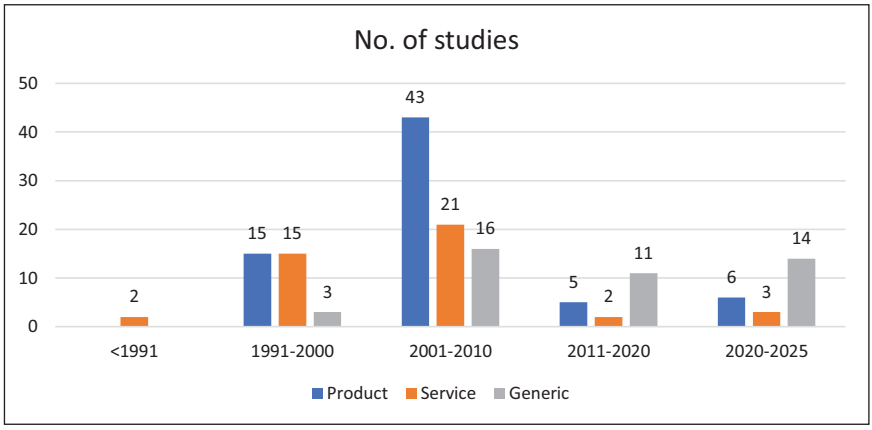

Figure 1. Terminologies Evolution on Capacity Management Strategies in Supply Chains.

This category addresses the unique dynamics and complexities of service delivery, where production and consumption are simultaneous.

a. *Scope*: The research covers integral functions such as design, marketing, management, innovation and service operations.
b. *Important topics*: Key operational foci include managing queues (lines), wait times, customer experience and service design.
c. *Unique characteristics (service variability)*: Services are fundamentally different from products due to higher inherent variability and less predictability than manufacturing processes (Hope & Mühlemann, 1997; Lovelock, 1983).
d. *Simultaneity and non-inventory*: Critical differences highlighted are that service is not inventoried, customer-provider interaction times are unpredictable, and production and consumption occur simultaneously.

3. ([G]-SC Network)

This third, integrative category combines aspects of both product and service domains, focusing on network-level operations.

a. *Integration*: These studies integrate both product and service elements, typically in the areas of distribution and logistics.
b. *Strategies covered*: The research focuses on holistic strategies for resource scheduling and capacity augmentation to manage fluctuations during both high- and low-demand periods.

SC Hazards

This passage underscores the heightened scholarly attention directed towards SCRs, particularly focusing on the interrelated hazards of service delivery integrity, capacity constraints and demand volatility. It synthesises key academic perspectives regarding the detrimental consequences of these hazards and outlines established mitigation approaches.

Core SCRs and Consequences

Academic literature identifies significant risks associated with operational variance and capacity limitations:

- *Demand variability*: Volatility in demand negatively correlates with financial outcomes across the entire SC, manifesting as reduced enterprise and chain earnings, inflated retail pricing, complications in after-sales service provisioning, and a tendency towards smaller, more frequent order batches.
- *Limited capacity*: Capacity constraints lead to elevated workforce demands, necessitate quality-versus-speed trade-offs, and create the significant risk of lost business opportunities during periods of peak demand.
    - This peril is often exacerbated by the prohibitive capital costs associated with scaling capacity.
- *Negative fiscal threat*: Conversely, the existence of redundant (idle) capacity during slack periods introduces a distinct negative fiscal threat (Baramichai et al., 2007).

Risk Mitigation and Visibility Enhancement

Research suggests that collaborative and informational strategies are pivotal in addressing these hazards:

- *SC cooperation*: Cooperative mechanisms are cited as effective tools for reducing the threat of compromised service delivery, constrained capacity and demand volatility. This highlights the necessity of inter-firm collaboration for systemic risk reduction.
- *SC visibility*: Yu and Goh (2014) propose a risk-informed model where decision-makers typically enhance SC visibility subsequent to, or as a direct consequence of, mitigating primary SC pitfalls. This suggests that successful risk management often precedes or accelerates the drive toward operational transparency.

In conclusion, effective SC risk management requires a dual focus on minimising both the negative impacts of demand volatility and the operational inefficiencies resulting from capacity imbalances, leveraging both inter-organisational cooperation and enhanced visibility.

Crucial SCRs are included in Table 1.

Strategies for CM

Capacity Planning and Information Sharing

'When the lead time for replenishing was less than the seasonal period, information sharing led to better performance'. 'To improve SC effectiveness, organizations must actively acquire information' (Afolayan et al., 2016).

Table 1. Key Supply Chain Risks Identified from Selected Studies.

Supply Chain Risks	Items
Variability in demand	Degree of demand variation
	Unable to predict demand variability for customers
	Insufficient ability to meet demand at peak times
Capacity mismatch	Constraint to meet customer requirements
Regarding demand	Increasing costs
Quality of service	Low levels of customer tolerance for surplus capacity
	Low customer tolerance levels
	Unable to fulfil the expectations level of quality
	Worry about the poor quality of service

'The effectiveness of knowledge management (KM), R&D innovation, and business performance are all significantly impacted by KM enablers' (Kamath et al., 2016).

'Knowledge sharing is positively impacted by organizational culture, and this in turn improves organizational agility'.

Increasing Capacity to Manage Spikes in Demand During Peak

'Variables related to people excellence have a favourable impact on organizational maturity, which results in business outcomes for employees, the company, and customers' (Kothandaraman & Kamalanabhan, 2018).

'Changes in staffing, hiring more full-time employees, adding part-time employees, shifting back-end to front-end staffing, keeping temporary/extra staff using spare capacity with business partners (sub-contract work out), and/or sharing capacity between various service delivery organization parts are some of the key capacity augmentation actions during peaks' (Table 2).

Increasing Capacity Amid Brief Spikes in Demand

'Increased hours/days of operation, hourly/daily scheduling, weekly/shift staff scheduling, hiring temporary workers, and scheduling overtime for specific staff

Table 2. Key Capacity Augmentation Actions During Peaks..

S. No.	Action Category	Description of Implementation
1	Workforce expansion	Hiring additional full-time and part-time employees to increase baseline capacity.
2	Internal resource real-location	Shifting back-end support staff to front-end, customer-facing roles to handle immediate volume.
3	External partnerships	Utilizing spare capacity through business partners or third-party sub-contracting agreements.
4	Organizational sharing	Distributing workloads and sharing capacity between different service delivery units or branches.

Table 3. Capacity Augmentation Measures During Brief Demand Spikes.

S. No.	Measure Type	Operational Strategy
1	Operational extension	Extending hours or days of operation to maximize existing facility utility.
2	Dynamic scheduling	Implementing granular hourly, daily, and weekly shift scheduling to align with peak arrival times.
3	Agile labor use	Engaging temporary workers and authorizing overtime for current staff to cover immediate gaps.

are examples of capacity augmentation measures during brief demand spikes' (Table 3) (Zeithaml et al., 1985).

Strategies to Make Use of Available Capacity During Lean Periods

'Because services are ephemeral, a company's capacity should be intelligently allocated from both an operational and marketing standpoint in order to boost performance' (Brausch & Taylor, 1997).

'Lean times have a detrimental effect on financial performance and result in low-capacity utilization. Training employees and partners'.

Results of CMS Implementation

'Prioritizing the SC coordination mechanism is aided by the relationship between cost, flexibility, quality, service level, and lead time'. 'Businesses can use integrated world-class supply chain management techniques to address quality-cost-time trade-offs'. 'Financial performance, adaptability, dependability, and quality are all components of economic sustainability' Key findings: Key result of the SC (77) (Figure 2).

Examination of the Reviewed Material and Conversations

The research development in the structural dimensions (LOA and EOEs) is presented in this section. The RQs *RQ1* and *RQ2* are addressed by this cross-category study.

Reports Concerning the LOA

Figure 3 demonstrates the research study on CM strategies in the structural dimension. Since the 1990s, the term 'product' has dominated studies, particularly in the context of 'chains'. Only in DNW and WNW, which deal with SC and networks associated with outbound logistics, did services surpass products. Research on DNWs has grown between 2001 and 2010, and this growth is linked to an increase in logistics management.

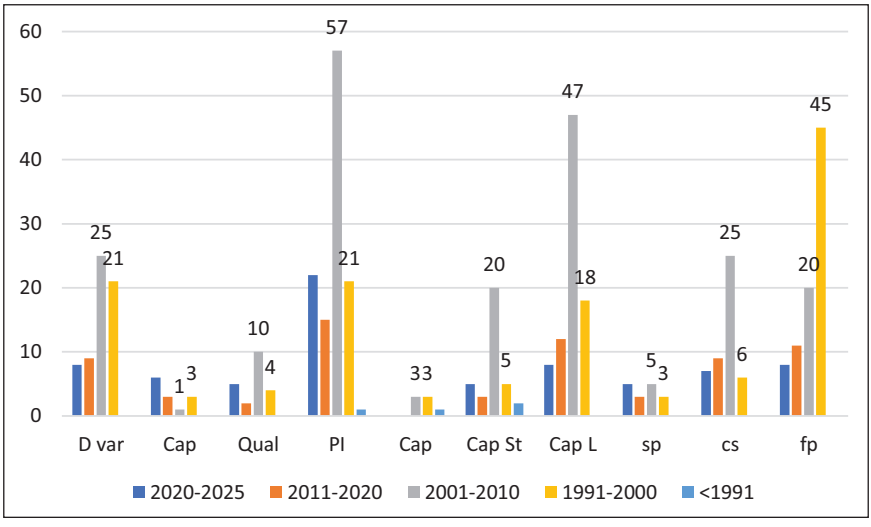

Figure 2. Number of Studies Against Each Theme.

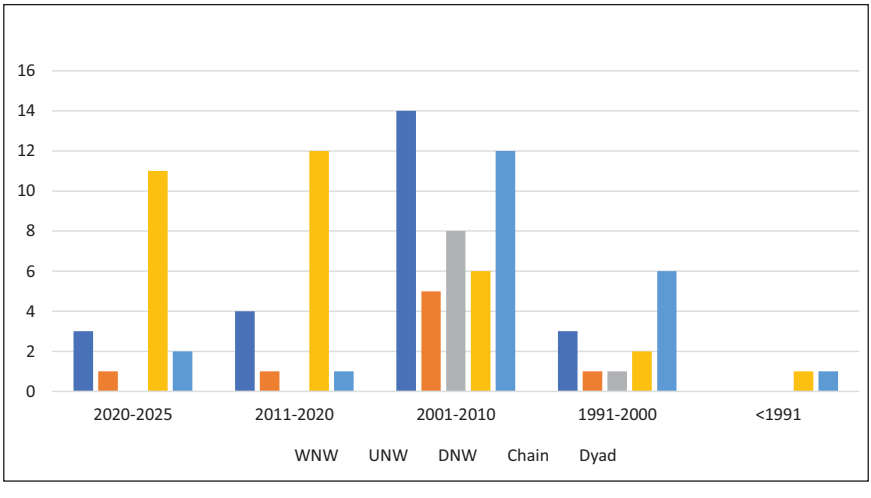

Figure 3. Research Study on Capacity Management Strategies on Structural Dimension.

Reports from All EOEs

The majority of studies discuss the exchange of assets and information as a crucial component of exchanges. Asset exchange is essential for even service-oriented enterprises, such as retail, food services, rentals, hotels and hospitality, hospitals and health services, and logistics and distribution. Information exchange is essential to any transaction in light of information technology (IT) improvements. Information and relationship components have been the subject of studies on 'capacity planning and information sharing'. Since 2001, there has been an

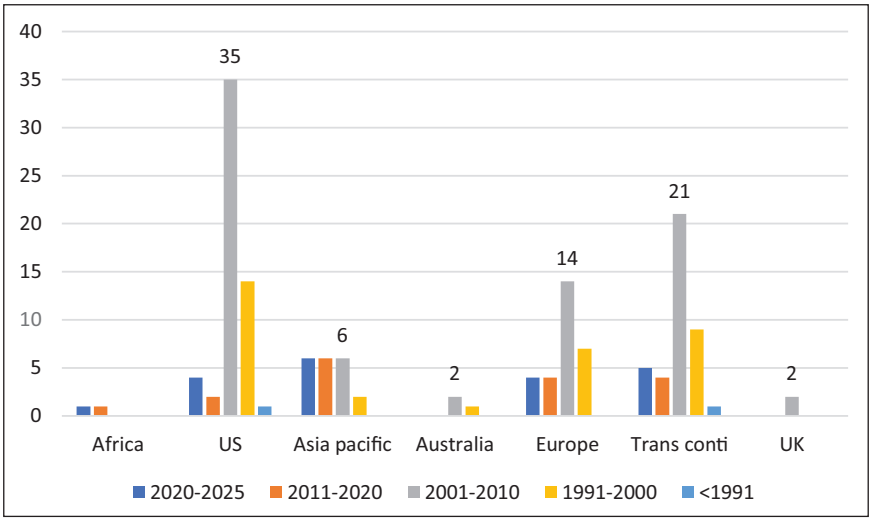

Figure 4. Geographical Scope of Research.

emphasis on knowledge and relationship exchanges. There are a few studies that address the knowledge dimension. Product manufacturing studies tend to focus more on information and assets than on relationships and knowledge. The growing emphasis on relationships and knowledge components has been sparked by the work being done in services and SC networks.

Collaboration, cooperative planning and knowledge exchange are now necessary as a result of increased outsourcing.

Research Advancements by Regions and Research Approaches (Figure 4)

The major regions with the greatest amount of CMS investigations have been the Americas, Asia and Europe (Figure 5). Conceptual research comes in second, after model-based and empirical studies. Research conducted in the Americas shows that the economy is increasing and that SC efforts are becoming more and more popular, particularly in the manufacturing of products. The transcontinental study, in contrast to the Americas, focuses on conceptual studies that have examined strategies for handling demand unpredictability.

Comparing Research Across Significant Themes Across Continents

All of the main scientific topics are represented by the Americas. The majority of research in the Americas focuses on using capacity planning and information exchange to address the problem of demand fluctuation. Research has concentrated more on challenges across the areas.

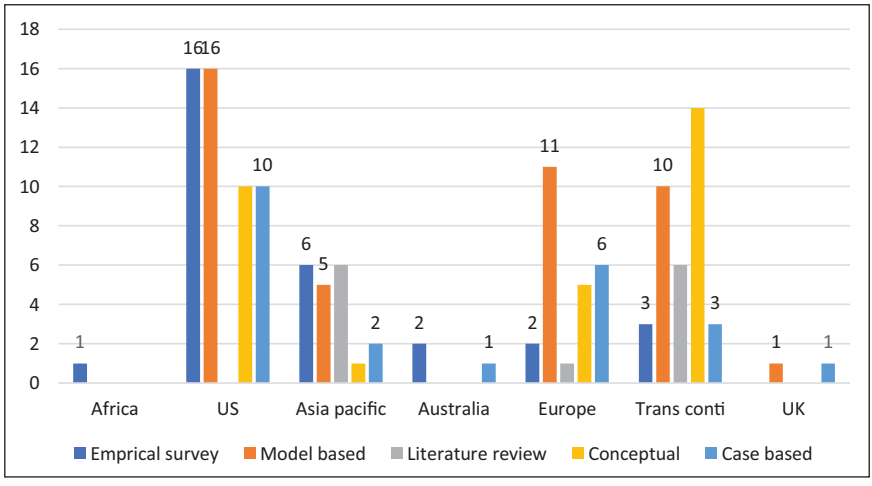

Figure 5. Geographical Study Against Research Methods.

Studies that span several geographies are referred to as transcontinental studies, as are conceptual and modelling studies that have regional applicability and were started in any geography.

Focus on Findings and Solutions

Following initial CM models, empirical and case-based studies validated the results, ultimately leading to the proposal of a value delivery framework aimed at mitigating SCRs (like demand fluctuation and delivery issues) and enhancing overall performance (Figure 6).

Focus on Business Benefit

Companies that strategically differentiate their capacity usage, especially during lean economic periods, achieve better capital utilisation and higher returns on investment.

In order to increase capacity utilisation, there is a rising focus on alternative uses of capacity during lean times, even if the primary priorities are capacity planning, information exchange and long- and short-term capacity augmentation. In addition to cutting workers as a short-term solution, progressive businesses use lean periods to manage non-urgent activities, train staff and partner resources, and increase interaction in providing the best customer touchpoints. Additionally, they provide interaction as an alternative to automated or self-service procedures. Among the most significant advantages that a CMS offers are improved SC performance, customer happiness and financial outcomes.

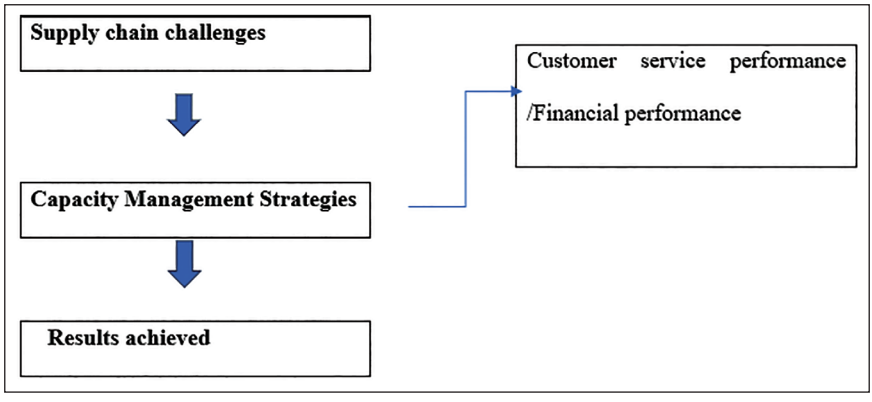

Figure 6. Capacity Management Strategies.

Conclusions

This chapter summarises distinctive submissions, limitations and future research opportunities derived from the study, based on the findings related to its RQs.

Unique Contributions of the Article

The article makes several unique contributions to the CM literature, primarily by addressing identified research gaps:

1. Development of the CMS:
    a. The study systematically analysed the SCRs.
    b. It covered a wide range of CM technologies.
    c It introduced and utilised a corporate performance construct to develop the CMS value delivery framework.
2. Highlighting the strategic imple10tion gap:
    a. It confirmed a low level of research interest in the structural and terminological dimensions of CMS.
    b. It identified that the existing literature is heavily skewed towards discussing CM options (CMOs), per Klassen and Rohleder (2010), but lacks research on the strategic implementation of CMS for SCR reduction or business performance enhancement.
3. Advocating for comprehensive performance measurement:
    a. It underscores the necessity of a comprehensive approach to business performance, pointing out the pitfall where a programme might improve SC competitive performance without addressing customer happiness or mitigating negative financial impacts.

Findings Based on RQs

The article's findings, discussed in Sections 3 and 4 (relating to *RQ1* and *RQ2*), establish the current state and advancement of research regarding SCRs and CMS utilisation:

- *SCR focus is manufacturing-centric*: The primary focus of studies addressing the risk of demand unpredictability is the bullwhip effect in manufacturing, with very few studies focused on the service sector.
- *Identified service SCRs*: Other critical SCRs identified include issues with delivery quality and insufficient delivery capacity to meet demand.
- *Existing capacity strategies*: The study summarised existing suggested strategies, which involve:
    - Capacity planning.
    - Information exchange throughout the SC.
    - Matching capacity to demand during peak and lean periods.
    - Enhancing capacity using both internal and partner resources.

Determining Potential Research Gaps and Scope

Current academic literature reveals a fragmentation in CM research, with a disproportionate focus on SCM within the manufacturing sector. Research concerning service supply chains (SSCs) is largely tangential, often concentrating on the downstream activities of manufactured goods, such as distribution, logistics or post-purchase services, leaving SCM in pure service contexts under-addressed.

A significant methodological limitation is the prevailing focus on linear 'chains' rather than complex 'networks', particularly in the downstream sphere. Furthermore, empirical investigation into the value proposition of CM organisations (CMOs) and demand management organisations (DMOs) has been scarce since the foundational work of Klassen and Rohleder (2010). Similarly, studies that conceptualise 'knowledge' as a key exchange component within SC interactions remain rare.

Conceptual Contribution and Empirical Directives

This study introduces a novel conceptual framework designed to guide subsequent empirical research on CMSs. We advocate for a strategic managerial emphasis on the CMS across the entire service lifecycle. Assessing the utility of the CMS necessitates a holistic evaluation of the interdependencies between intra- and inter-structural elements of the SC.

We recommend the integration of the CMS throughout the entire SC, including upstream tiers and DNWs. The CMS should be leveraged for capacity planning and scheduling simulations, facilitating a seamless, reciprocal flow of information between planning and service delivery. A critical strategic imperative is to focus on knowledge exchange within SCs to effectively mitigate SCRs.

Future Research Trajectories

Future research should focus on clarifying the intricate linkages between the client, service provider, marketing, design and manufacturing functions. Addressing the scarcity of studies on knowledge exchange can be achieved by empirically investigating the structural formation of DNWs (e.g., clusters for back-office operations, online sales/pricing, logistics and customer support). Such studies would enhance comprehension of the evolving configuration—specifically, stakeholder identification, requirements and relationship dynamics.

To advance global competencies, particularly in relation to the CMS, we urge intensified empirical investigation and comparative analysis across diverse geopolitical regions, including Asia, Australia, Europe, the UK and Africa. The CMS must be institutionally embraced across these regions to precisely determine the value derived from its implementation. This necessitates transcontinental research to examine the global, regional and local practices associated with CMS deployment, the structural variables of the SC system, and to provide cross-industry comparisons alongside a focus on specific industry practices.

Declaration of Conflicting Interests

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ORCID iD

A. Maragathamuthu https://orcid.org/0000-0003-1159-074X

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Annexure: Coding Scheme Summary

Themes: Supply Chain Risks (Demand Variability, Capacity Mismatch, Quality); CMS Strategies (Planning, Information Sharing, Augmentation); and Performance Results (Financial, Customer Satisfaction).