

MARKETING STRATEGY IN THE SOFTWARE INDUSTRY IN THE ERA OF INDUSTRY 4.0: A
SYSTEMATIC LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Ajay Bhosale¹, Dr. Sajid Alvi² and Dr. Manisha Jagtap³

¹Research Scholar, Dnyansagar Institute of Management and Research, DIMR, Pune, Maharashtra, India

²Director, Zeal Institute of Management & Computer Application, Pune, Maharashtra, India

³Associate Professor, Dnyansagar Institute of Management and Research, DIMR, Pune, Maharashtra, India

ABSTRACT

The emergence of Industry 4.0 has transformed the global software industry, changing business models, customer engagement, service delivery and value creation processes. With the rapid development of Artificial Intelligence (AI), Internet of Things (IoT), Cloud Computing, Big Data Analytics, Blockchain, and automation, software companies have been forced to rethink their marketing strategies to stay competitive in a digital and customer-centric ecosystem. Although research on Industry 4.0 and digital transformation is increasing, the literature on marketing strategies utilised by software companies is fragmented and requires a comprehensive synthesis.

The present work proposes a Systematic Literature Review (SLR) that aims to critically review the literature on marketing strategy in the software industry in the context of Industry 4.0. The review will be conducted following a structured and transparent methodology based on the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework. Relevant studies published in peer-reviewed journals will be identified from leading academic databases using predefined search strings, inclusion criteria and quality assessment procedures.

The review synthesised 70 studies and identified six major marketing capability dimensions including customer intelligence, personalization, customer engagement, relationship marketing, customer success, and trust-based marketing. It also seeks to analyse the current research methodologies, identify the key research gaps and develop a conceptual framework for future empirical research. The study is expected to contribute to existing knowledge by providing an integrated understanding of marketing strategy in the software industry, and valuable insights for researchers, practitioners and policy makers. The findings also will provide a theoretical basis for future research on marketing strategies in the software industry, especially in emerging economies such as India.

Keywords: Software Industry; Marketing Strategy; Industry 4.0; Digital Transformation; Artificial Intelligence; Systematic Literature Review; Digital Marketing; Customer Engagement.

1. INTRODUCTION

The global software industry has emerged as one of the fastest-growing sectors of the digital economy, driven by rapid advances in cloud computing, artificial intelligence (AI), big data analytics, the Internet of Things (IoT), blockchain, and Software-as-a-Service (SaaS). Recent industry reports indicate that the global software market exceeded USD 730 billion in 2024 and is projected to grow steadily over the coming decade, supported by increasing digital transformation initiatives across manufacturing, healthcare, finance, retail, education, and government sectors. Simultaneously, the adoption of Industry 4.0 technologies has fundamentally transformed the way organisations create value, engage customers, and compete in increasingly digital and interconnected markets (Kagermann et al., 2013; Lasi et al., 2014; Vial, 2019).

The software industry plays a central role in enabling Industry 4.0 by developing digital platforms, enterprise applications, intelligent automation solutions, cloud services, and AI-driven technologies that support digital transformation across industries. Consequently, software firms are experiencing a shift from traditional product-centric business models towards service-oriented, subscription-based, and platform-driven approaches. (Bharadwaj et al., 2013; Kotler et al., 2021; Verhoef et al., 2021).

Table 1. Global Software and Industry 4.0 Market Indicators (2024–2026)

Indicator	Latest Status (2024–2026)	Implications for Marketing Strategy Research
Global Software Market	Valued at USD 730.7 billion in 2024, expected to reach USD 817.8 billion in 2025 and approximately USD 1.40 trillion by 2030 (CAGR 11.3%). (Grand View Research)	Demonstrates the rapid expansion of the global software industry, increasing the need for innovative and technology-enabled marketing strategies.
Industry 4.0	Industry 4.0 technologies are increasingly	Highlights that marketing strategy is

Adoption	integrated into manufacturing, healthcare, finance, retail, logistics, education, and public services, driving enterprise-wide digital transformation. (Grand View Research)	increasingly dependent on digital technologies, customer analytics, automation, and intelligent decision-making.
Artificial Intelligence (AI)	AI is rapidly becoming a core business capability supporting customer analytics, personalization, predictive marketing, intelligent automation, and decision support across industries. (arXiv)	AI is transforming marketing from transactional activities to intelligent, customer-centric, and data-driven strategic processes.

Source: Compiled by the author from recent industry reports and global technology market analyses.

Table 2. India's Digital Economy and Software Industry Indicators (2024–2026)

Indicator	Latest Status (2024–2026)	Relevance to the Present Study
Indian IT-BPM Industry Revenue	Estimated at USD 297 billion in FY2025 and projected to reach USD 350 billion by 2026. (India Brand Equity Foundation)	Demonstrates India's emergence as a global software and digital services hub, requiring advanced marketing capabilities to sustain competitiveness.
IT Exports	IT exports reached approximately USD 233 billion in FY2025, accounting for the majority of industry revenue. (India Brand Equity Foundation)	Highlights the importance of customer-centric global marketing strategies for Indian software firms operating in international markets.
Indian Software Product Industry	Expected to reach approximately USD 100 billion by 2025, driven by software products, SaaS platforms, and digital innovation. (India Brand Equity Foundation)	Demonstrates increasing demand for innovative marketing strategies in software product and SaaS firms.
Maharashtra Software Ecosystem	Maharashtra, particularly Pune, Mumbai, and Navi Mumbai, remains one of India's leading software and IT hubs, hosting multinational corporations, startups, GCCs, and innovation centres. (India Brand Equity Foundation)	Establishes Maharashtra as an appropriate context for examining Industry 4.0-enabled marketing strategies in the software industry.

Source: Compiled by the author from India Brand Equity Foundation (IBEF), industry reports, and recent technology market analyses

Within India, Maharashtra occupies a strategically significant software and technology ecosystem, making it a particularly relevant context for examining how Industry 4.0 influences marketing strategy in the software industry.

Collectively, these Industry 4.0 technologies have shifted marketing strategy from product orientation towards customer-centricity, relationship marketing, digital engagement, and capability-driven value creation — a transformation examined technology-by-technology in Section 4.3 (Payne & Frow, 2005; Huang & Rust, 2021; Verhoef et al., 2021).

By synthesising evidence from 70 high-quality studies (methodology detailed in Section 3), the review examines the evolution of marketing strategy in the software industry, analyses the role of major Industry 4.0 technologies, identifies key research themes and capability dimensions, highlights existing research gaps, and develops a capability-based conceptual framework. The findings are expected to contribute to marketing theory, support managerial decision-making in software organisations, and provide directions for future research on Industry 4.0-enabled marketing strategies.

2. OBJECTIVES OF THE STUDY

The present study aims to systematically review the existing literature on the marketing strategies adopted by the software industry in the context of Industry 4.0. The specific objectives are:

1. To examine the evolution of marketing strategies in the software industry within the context of Industry 4.0.
2. To identify the major technological, organizational, and market-driven factors influencing marketing strategies in software firms.

3. To analyse the role of Industry 4.0 technologies, including Artificial Intelligence (AI), Cloud Computing, Big Data Analytics, Internet of Things (IoT), Blockchain, and Digital Platforms, in transforming software marketing practices.
4. To synthesize the existing literature by identifying dominant research themes, methodologies, emerging trends, and existing research gaps in marketing strategy in the software industry.
5. To develop a conceptual framework that integrates the key dimensions influencing marketing strategy in software firms operating in the Industry 4.0 environment.

3. REVIEW METHODOLOGY

3.1 Research Design

In this study, we use a **Systematic Literature Review (SLR)** methodology to synthesise and critically analyse the current body of knowledge on marketing strategy in the software industry in the era of industry 4.0. Systematic literature review is a rigorous, transparent and reproducible method for identifying, evaluating and integrating the findings of published research.

The review was undertaken in accordance with the **Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020)** guidelines, which provide an internationally accepted framework for the design, conduct and reporting of systematic reviews.

The review process was structured in six sequential stages: (i) definition of the objectives and research questions of the review; (ii) formulation of the search strategy and identification of relevant studies; (iii) application of pre-defined inclusion and exclusion criteria; (iv) screening and selection of eligible studies using the PRISMA framework; (v) systematic extraction of data and thematic synthesis; and (vi) identification of research gaps and development of a proposed conceptual framework.

3.2 Review Protocol and Research Questions

The review protocol was developed to ensure a systematic, transparent and reproducible approach to the identification, selection, analysis and synthesis of the literature. The review scope, search strategy, eligibility criteria, study selection, data extraction and thematic analysis were described in the review protocol before the review was carried out. A standard protocol was established to minimise selection bias and to obtain a uniform review process.

The main objective of this systematic literature review was to investigate the impact of Industry 4.0 technologies on marketing strategies in the software industry.

To accomplish this goal, four research questions (RQs) were defined:

RQ1: How does Industry 4.0 influence the evolution of marketing strategy in the software industry?

RQ2: What are the most impactful Industry 4.0 technologies on marketing capabilities and customer value creation in software firms?

RQ3: What are the key themes, implementation difficulties and research gaps found in the existing literature on marketing strategy in the Industry 4.0 era?

RQ4: What theoretical framework can be developed to investigate the relationship between Industry 4.0 technologies, marketing capabilities, customer value creation, competitive advantage and organizational performance?

These research questions informed all stages of the review process, including the development of search strings, selection of academic databases, screening of relevant studies, thematic classification of the literature, and synthesis of research findings. In addition, they offered a means to pinpoint the knowledge gaps and to suggest a conceptual framework based on capabilities that integrates the various perspectives discussed in the extant literature.

The review protocol was designed to ensure methodological rigour and at the same time to provide sufficient flexibility to incorporate interdisciplinary studies from the fields of marketing, information systems, software engineering, digital transformation, innovation management, and strategic management. Therefore, the review includes both technological and managerial aspects of Industry 4.0 and their implications for marketing strategy in the software industry.

3.3 Search Strategy

A systematic and comprehensive literature search was performed to find relevant studies on Industry 4.0, marketing strategy, digital transformation and the software industry. Several internationally recognised academic databases were used to capture all high-quality scholarly publications, including Scopus, Web of Science, ScienceDirect, IEEE Xplore, SpringerLink, Emerald Insight, Wiley Online Library, Taylor & Francis Online, and Google Scholar. The databases were chosen to provide a comprehensive coverage of peer-reviewed literature in marketing, information systems, software engineering, business management, innovation and digital technologies.

The literature search was primarily limited to studies published from 2015 to 2025, when Industry 4.0 received widespread attention from academia and industry. However, seminal publications published before 2015 were also included where needed to establish the theoretical basis of marketing strategy, digital transformation, customer relationship management and strategic management.

The search strategy consisted of combinations of keywords and Boolean operators (AND, OR) to retrieve relevant publications. Keywords were selected according to the research objectives, the preliminary literature review, and the most common terms used in Industry 4.0 and marketing. To optimise the retrieval of relevant studies and minimise the omission of significant studies, multiple search strings were used.

Table 3 presents the principal search strategy adopted for this review.

Table 3. Literature Search Strategy

Search Component	Description
Academic Databases	Scopus, Web of Science, ScienceDirect, IEEE Xplore, SpringerLink, Emerald Insight, Wiley Online Library, Taylor & Francis Online, and Google Scholar
Publication Period	2015–2025 (with selected seminal studies published before 2015)
Language	English
Document Types	Peer-reviewed journal articles, review papers, conference proceedings, and selected scholarly books/book chapters
Subject Areas	Marketing, Software Industry, Information Systems, Digital Transformation, Business Management, Industry 4.0
Search Operators	Boolean operators (AND, OR), quotation marks (" "), and keyword combinations

Representative search strings included: ("marketing strategy" OR "marketing capability") AND ("software industry" OR "software firms") AND ("Industry 4.0" OR "digital transformation"); and ("artificial intelligence" OR "big data analytics" OR "cloud computing" OR "SaaS" OR "Internet of Things" OR "blockchain") AND ("customer engagement" OR "customer relationship management" OR "personalization"). Initial database searches yielded approximately 250 records. After removal of duplicate records and a priori screening criteria, remaining studies were considered for relevance based on title, abstract, and full-text review. The final set of studies included in the systematic review were used to conduct thematic analysis, synthesis of findings and development of the proposed conceptual framework.

3.4 Eligibility Criteria and Quality Assessment

Predefined inclusion and exclusion criteria were set before the screening process to ensure the relevance, quality and reliability of literature included in this review. The inclusion criteria were developed in line with the research objectives and review protocol to include only studies that are directly relevant to marketing strategy, the software industry and Industry 4.0. This systematic approach helped to mitigate the risk of selection bias and also increased the transparency and reproducibility of the review.

Table 4 presents the eligibility criteria adopted for selecting studies.

Table 4. Inclusion and Exclusion Criteria

Criterion	Inclusion Criteria	Exclusion Criteria
Publication Type	Peer-reviewed journal articles, review papers, conference proceedings, and selected scholarly books/book chapters	Editorials, news articles, magazines, blogs, dissertations, white papers, and opinion articles
Language	English	Publications in languages other than English
Publication Period	Primarily 2015–2025, with seminal studies included where necessary	Publications outside the review period with no significant theoretical

		contribution
Research Domain	Industry 4.0, Marketing Strategy, Software Industry, Digital Transformation, Artificial Intelligence, Big Data Analytics, Cloud Computing, CRM, SaaS, IoT, Blockchain	Studies unrelated to marketing strategy or the software industry
Accessibility	Full-text articles available	Abstract-only publications or inaccessible full-text articles
Quality	Studies published in reputable peer-reviewed journals and conferences	Studies lacking methodological clarity or scholarly contribution

The application of these criteria of eligibility and quality assessment led to the selection of around 70 high quality studies which were utilised for thematic analysis, identification of research gaps and for the development of the proposed conceptual framework.

3.5 Study Selection Process

The selection process of studies was performed following PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines for transparency, consistency and reproducibility. Four sequential steps were used to select studies: identification, screening, eligibility assessment and final inclusion.

In the identification phase, a systematic search was conducted on several academic databases, resulting in about 250 records relevant to Industry 4.0, marketing strategy, digital transformation, and the software industry. After the first search duplicate publications were identified and excluded, resulting in 215 unique records for further screening.

At the screening phase, the titles and abstracts of the identified studies were compared against the pre-specified eligibility criteria. Publications that were not related to the research objectives, not written in English, were excluded as well as editorials, opinion papers, and studies not related to marketing strategy or the software industry. Following this screening process, 90 articles were assessed in full-text, with 125 records excluded.

The full texts of the remaining articles were critically reviewed at the eligibility stage to determine their methodological quality, theoretical contribution and relevance to the research questions. Studies were excluded from the analysis if they were not sufficiently addressing the relationship between Industry 4.0 technologies and marketing strategy, if they were lacking methodological rigour or were duplicating the findings of other publications. Thus, 20 articles were excluded in the full text assessment.

Finally, 70 studies fulfilled all eligibility and quality assessment criteria and were included in the systematic literature review. The studies formed the basis of thematic analysis, synthesis of findings, research gaps and development of the proposed conceptual framework in this paper.

First, a total of 250 records were retrieved from the selected academic databases and Google Scholar. After removing duplicate records and applying pre-specified inclusion and exclusion criteria during title, abstract and full-text screening stages, 70 studies were retained for the final qualitative synthesis. The full study selection process is shown in Figure 1.

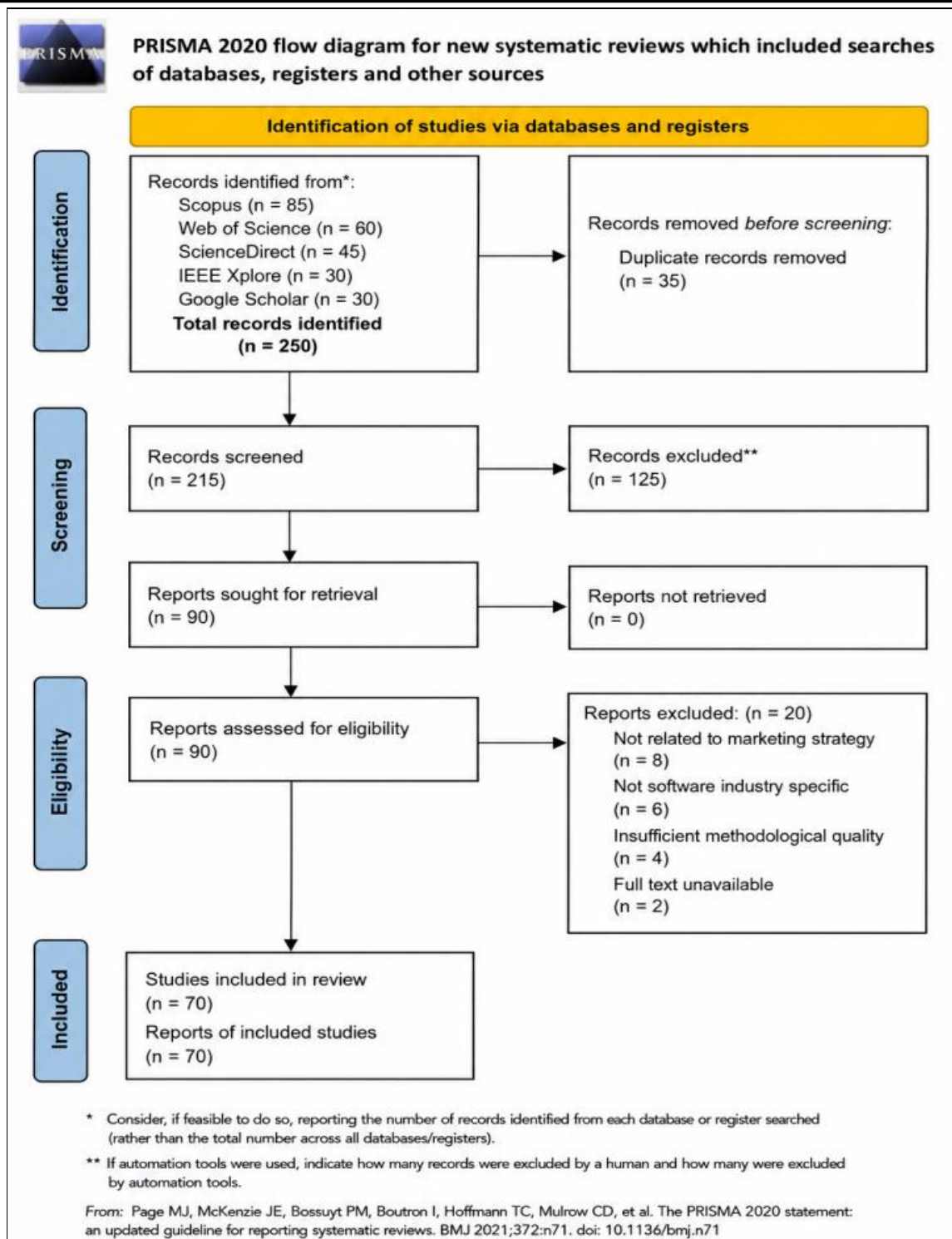


Figure 1. PRISMA 2020 Flow Diagram of the Study Selection Process

Source: Adapted from the PRISMA Statement.

The application of the PRISMA 2020 framework enhanced the methodological rigour of the review by ensuring a transparent, systematic, and reproducible study selection process.

3.6 Data Extraction and Thematic Analysis

Following the final choice of 70 studies, data extraction was conducted in a structured manner to ensure consistency and allow for a systematic comparison across the selected literature. An essential data extraction from each study was made possible by the development of a standardised framework for data extraction, allowing for a complete review and synthesis of the evidence. The extracted information included bibliographic data, research objectives, research methodology, Industry 4.0 technologies studied, marketing dimensions considered, principal findings, theoretical viewpoints and research gaps identified by the respective authors.

Table 5 presents the data extraction framework adopted in this review.

Table 5. Data Extraction Framework

Data Element	Description
Bibliographic Information	Author(s), year of publication, journal/source
Research Context	Country/industry context and study objective
Research Methodology	Conceptual, empirical, case study, survey, review, or mixed methods
Industry 4.0 Technology	Artificial Intelligence, Big Data Analytics, Cloud Computing, CRM, SaaS, Internet of Things, Blockchain, and related technologies
Marketing Dimension	Customer engagement, customer relationship management, personalization, digital marketing, customer value creation, marketing performance, competitive advantage
Key Findings	Major conclusions and contributions of the study
Research Gaps	Limitations and future research opportunities identified by the authors

4. LITERATURE REVIEW

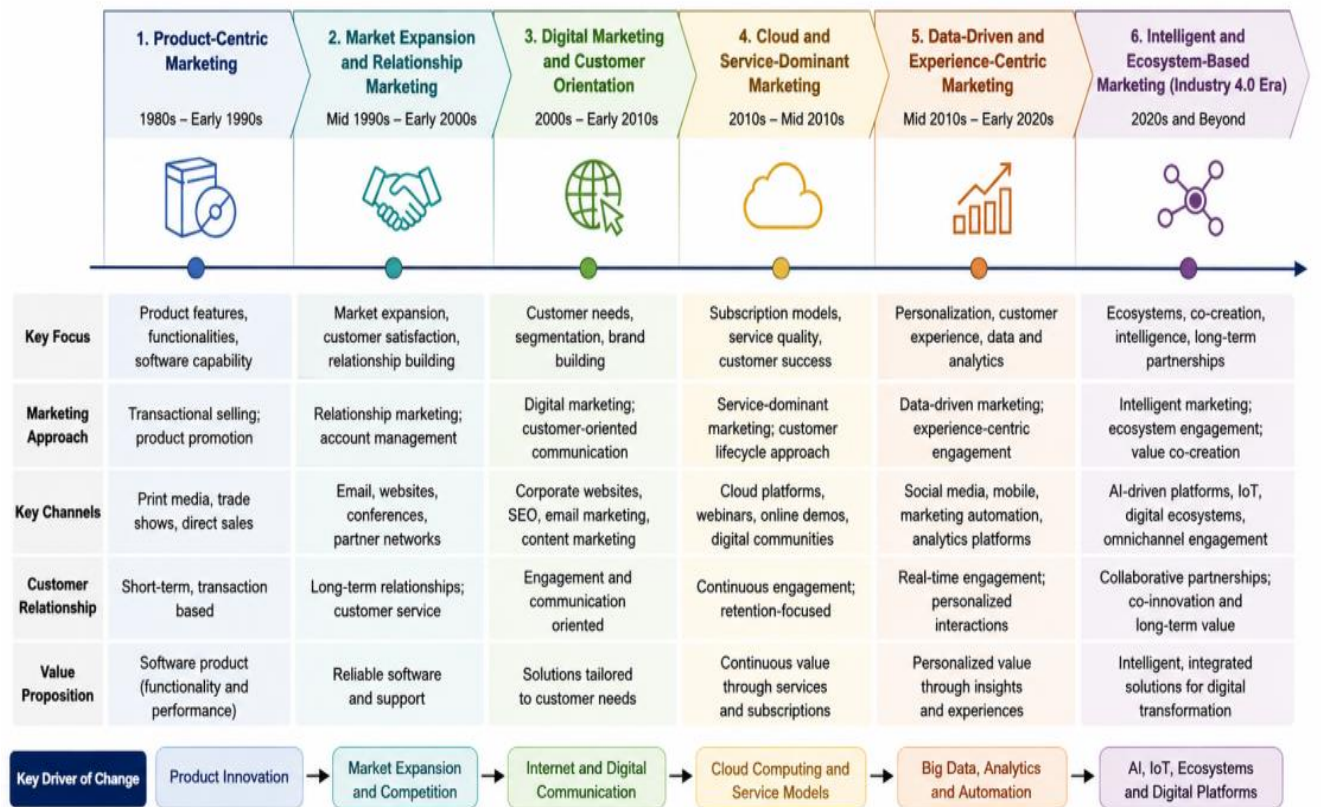
4.1 Evolution of the Software Industry and Marketing Strategy

4.1.1 Evolution of the Software Industry and Service-Based Business Models

Software industry has changed dramatically in the last few decades. From being a niche sector developing mainly standalone software applications, it has grown to become a global knowledge-based industry that is at the heart of digital transformation and economic development. The rapid advancement of digital technologies has broadened the scope of the software industry from software development to cloud platforms, artificial intelligence solutions, cybersecurity services, business analytics, digital platforms and intelligent automation. Software companies have become strategic partners in organisational transformation by enabling the adoption of advanced technologies, optimising operations, and enhancing customer experiences. This has resulted in increased competition in the industry with firms having to constantly innovate not only in terms of product development but also in terms of business strategy, customer engagement and value creation.

Figure 2. Evolution of Marketing Strategy in the Software Industry

Figure 2: Evolution of Marketing Strategy in the Software Industry



Source: Developed by the author based on review of literature.

4.1.2 Evolution of Marketing Strategy in the Software Industry

Technology, changing customer expectations and the increasing complexity of digital markets have all played their part in a significant transformation of the marketing strategy of the software industry. In the early days of the software industry, marketing was primarily product-centric, focusing on technical features, functionality, software performance, and competitive pricing. Software vendors targeted business organisations, selling directly, exhibiting at trade shows, giving technical demonstrations, and using personal selling, with product specifications and technological superiority heavily influencing buying choices.

The literature also highlights an increasing convergence between marketing strategy and digital innovation. Marketing decisions are more and more data-driven, based on customer data, platform interactions, partnerships with other ecosystem participants and feedback loops that allow software companies to respond quickly to changing market conditions. Thus, competitive advantage is no longer only based on technological excellence, but also on the firm's ability to create superior customer value, stimulate innovation and maintain lasting customer relationships in a more dynamic digital environment.

4.2 Industry 4.0 and Digital Transformation**4.2.1 Concept and Evolution of Industry 4.0**

Industry 4.0 refers to the integration of cyber-physical systems, cloud computing, artificial intelligence, IoT, and advanced analytics to create interconnected, data-driven business environments. These technologies enable real-time information exchange, intelligent decision-making, and customer-centric value creation, thereby transforming organisational operations and competitive strategies (Kagermann et al., 2013; Lasi et al., 2014; Vial, 2019).

4.2.2 Digital Transformation in the Software Industry

From the literature, digital transformation has created a paradigm shift in software development and service delivery practices. Agile methodologies, DevOps, Continuous Integration and Continuous Deployment (CI/CD), cloud-native architectures and collaborative digital platforms have mostly replaced the traditional linear development approaches. With organisations becoming more data-driven, marketing strategy is becoming a collaborative function that links technology innovation and value creation for customers and business growth.

(Payne & Frow, 2005; Kumar et al., 2021; Kotler et al., 2021)

Software companies have to develop customer-centric strategies that integrate technological capabilities with marketing intelligence, service innovation and relationship management. From this point of view, digital transformation is not only a technology initiative, but a strategic imperative that has effects on all areas of organisational performance, including marketing effectiveness and long-term competitiveness. (Vargo & Lusch, 2004; Bharadwaj et al., 2013)

4.2.3 Strategic Implications of Industry 4.0 for Marketing Strategy

The literature suggests that Industry 4.0 has enabled software firms to integrate marketing with technological innovation, customer relationship management, product development and business strategy. As such, marketing has been upgraded from an operational function to a strategic organisational capability.

One of the most significant consequences of Industry 4.0 is the availability of real-time customer data generated by digital platforms, software applications, connected devices and online interactions. Advanced Analytics and Artificial Intelligence enable software companies to turn this data into actionable insights about customer preferences, buying behaviour, product usage patterns and future needs. As a result, decisions are becoming more evidence-based, which means organisations can develop highly targeted campaigns, improve customer segmentation, optimise pricing strategies, and improve customer retention.

Moreover, literature suggests that Industry 4.0 has enhanced marketing agility and strategic responsiveness. Real-time analytics allow organisations to continually monitor market dynamics, evaluate campaign performance, identify new opportunities, and pivot their marketing strategies quickly. This skill is especially useful in the software industry where technology, customer expectations and competition change rapidly. As a result, agile marketing has become a critical strategic competency that allows software companies to stay responsive, innovative and customer-centric.

However, despite such significant advances, the literature also presents several challenges. Many organisations still struggle to integrate advanced technologies into existing marketing processes, manage data privacy and cybersecurity risks, handle ethical issues concerning Artificial Intelligence and develop the digital skills necessary to fully exploit the capabilities of Industry 4.0. Additionally, a wealth of research exists on individual technologies, but there is a relative lack of studies that provide a holistic understanding of how multiple

Industry 4.0 technologies work together and affect marketing strategy in software firms. The fragmentation highlights the need for integrated conceptual frameworks which can capture the complex inter-relationships of digital technologies, marketing capabilities, customer value creation and organisational performance.

(Teece, 2018; Verhoef et al., 2021)

4.3 Emerging Industry 4.0 Technologies Shaping Marketing Strategy

The advent of the Industry 4.0 has brought a number of advanced digital technologies that are fundamentally changing the marketing strategy in the software industry. The literature consistently shows that the integration of these technologies has turned marketing from a reactive function into a proactive and predictive capability. Organisations are increasingly able to anticipate customer needs, automate routine marketing tasks, optimise customer journeys and deliver personalised value propositions based on real-time data. (Vial, 2019; Chatterjee et al., 2021)

The following subsections analyse the major Industry 4.0 technologies that have transformed marketing practices in the software industry and discuss their strategic implications for customer engagement and competitive advantage.

4.3.1 Artificial Intelligence and Marketing Strategy

Significant contribution of AI is its capacity to support personalised marketing at scale. The literature states that customers are coming to expect more and more individualised experiences which respond to their own unique needs and preferences. AI allows software companies to customise marketing messages, suggest personalised software solutions, and send targeted messages on multiple digital platforms. As a result, personalisation has become a strategic differentiator that drives customer engagement, builds brand loyalty, and increases customer lifetime value (Davenport & Harris, 2007; Wamba et al., 2017).

However, the literature also highlights issues of data privacy, algorithmic bias, transparency, and ethical decision making. These challenges highlight the need for responsible AI governance and the development of organisational capabilities to balance technology innovation with customer trust and regulatory compliance (Kumar et al., 2021; Verhoef et al., 2021; Teece, 2018; Bharadwaj et al., 2013; Vial, 2019).

4.3.2 Big Data Analytics for Customer Intelligence

Big Data Analytics has become a core competency for marketing strategy in the software industry by enabling organisations to turn large volumes of structured and unstructured data into actionable business intelligence. The literature body consistently highlights that software companies are increasingly using Big Data Analytics to understand customer behaviour, identify market trends, evaluate product performance and support strategic marketing decisions.

The literature also highlights the synergetic relationship between Big Data Analytics and Artificial Intelligence. Big Data Analytics offers the infrastructure for the collection, integration, and analysis of customer information, while Artificial Intelligence uses these insights to automate decision-making, personalise customer interactions and optimise marketing activities.

Future research should therefore focus on building integrated frameworks that explain the relationship between analytics maturity, marketing capability development, customer value creation and organisational performance (Davenport & Harris, 2007; Wamba et al., 2017).

The current literature is fragmented regarding the organisational capabilities needed to translate analytics investments into sustained marketing performance. This indicates the need for future research on the interaction of analytic capabilities, marketing strategy and competitive advantage in software companies doing business in different business settings (Kotler et al., 2021; Chatterjee et al., 2021).

4.3.3 Cloud Computing for Customer Engagement and Service Innovation

From a marketing point of view, cloud computing has changed the organization from a transaction-based selling to a continuous customer engagement. According to the literature, this transformation has increased the importance of relationship marketing, customer experience management and value co-creation across the customer life cycle.

Firms can be agile in responding to customer needs, monitoring service performance and continuously improving products, through centralised customer data and cloud-based Customer Relationship Management (CRM) systems that enable real-time collaboration across organisational functions. Researchers agree that this integrated approach increases customer satisfaction, enhances brand loyalty, and increases organisational agility.

4.3.4 Customer Relationship Management (CRM) for Relationship Marketing

Customer Relationship Management (CRM) is changing from a customer database system to a strategic marketing capability that software companies can use to develop, maintain and strengthen long term customer relationships.

Technologies of Industry 4.0 have further extended the capabilities of CRM systems by providing real-time customer intelligence and predictive decision-making. AI-powered CRM platforms are able to analyse customer interactions across multiple digital touchpoints to identify behavioural patterns, forecast customer needs and recommend appropriate marketing actions. Cloud-based CRM systems facilitate easy access to customer information across organisational functions, and Big Data Analytics improves the organization's capacity to generate actionable insights from large and diverse datasets. The literature has increasingly highlighted that these integrated capabilities allow software firms to deliver proactive customer support, enhance service quality and unify customer engagement. (Huang & Rust, 2021; Wamba et al., 2017; Verhoef et al., 2021, Vargo & Lusch (2004), Payne & Frow (2005)).

Future research should investigate the role of AI-enabled CRM systems in contributing to organisational agility, customer value creation, and long-term marketing performance of software firms. (Payne & Frow, 2005; Vargo & Lusch, 2004; Kumar et al., 2021).

4.3.5 Software-as-a-Service (SaaS) as a Business Model for Customer Success

Software-as-a-Service (SaaS) is one of the most impactful business models in the software industry, transforming the way software products are marketed, delivered and monetised. SaaS companies are unlike conventional software business models, as their success is reliant on customer retention, recurring revenue and continued customer satisfaction. Hence, marketing strategy has now evolved from customer acquisition to include customer onboarding, product adoption, customer success and renewal management. Researchers increasingly stress that SaaS firms must continuously demonstrate value across the customer lifecycle to reduce churn and maximise customer lifetime value. This has raised the strategic significance of relationship marketing, customer education and proactive customer support.

(Cusumano, 2010; Bharadwaj et al., 2013; Verhoef et al., 2021).

From a strategic viewpoint, SaaS has also made it simpler to go global by reducing the barriers to software adoption. Thanks to flexible subscription plans, scalable service delivery and remote implementation, software firms have been able to reach out to a wide range of customer segments including small and medium-sized enterprises. Also, digital distribution channels and self-service platforms have lowered marketing and distribution costs, while increasing market accessibility and operational efficiency. (Davenport & Harris, 2007; Wamba et al., 2017; Kumar et al., 2021).

However, further research is necessary to investigate how customer success practices can be systematically combined with other marketing capabilities enabled by Industry 4.0 to improve long-term organisational performance and competitive advantage.

(Cusumano, 2010; Bharadwaj et al., 2013; Kotler et al., 2021).

4.3.6 Internet of Things (IoT) for Real-Time Customer Interaction

Studies by Porter and Heppelmann (2014, 2015), Verhoef et al. (2021), and Vial (2019) indicate that IoT significantly improves customer engagement by providing continuous insights into product usage and customer interactions. Software companies can use data generated by IoT to monitor system performance, understand customer needs, predict maintenance requirements, and proactively address service issues. This enables organisations to switch from reactive customer support to proactive customer engagement, leading to increased customer satisfaction and building long-term relationships.

But there are challenges with IoT implementation despite its strategic potential. Concerns have been raised in the literature regarding cybersecurity, interoperability, data privacy, infrastructure requirements and managing large volumes of real-time data. Future research should, therefore, explore how IoT-enabled customer intelligence and real-time engagement can be integrated in holistic marketing strategies that increase customer value creation and organisational competitiveness. (Porter & Heppelmann, 2014; Vial, 2019; Frank et al., 2019).

4.3.7 Blockchain for Trust-Based Marketing

Blockchain technology has received more attention as an Industry 4.0 innovation that can enhance transparency, security, and trust in digital business environments. Blockchain allows organisations to boost customer trust, protect digital transactions, and improve the reliability of business processes through secure, decentralised, and tamper-proof data management.

(Crosby et al., 2016; Casino et al., 2019).

The literature also documents the role of blockchain in improving customer relationship management by safely storing customer information and executing digital contracts transparently. Smart contracts automate service agreements, increase operational efficiency and reduce transaction costs. These capabilities help build customer confidence and enhance brand reputation, particularly in industries where data security and regulatory compliance are critical. However, the use of blockchain in software companies is at an embryonic stage. The researchers identified challenges of scalability, costs of implementation, integration with existing information systems, regulatory uncertainty and the lack of specialised skills. Hence, future research should address how blockchain-enabled trust mechanisms can supplement other Industry 4.0 technologies for customer value creation, relationship marketing and sustainable competitive advantage. (Casino et al., 2019; Vial, 2019)

Currently, the applications are still somewhat limited but blockchain technology can enhance customer trust, secure digital transactions and strengthen long-term customer relationships. Future research should concentrate on integrating blockchain with other Industry 4.0 technologies to build complete trust-based marketing frameworks for software firms.

(Casino et al., 2019; Crosby et al., 2016).

4.3.8 Thematic Synthesis of Industry 4.0 Technologies and Marketing Capabilities

Collectively, studies by Kotler et al. (2021), Verhoef et al. (2021), Vial (2019), Bharadwaj et al. (2013), Huang and Rust (2021), and Teece (2018) indicate that Industry 4.0 technologies should not be viewed as isolated technological innovations but as complementary enablers of strategic marketing capabilities within software firms.

Across the reviewed studies, three recurring themes emerge: the shift from product-centric to customer-centric marketing, the growing importance of data-driven decision-making, and the development of dynamic marketing capabilities through the integration of Industry 4.0 technologies.

The literature reviewed also suggests that competitive advantage in the software industry is no longer based on technological innovation alone, but increasingly on the ability of an organization to integrate digital technologies into its marketing capabilities (Teece, 2018; Vial, 2019; Verhoef et al., 2021). This gap is addressed in the current review by synthesising the literature through a capability-based lens, which sets the stage for future empirical research within the software industry.

4.4 Challenges in Implementing Industry 4.0 Marketing Strategies

While Industry 4.0 technologies provide significant opportunities, the literature also suggests some challenges that influence the successful adoption and integration of these technologies into marketing strategies in the software industry. Although technologies such as Artificial Intelligence, Big Data Analytics, Cloud Computing, Customer Relationship Management, Software-as-a-Service, the Internet of Things and Blockchain have enhanced organisational capabilities, their deployment generally requires major technological, organisational and strategic transformation. Thus, there are different challenges for software companies to maximise the marketing benefits of industry 4.0. (Frank et al., 2019; Vial, 2019; Verhoef et al., 2021).

The literature indicates that interoperability challenges between platforms, data quality management, cybersecurity, and scalability of systems are still viewed as major concerns that directly impact the effectiveness of Industry 4.0-enabled marketing initiatives. And with organisations increasingly relying on digital platforms and cloud-based services, ensuring system reliability and business continuity is a strategic priority. (Teece, 2018; Chatterjee et al., 2021), (Huang & Rust, 2021; Casino et al., 2019).

Smaller firms, as compared to large multinational organisations, usually face financial constraints, poor technological infrastructure, unavailability of skilled professionals and limited investment capability. These limitations can delay digital transformation initiatives and restrict the adoption of advanced Industry 4.0 technologies. But cloud-based platforms, subscription-based software offerings and digital ecosystems are increasingly lowering barriers to technology adoption and enabling smaller software firms to compete more effectively in digitally connected markets. (Frank et al., 2019; Chatterjee et al., 2021).

5. Research Gaps

The systematic review reveals that there are still several significant gaps in the understanding of the transformation of marketing strategies in the software industry, despite the growing body of literature on Industry 4.0 and digital marketing. The existing studies have mainly focused on individual Industry 4.0 technologies such as Artificial Intelligence, Big Data Analytics, Cloud Computing, Internet of Things,

Blockchain and Customer Relationship Management in isolation. However, relatively little attention has been devoted to understanding how these technologies shape marketing strategy in aggregate and how integrated marketing capabilities emerge from these technologies.

Another important gap noted in the literature is the fragmented nature of existing research. Most research studies focus either on technological innovation or marketing practices, with few interdisciplinary perspectives integrating technological, organisational and strategic marketing dimensions. Thus, there is a gap in understanding how software companies align Industry 4.0 technologies with marketing objectives to increase value creation for customers and sustainable competitive advantage.

The review also indicates that much of the existing literature is concentrated in developed economies, especially in North America and Europe. Although Industry 4.0 adoption has gained momentum in emerging economies, empirical studies on software firms in countries such as India are relatively scarce. Furthermore, there are very few studies focusing on regional software ecosystems where local economic conditions, government policy, industrial clusters and organisational capabilities could have a great impact on marketing strategy. This geographic imbalance limits generalisability of existing findings and calls for context-specific research.

Another big gap is the measurement of marketing capabilities. Although there is a lot of talk about customer intelligence, personalisation, customer engagement, relationship marketing, customer success, and trust-based marketing, there is no common framework that explains how these capabilities are created by the integration of multiple Industry 4.0 technologies. Thus, future research should consider developing and empirically testing comprehensive models that explain the relationships between digital technologies, marketing capabilities, customer value creation and organisational performance (Vial, 2019).

Also identified in the literature is a methodological gap. Most of the existing studies are conceptual or exploratory, and relatively few are based on comprehensive empirical methods to validate proposed theoretical relationships. What is needed are more quantitative studies using sound statistical methods, qualitative studies that provide richer organisational insights, and mixed-method designs that capitalise on the strengths of both. Longitudinal studies would also be useful to understand the evolution of marketing capabilities as organisations go through different phases of digital transformation over time.

Considering the gaps identified, it is clear that there is a need for an integrated investigation on how the Industry 4.0 technologies influence the marketing strategies of software firms. Empirical research that directly addresses the software industry in Maharashtra can be particularly helpful in understanding the technological, organisational and strategic dimensions of the development of marketing capability in an important regional innovation ecosystem. Thus, the present review offers the theoretical basis for future empirical studies that aim to develop and validate a comprehensive framework linking Industry 4.0 technology, marketing capabilities, customer value creation, and organisational performance.

6. DISCUSSION

The present systematic literature review examined the changing marketing strategies adopted by the software industry in the era of Industry 4.0. The results indicate a paradigm shift in the marketing strategy, driven by fast paced developments in digital technology and changing customer expectations. The software industry is increasingly moving towards customer-centric, data-driven and capability-based marketing strategies using Industry 4.0 technologies, leaving behind traditional product-centric approaches to generate greater customer value and sustainable competitive advantage.

One of the most important contributions of the review is the convergence of a number of Industry 4.0 technologies in the development of current marketing capabilities. The technology convergence allows software companies to efficiently gather, analyse and utilise customer data to improve decision making, customise customer engagement and improve organisational responsiveness. (Bharadwaj et al. (2013), Vargo & Lusch (2004), Vial (2019))

Another key observation is the increasing strategic importance of data as a source of competitive advantage. The literature consistently stresses that customer data is now a valuable organisational asset, allowing software firms to learn about evolving customer needs, predict market trends, optimise marketing campaigns and continuously improve software products and services. But the review also stresses that data availability alone is not a guarantee of superior performance.

7. PROPOSED CONCEPTUAL FRAMEWORK

The systematic literature review has led to the proposal of a conceptual framework to explain the relationship between Industry 4.0 technologies and marketing strategy in the software industry. The reviewed literature

consistently suggests that individual technologies such as Artificial Intelligence, Big Data Analytics, Cloud Computing, Customer Relationship Management, Software-as-a-Service, the Internet of Things, and Blockchain should not be considered as standalone technological innovations. Conversely, their strategic importance is in their combined potential to build organisational marketing capabilities that enhance customer value creation and sustainable competitive advantage.

Bharadwaj et al. (2013)

The proposed framework takes a capability-based view where Industry 4.0 technologies are considered as strategic enablers and not as standalone determinants of organisational performance. These technologies together enable building core marketing capabilities like customer intelligence, personalisation, customer engagement, relationship marketing, customer success, and trust-based marketing. These capabilities are suggested by the literature to help software firms to better understand customer needs and to provide better service quality, improve customer relationships and adapt better to fast changing market conditions.

The framework also shows that superior marketing capabilities lead to customer value creation. Software firms can improve customer satisfaction, increase customer retention, strengthen brand loyalty, and enhance customer lifetime value through personalised customer experiences, data-driven decision making, proactive service delivery, and continuous customer engagement. These are important indicators of successful marketing strategy in more and more competitive digital markets.

Finally, the framework assumes that continuous creation of value to customers leads to improved organisational performance and competitive advantage. Organisations that successfully integrate Industry 4.0 technologies in their marketing strategies are better positioned to boost marketing performance, speed up innovation, increase organisational agility, and achieve sustainable business growth. Thus, the building of marketing capability is an important mechanism through which technology innovation influences business success in a longer time horizon.

Figure 3: Proposed Capability-Based Conceptual Framework
(Marketing Strategy of Software Industry in the Era of Industry 4.0)

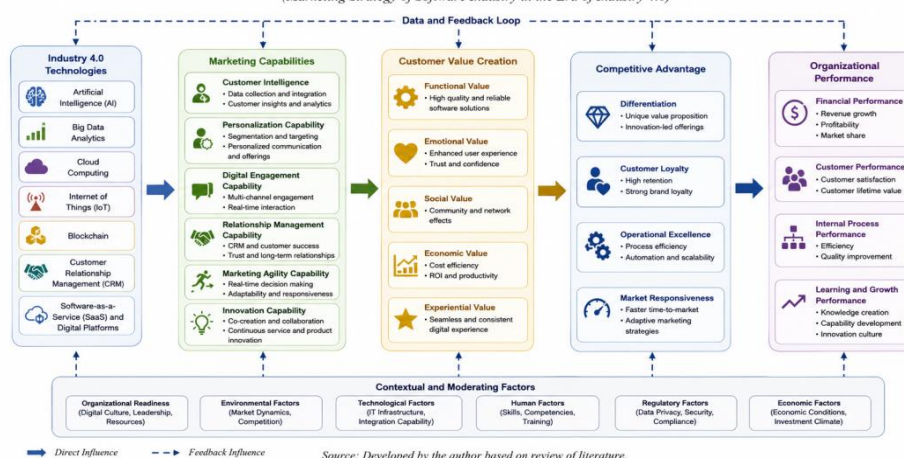


Figure 3. Proposed Capability-Based Conceptual Framework Linking Industry 4.0 Technologies, Marketing Capabilities, Customer Value Creation, and Organisational Performance

8. Conclusion

This systematic literature review examined the development of marketing strategy in the software industry in the Industry 4.0 era by synthesising the existing body of knowledge on digital transformation and emerging technologies. This review demonstrates that the marketing strategy has been significantly changed by Industry 4.0. Kotler et al. (2021)

The review summarises existing knowledge but also highlights important gaps in research and proposes avenues for future work. The analysis shows the need for a comprehensive study of the combined influence of a number of Industry 4.0 technologies on the development of marketing capability, especially in software companies in developing economies.

To fill these gaps, this paper proposes a conceptual framework based on capabilities, where marketing capabilities are considered as the strategic mechanism linking Industry 4.0 technologies to the generation of customer value and organisational performance. This framework provides a theoretical basis for future

empirical research and practical guidance for managers who want to develop effective digital marketing strategies in the software industry.

This study has a few limitations. The review draws on published academic literature and as such may not fully represent recent industry practices or emerging technological developments that have not yet been published in scholarly publications. Furthermore, this review provides an integrated conceptual framework but the relationships have not been empirically tested. The limitations offer opportunities for future research to validate and extend the framework using quantitative, qualitative and mixed methods.

In conclusion, Industry 4.0 represents a technological revolution, but also a strategic shift in how software firms design and deploy marketing strategies. Digital technologies will continue to evolve and marketing success will increasingly depend on the organization's ability to combine technological capabilities with customer-centric strategies that create sustainable value. The proposed capability-based perspective is expected to foster further academic research, and to be a useful basis for future empirical research and managerial decision making within the software industry.

REFERENCES

- Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. (2013). Digital business strategy: Toward a next generation of insights. *MIS Quarterly*, 37(2), 471–482.
- Casino, F., Dasaklis, T. K., & Patsakis, C. (2019). A systematic literature review of blockchain-based applications. *Telematics and Informatics*, 36, 55–81.
- Chatterjee, S., Rana, N. P., Dwivedi, Y. K., & Baabdullah, A. M. (2021). Understanding AI adoption in manufacturing and production firms using an integrated TAM-TOE model. *Technological Forecasting and Social Change*, 170, 120880.
- Crosby, M., Pattanayak, P., Verma, S., & Kalyanaraman, V. (2016). Blockchain technology: Beyond Bitcoin. *Applied Innovation Review*, 2, 6–19.
- Cusumano, M. (2010). Cloud computing and SaaS as new computing platforms. *Communications of the ACM*, 53(4), 27–29.
- Davenport, T. H., & Harris, J. G. (2007). *Competing on Analytics: The New Science of Winning*. Harvard Business School Press.
- Frank, A. G., Dalenogare, L. S., & Ayala, N. F. (2019). Industry 4.0 technologies: Implementation patterns in manufacturing companies. *International Journal of Production Economics*, 210, 15–26.
- Huang, M.-H., & Rust, R. T. (2021). A strategic framework for artificial intelligence in marketing. *Journal of the Academy of Marketing Science*, 49(1), 30–50.
- Kagermann, H., Wahlster, W., & Helbig, J. (2013). *Recommendations for Implementing the Strategic Initiative INDUSTRIE 4.0*. Forschungsunion / acatech.
- Kotler, P., Kartajaya, H., & Setiawan, I. (2021). *Marketing 5.0: Technology for Humanity*. Wiley.
- Kumar, V., Ramachandran, D., & Kumar, B. (2021). Influence of new-age technologies on marketing: A research agenda. *Journal of Business Research*, 125, 864–877.
- Lasi, H., Fettke, P., Kemper, H.-G., Feld, T., & Hoffmann, M. (2014). Industry 4.0. *Business & Information Systems Engineering*, 6(4), 239–242.
- Payne, A., & Frow, P. (2005). A strategic framework for customer relationship management. *Journal of Marketing*, 69(4), 167–176.
- Porter, M. E., & Heppelmann, J. E. (2014). How smart, connected products are transforming competition. *Harvard Business Review*, 92(11), 64–88.
- Porter, M. E., & Heppelmann, J. E. (2015). How smart, connected products are transforming companies. *Harvard Business Review*, 93(10), 96–114.
- Teece, D. J. (2018). Business models and dynamic capabilities. *Long Range Planning*, 51(1), 40–49.
- Vargo, S. L., & Lusch, R. F. (2004). Evolving to a new dominant logic for marketing. *Journal of Marketing*, 68(1), 1–17.

Verhoef, P. C., et al. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*, 122, 889–901.

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, 28(2), 118–144.

Wamba, S. F., Gunasekaran, A., Akter, S., Ren, S. J. F., Dubey, R., & Childe, S. J. (2017). Big data analytics and firm performance: Effects of dynamic capabilities. *Journal of Business Research*, 70, 356–365.