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AN INTEGRATED MARKETING CAPABILITY ENHANCEMENT FRAMEWORK FOR SOFTWARE FIRMS IN THE INDUSTRY 4.0 ERA

Ajay Bhosale[1], Dr. Sajid Alvi[2] and Dr. Manisha Jagtap[3]
[1]Research Scholar, Dnyansagar Institute of Management and Research, DIMR, Pune, Maharashtra, India
[2]Director, Zeal Institute of Management & Computer Application, Pune, Maharashtra, India
[3]Associate Professor, Dnyansagar Institute of Management and Research, DIMR, Pune, Maharashtra, India

ABSTRACT
The rapid adoption of Industry 4.0 technologies has fundamentally transformed the competitive landscape of the software industry, requiring organisations to develop integrated marketing capabilities that extend beyond traditional marketing practices. Existing studies have examined strategic marketing capability, digital marketing capability, customer value capability, and organisational capability independently, providing limited understanding of how these complementary capabilities collectively contribute to sustainable competitive advantage. Addressing this gap, this paper proposes an Integrated Marketing Capability Enhancement Framework (MCEF) for software firms operating in the Industry 4.0 era. Drawing upon the Resource-Based View, Dynamic Capabilities Theory, and Market Orientation Theory, the framework conceptualises marketing capability as an integrated organisational capability architecture comprising four interrelated capability domains coordinated through Capability Orchestration. The proposed framework explains how the integration of strategic marketing, digital marketing, customer value creation, and organisational capability enhances customer value, strengthens competitive advantage, and improves business performance in technology-intensive environments. The study contributes to marketing capability literature by synthesising fragmented theoretical perspectives into a unified conceptual framework tailored to the software industry. The framework also provides managers with a structured approach for aligning strategic planning, digital transformation, customer-centric initiatives, and organisational learning to enhance marketing effectiveness. As a conceptual study, the proposed framework offers a foundation for future empirical research aimed at validating the proposed relationships and extending marketing capability theory within Industry 4.0 environments.

Keywords: Industry 4.0; Marketing Capability; Software Industry; Dynamic Capabilities; Resource-Based View; Market Orientation; Digital Marketing; Capability Orchestration; Conceptual Framework.

1. INTRODUCTION
The emergence of **Industry 4.0** has transformed the global business environment through the convergence of advanced digital technologies, including artificial intelligence (AI), big data analytics, cloud computing, the Internet of Things (IoT), automation, and cyber-physical systems. These technologies have significantly reshaped organisational operations, customer interactions, and competitive strategies, compelling firms to continuously adapt to increasingly dynamic and technology-driven markets (Kagermann et al., 2013; Schwab, 2017). As providers and adopters of digital technologies, software firms occupy a central position within this transformation, making marketing capability an essential organisational competency for sustaining competitiveness.

Marketing has evolved from a functional business activity to a strategic organisational capability that enables firms to sense market opportunities, respond to customer needs, leverage digital technologies, and create superior customer value (Day, 1994; Vorhies & Morgan, 2005). In Industry 4.0 environments, software firms are expected to integrate technological innovation with customer-centric marketing strategies while continuously adapting to changing market conditions. Consequently, marketing capability has become a critical driver of innovation, organisational agility, and long-term business performance.

Previous research has examined marketing capability from multiple perspectives, including strategic marketing capability, digital marketing capability, customer value capability, and organisational capability. These studies, supported by the Resource-Based View (RBV), Dynamic Capabilities Theory (DCT), and Market Orientation Theory (MOT), consistently demonstrate that organisational capabilities contribute to competitive advantage and superior organisational performance (Barney, 1991; Teece et al., 1997; Kohli & Jaworski, 1990). However, existing research has largely investigated these capability domains independently, providing limited understanding of how they interact to create an integrated marketing capability architecture for software firms operating in Industry 4.0 environments.

This limitation is particularly important because software firms rarely rely on isolated capabilities. Effective marketing increasingly depends on the coordinated integration of strategic planning, digital technologies, customer relationship management, organisational learning, and innovation. Despite their interdependence, the literature provides limited conceptual guidance on how these complementary capabilities should be integrated to support organisational competitiveness in digitally transformed business environments.

To address this research gap, this paper proposes an **Integrated Marketing Capability Enhancement Framework (MCEF)** for software firms operating in the Industry 4.0 era. The framework integrates four complementary capability domains—**Strategic Marketing Capability, Digital Marketing Capability, Customer Value Capability, and Organisational Capability**—into a unified organisational capability architecture. Furthermore, it introduces **Capability Orchestration** as the coordinating mechanism through which these capabilities collectively contribute to customer value creation, sustainable competitive advantage, and business performance.

This study makes three contributions to the marketing capability literature. First, it synthesises fragmented theoretical perspectives into an integrated conceptual framework specifically designed for software firms. Second, it extends existing capability theory by conceptualising Capability Orchestration as the mechanism linking complementary marketing capabilities to organisational outcomes. Third, it provides a theoretically grounded framework that offers a foundation for future empirical research on marketing capability development within Industry 4.0 environments.

The remainder of the paper is organised as follows. Section 2 synthesises the literature and establishes the theoretical foundation for the proposed framework. Section 3 presents the Integrated Marketing Capability Enhancement Framework and associated research propositions. Section 4 discusses the theoretical and managerial implications of the framework, while Section 5 concludes the study by outlining its contributions, limitations, and future research directions.

2. LITERATURE SYNTHESIS AND CONCEPTUAL FOUNDATION

Marketing capability has evolved from being viewed as a functional marketing competence to a strategic organisational capability that enables firms to identify market opportunities, respond to environmental changes, and create superior customer value. Early research emphasised market sensing, strategic planning, and customer responsiveness as the primary determinants of marketing effectiveness (Day, 1994; Vorhies & Morgan, 2005). With increasing digitalisation, marketing capability has expanded to include customer engagement, innovation, data-driven decision-making, and organisational learning, reflecting the growing complexity of competitive business environments (Morgan et al., 2009; Chaffey & Ellis-Chadwick, 2022).

The emergence of Industry 4.0 has accelerated this transformation by integrating advanced digital technologies such as artificial intelligence (AI), big data analytics, cloud computing, the Internet of Things (IoT), intelligent automation, and digital platforms into organisational processes. These technologies have fundamentally altered customer expectations, shortened innovation cycles, and intensified global competition. Consequently, software firms require marketing capabilities that combine strategic agility with technological innovation and customer-centric decision-making (Kagermann et al., 2013; Schwab, 2017; Kotler et al., 2021).

The evolution of marketing capability research is illustrated in **Figure 1**, which highlights the transition from traditional market-oriented marketing towards integrated, technology-enabled capability development in the Industry 4.0 era.

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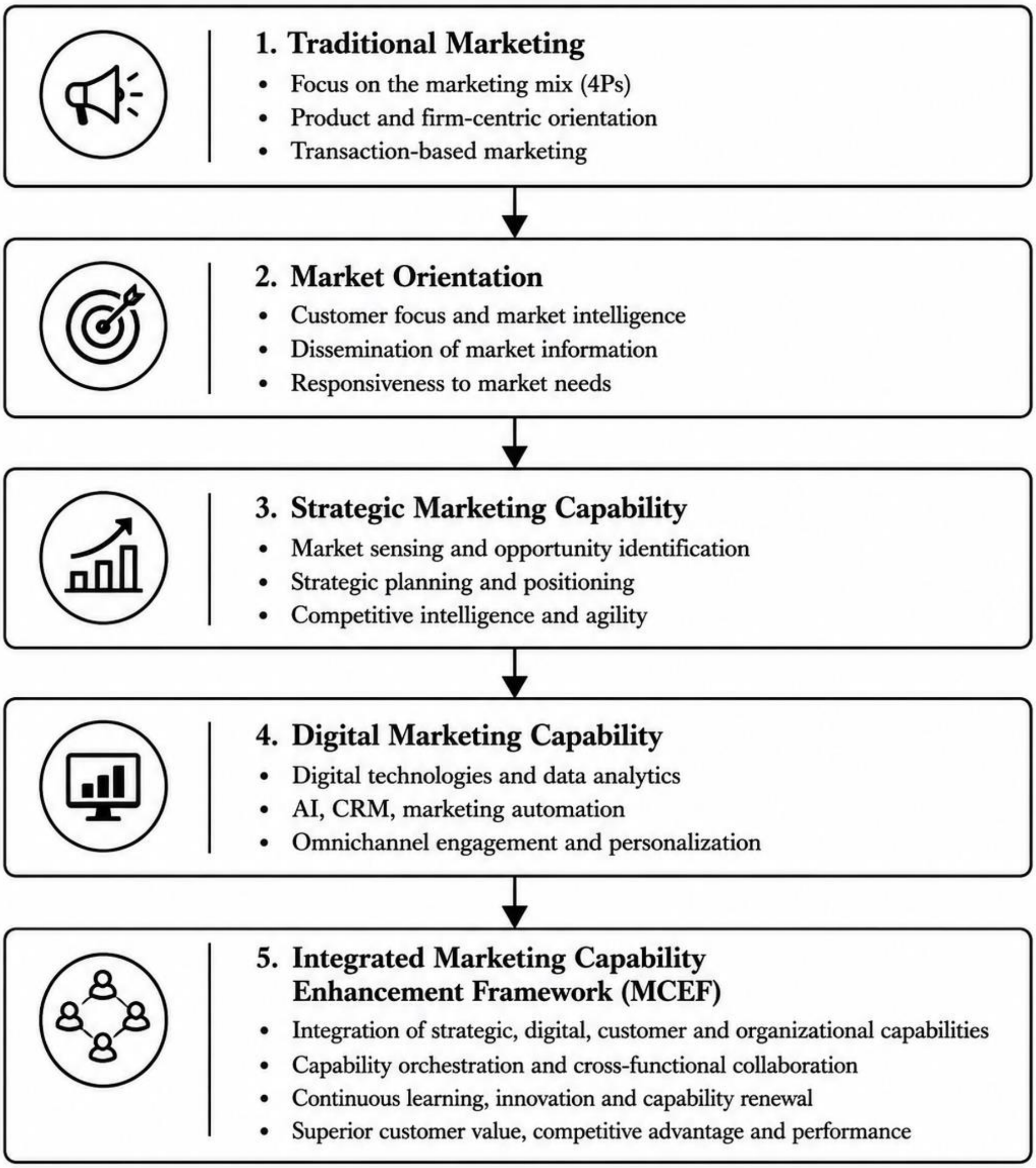
Figure 1 presents the evolution of marketing capability research, tracing its progression from traditional transaction-based marketing to the proposed Integrated Marketing Capability Enhancement Framework (MCEF).

Figure 1. Evolution of Marketing Capability Research



Source: Developed by the author based on Day (1994); Kohli & Jaworski (1990); Narver & Slater (1990); Vorhies & Morgan (2005); Morgan et al. (2009); Teece (2007); Chaffey & Ellis-Chadwick (2022); Kumar et al. (2021).

The theoretical foundation of marketing capability development is primarily supported by three complementary perspectives: the **Resource-Based View (RBV)**, **Dynamic Capabilities Theory (DCT)**, and **Market Orientation Theory (MOT)**. RBV explains that sustainable competitive advantage arises from valuable organisational resources and capabilities that are difficult for competitors to imitate (Barney, 1991). Dynamic Capabilities Theory extends this perspective by emphasising an organisation's ability to continuously renew, integrate, and reconfigure its capabilities in response to technological and market changes (Teece et al., 1997; Teece, 2007). Market Orientation Theory complements these perspectives by highlighting the importance of customer intelligence, competitor awareness, and cross-functional coordination in enhancing organisational performance (Kohli & Jaworski, 1990; Narver & Slater, 1990). Collectively, these theories suggest that long-

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term competitiveness depends not only on possessing valuable organisational capabilities but also on effectively integrating and adapting them within dynamic business environments.

Existing literature consistently identifies four interrelated capability domains that contribute to marketing effectiveness in software firms. **Strategic Marketing Capability** supports market sensing, competitive intelligence, and strategic alignment. **Digital Marketing Capability** enables firms to leverage AI, analytics, CRM systems, marketing automation, and digital platforms to improve marketing decision-making. **Customer Value Capability** focuses on customer engagement, relationship management, personalised experiences, and value co-creation. **Organisational Capability** provides the enabling foundation through organisational learning, innovation, knowledge management, human capital development, and cross-functional collaboration. Rather than functioning independently, these capability domains reinforce one another to enhance organisational adaptability and customer value creation.

The major themes emerging from marketing capability research are summarised in **Table 1**, while **Table 2** presents a concise overview of the four capability domains and their strategic roles within software firms.

Table 1: Major Themes in Marketing Capability Literature

Theme	Primary Focus	Representative Studies
Strategic Marketing	Market sensing, competitive strategy	Day (1994); Vorhies & Morgan (2005)
Digital Marketing	AI, analytics, CRM, automation	Chaffey & Ellis-Chadwick (2022); Kotler et al. (2021)
Customer Value	Customer engagement, value co-creation	Vargo & Lusch (2004); Kumar et al. (2021)
Organisational Capability	Learning, innovation, collaboration	Grant (1996); Teece (2007)

Source: Developed by the author based on the cited literature.

Table 2: Summary of the Four Marketing Capability Domains

Capability Domain	Strategic Role	Expected Outcome
Strategic Marketing Capability	Market sensing and strategic alignment	Competitive responsiveness
Digital Marketing Capability	AI-enabled marketing and analytics	Data-driven decision-making
Customer Value Capability	Customer engagement and relationship management	Customer satisfaction and loyalty
Organisational Capability	Learning, innovation and collaboration	Continuous capability development

Source: Developed by the author based on Barney (1991), Kohli and Jaworski (1990), Narver and Slater (1990), Grant (1996), Teece (2007), Vorhies and Morgan (2005), Kotler et al. (2021), Chaffey and Ellis-Chadwick (2022), Kumar et al. (2021), and other literature reviewed.

Although these capability domains have been widely recognised in previous studies, they have largely been examined as independent organisational competencies. This fragmented perspective provides limited guidance on how software firms can integrate these complementary capabilities into a unified organisational architecture capable of responding to the challenges of Industry 4.0. Addressing this limitation, the present study proposes an **Integrated Marketing Capability Enhancement Framework (MCEF)** that conceptualises marketing capability as an integrated organisational system coordinated through **Capability Orchestration**. The proposed framework is presented in the following section.

3. Proposed Integrated Marketing Capability Enhancement Framework (MCEF)

Building upon the preceding literature synthesis, this study proposes the **Integrated Marketing Capability Enhancement Framework (MCEF)** to explain how software firms can systematically develop marketing capabilities in the Industry 4.0 era. Existing studies acknowledge the importance of strategic, digital, customer-oriented, and organisational capabilities; however, they largely examine these capabilities in isolation. The proposed framework addresses this limitation by integrating them into a unified organisational capability architecture that supports continuous adaptation, customer value creation, and sustainable competitive advantage.

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The proposed framework, illustrated in **Figure 2**, conceptualises marketing capability development as a dynamic and iterative organisational process. It comprises four interrelated components: **Environmental Context**, **Integrated Marketing Capability Architecture**, **Capability Orchestration**, and **Strategic Outcomes**. These components collectively explain how software firms can align technological transformation with strategic marketing objectives to enhance organisational performance.

Figure 2. Integrated Marketing Capability Enhancement Framework (MCEF)

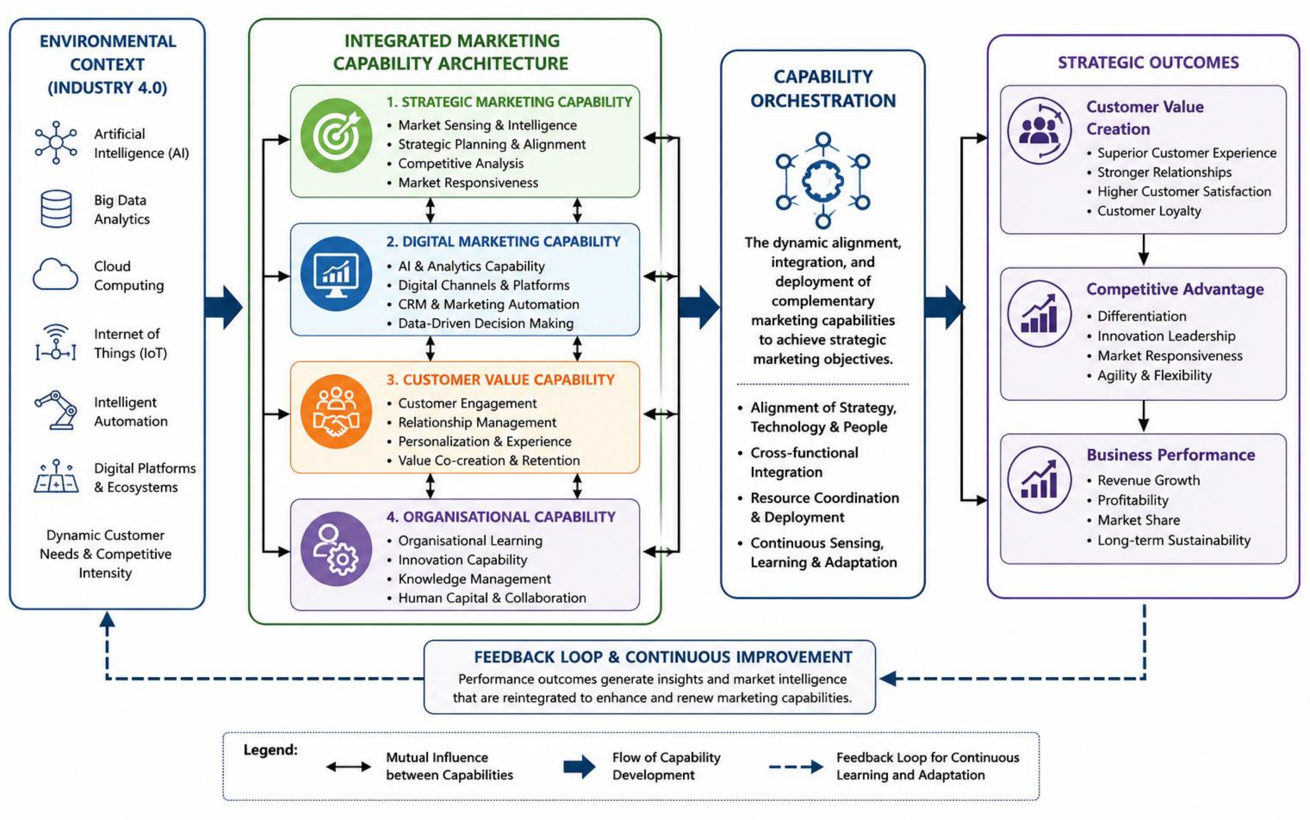

Figure 2. Integrated Marketing Capability Enhancement Framework (MCEF)

Industry 4.0 represents the external environmental context within which software firms operate. Technologies such as artificial intelligence, cloud computing, big data analytics, the Internet of Things (IoT), intelligent automation, and digital platforms continuously reshape customer expectations, competitive dynamics, and innovation processes. These developments create both opportunities and challenges, requiring organisations to strengthen their ability to sense market changes, adopt emerging technologies, and respond rapidly to evolving customer requirements.

At the core of the framework is the **Integrated Marketing Capability Architecture**, comprising four complementary capability domains:

- **Strategic Marketing Capability**, which enables market sensing, strategic planning, competitive analysis, and market responsiveness;
- **Digital Marketing Capability**, which facilitates the effective use of AI, analytics, CRM systems, digital platforms, and marketing automation;
- **Customer Value Capability**, which focuses on customer engagement, personalised experiences, relationship management, and value co-creation; and
- **Organisational Capability**, which provides the enabling foundation through organisational learning, innovation, knowledge management, human capital development, and cross-functional collaboration.

Rather than functioning as independent organisational competencies, these capability domains operate as an integrated system in which improvements in one capability reinforce the effectiveness of the others.

The distinguishing feature of the proposed framework is **Capability Orchestration**, which serves as the coordinating mechanism linking the four capability domains. Capability Orchestration refers to the systematic

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alignment, integration, and deployment of complementary organisational capabilities to achieve strategic marketing objectives. It enables software firms to synchronise strategic planning, digital technologies, customer-centric processes, and organisational learning into a cohesive marketing system capable of responding effectively to technological and market change. Consequently, sustainable competitive advantage arises not from excellence in any single capability but from their coordinated integration.

The framework proposes that effective capability orchestration enhances **customer value creation**, resulting in improved customer experiences, stronger customer relationships, greater innovation, and enhanced market responsiveness. These intermediate outcomes contribute to higher organisational performance by strengthening competitive advantage, organisational resilience, and long-term business growth. Furthermore, organisational performance generates new customer insights and market intelligence that are reintegrated into capability development, creating a continuous learning cycle consistent with the principles of Dynamic Capabilities Theory.

Accordingly, the proposed framework extends existing marketing capability literature in two important ways. First, it synthesises fragmented capability perspectives into a unified organisational capability architecture tailored to the software industry. Second, it introduces **Capability Orchestration** as the central mechanism through which complementary marketing capabilities collectively contribute to customer value creation, competitive advantage, and business performance in Industry 4.0 environments.

Based on the proposed framework, four research propositions are formulated to guide future empirical validation.

Table 3: Research Propositions Derived from the Proposed Integrated Marketing Capability Enhancement Framework (MCEF)

Proposition	Statement
P1	Organisational Capability positively influences Strategic Marketing Capability, Digital Marketing Capability, and Customer Value Capability.
P2	Strategic Marketing Capability positively influences Digital Marketing Capability and Customer Value Capability.
P3	Digital Marketing Capability positively influences Customer Value Capability through technology-enabled customer engagement and data-driven marketing decisions.
P4	Capability Orchestration positively influences Customer Value Creation, Competitive Advantage, and Business Performance.

Source: Developed by the author based on Barney (1991), Kohli and Jaworski (1990), Narver and Slater (1990), Day (1994), Grant (1996), Teece et al. (1997), Eisenhardt and Martin (2000), Teece (2007, 2018), Vorhies and Morgan (2005), Morgan et al. (2009), Kotler et al. (2021), Chaffey and Ellis-Chadwick (2022), and Kumar et al. (2021).

4. DISCUSSION AND IMPLICATIONS

The proposed Integrated Marketing Capability Enhancement Framework (MCEF) extends existing marketing capability literature by demonstrating that marketing effectiveness in software firms is not the outcome of isolated organisational capabilities but of their coordinated integration. Previous studies have largely focused on strategic marketing capability, digital marketing capability, customer value capability, and organisational capability as independent constructs. In contrast, the proposed framework conceptualises these capabilities as complementary and mutually reinforcing components of an integrated organisational capability architecture.

From a theoretical perspective, the framework integrates insights from the Resource-Based View, Dynamic Capabilities Theory, and Market Orientation Theory into a unified conceptual model. While RBV explains the strategic importance of valuable organisational capabilities, Dynamic Capabilities Theory emphasises their continuous adaptation, and Market Orientation Theory highlights customer-centric decision-making. By combining these perspectives, the framework provides a more comprehensive explanation of how software firms can develop marketing capabilities that remain effective within rapidly changing Industry 4.0 environments.

A key contribution of this study is the introduction of **Capability Orchestration** as the mechanism through which complementary marketing capabilities are aligned and deployed. The framework suggests that sustainable competitive advantage does not arise from excellence in individual capabilities but from the organisation's ability to coordinate strategic planning, digital technologies, customer engagement, and organisational learning into a coherent marketing system. This perspective shifts the focus of marketing capability research from individual capability development to capability integration.

The proposed framework also has important managerial implications. Software firms frequently invest in digital technologies, analytics platforms, artificial intelligence, and customer relationship management systems without adequately integrating these investments with strategic marketing objectives and organisational capabilities. The framework provides managers with a structured approach for aligning technology adoption with customer value creation and organisational learning. Such integration can improve marketing responsiveness, strengthen customer relationships, enhance innovation capability, and support sustainable business growth.

Finally, the framework provides several opportunities for future research. The proposed capability domains and research propositions may be operationalised into measurable constructs and empirically validated using quantitative techniques such as Structural Equation Modelling (SEM). Future studies may also investigate the framework across different categories of software firms, geographical regions, and stages of digital transformation to evaluate its generalisability and identify context-specific capability requirements.

5. CONCLUSION

Industry 4.0 has fundamentally transformed the competitive landscape of the software industry, making marketing capability an essential determinant of organisational competitiveness. Existing studies have examined multiple marketing capability dimensions; however, they provide limited guidance on how these complementary capabilities can be integrated to support sustained organisational performance.

This paper addressed this gap by proposing the **Integrated Marketing Capability Enhancement Framework (MCEF)**, which integrates Strategic Marketing Capability, Digital Marketing Capability, Customer Value Capability, and Organisational Capability within a unified organisational capability architecture. The framework further introduces **Capability Orchestration** as the central mechanism linking these complementary capabilities to customer value creation, competitive advantage, and business performance.

The proposed framework contributes to marketing capability literature by synthesising fragmented theoretical perspectives into an integrated conceptual model specifically designed for software firms operating in Industry 4.0 environments. In addition to its theoretical contribution, the framework provides managers with a practical roadmap for aligning strategic marketing, digital transformation, customer-centric initiatives, and organisational learning to improve marketing effectiveness. The research propositions developed in this study also provide a foundation for future empirical validation and further advancement of marketing capability theory.

LIMITATIONS AND FUTURE RESEARCH

This study is conceptual in nature and has not been empirically validated. The proposed framework is developed through a synthesis of existing literature and therefore requires empirical testing across software firms operating in different organisational and market contexts. Future research may operationalise the proposed capability domains, develop appropriate measurement scales, and examine the proposed relationships using quantitative methods such as Structural Equation Modelling or longitudinal studies. Comparative investigations across firm sizes, business models, and national contexts would further enhance the applicability and robustness of the proposed framework.

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