

## Marketing 4.0 analytics in the B2B sector

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# Marketing 4.0 analytics in the B2B sector: a state-of-the-art review and integrated framework

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## ABSTRACT

Using B2B marketing analytics, algorithms, and models can identify business blind spots, thus avoiding possible risks. It helps to better understand and predict trends and results, and rationalise decisions. The fourth industrial revolution has brought marketing 4.0, affecting marketing analytics methods. This study provides a holistic framework to investigate these effects on Marketing 4.0 analytics. To achieve this goal, a hybrid systematic literature review (SLR) and thematic analysis (TA) is conducted on the applications and models of B2B marketing analytics in Industry 4.0 from the most reliable scientific databases. Understanding these models and their applications changes the attitude toward communication between marketing channels, identifies potential marketing analytics applications for businesses, and facilitates areas for further research. Initially, 941 sources were screened, and ultimately 43 were examined. As a result, 25 codes were applied, and six themes were extracted, including Digital Transformation, Big Data, Marketing Analytics, Marketing, Analytics, and Customer.

## ARTICLE HISTORY


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## KEYWORDS

Marketing 4.0; fourth industrial revolution; systematic literature review; thematic analysis; marketing analytics; B2B marketing analytics

## Introduction

Marketing analytics has been affected by the fourth-generation industrial revolution, analysis methods have changed, and its capabilities and potential have increased (Cao et al., 2022). The fourth generation industrial revolution, Industry 4.0, was first introduced in Germany in 2011 (Lund & Vildåsen, 2022; Sharifpour et al., 2020). The aim of Industry 4.0 is the digitalisation and intelligentisation of manufacturing processes and to connect people and things through the Internet. Moreover, Industry 4.0 makes manufacturing processes more flexible to customise and personalise products that align with consumer needs (Rosário & Dias, 2022). Marketing 4.0, which arose in the era of Industry 4.0 (Yeğin & Ikram, 2022), has led to optimising sales and productivity in B2B. Interaction with consumers is performed mainly by creating content according to consumers' tastes, which results in real-time sales (Pandey et al., 2020). Collaboration, interactions, and communication in B2B,

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influenced by Marketing 4.0, make it a part of the B2B strategy (Kumar & Saroj, 2022). Marketing analysis 4.0 in B2B maintains the overall relationship with consumers, strengthens it, and affects the rate of return on investment (Wilson & Stephens, 2023).

Marketing 4.0 strives to gain foresight by predicting trends and activities and relies on advanced data analytics (Ghonim et al., 2022). Analysing data and information creates practical understanding and insight for individuals and organisations, helping them to make efficient and effective decisions in marketing, which leads to solid global competition and technical improvements in the organisation (Ghonim et al., 2022; Osuagwu, 2022). Marketing analytics is a business analytics model necessary for organisations to adopt strategies. Although marketing analytics is vital to various forms of organisations, if it is not conceptualised correctly, it may negatively affect organisations' understanding its applications (Osuagwu, 2022). Data quality, integration, interpretation and security are fundamental data analytics challenges that have lacked attention, making them ineffective (Zumstein et al., 2022). Fundamental changes and developing technologies in analytics have made this area of marketing much more interesting (Liu & Burns, 2018), as it allows managers to have a significant impact on the way of creating relationships with consumers and how firms make decisions (Vollrath & Villegas).

Marketing 4.0 analytics positively impacts marketing planning, product development, and customer relationship management. It also helps organisations improve their marketing activities and identify opportunities and threats by developing a new product, improving organisational performance, and evaluating competitors, the market environment, and consumer behaviour (Cao et al., 2022). Moreover, analytics is one of the main pillars of Marketing 4.0 (Başyazicioğlu & Karamustafa, 2018; Guven, 2020). Therefore, it can be expected that with the potential of Marketing 4.0, businesses can identify the needs of their stakeholders. By analysing these needs and understanding the challenges, they can change or improve towards creating or maintaining a competitive advantage. Marketing 4.0 offers new and innovative analysis solutions and creates numerous business opportunities, including B2B. Moreover, the application of Marketing 4.0 analytics and its relationships in the B2B sector has recently attracted researchers' attention (Singh et al., 2022).

Nonetheless, Marketing 4.0 analytics in many leading business organisations and the B2B sector is still at an early stage, and the full potential of its processes has not been achieved (Osaysa, 2022). Moreover, according to the literature, no article has been found that examines the analytics of Marketing 4.0 in the B2B sector. Also, few studies have researched the field of marketing analysis. Başyazicioğlu and Karamustafa (2018) investigated the changes in Marketing 1.0, Marketing 2.0, Marketing 3.0, and Marketing 4.0 activities through a systematic literature review. Afterwards, Confetto et al. (2020) examined the approach of all communication channels based on the integration of communication strategies between B2B and B2C in Marketing 1.0 up to Marketing 4.0. Moreover, Pandey et al. (2020) studied and reviewed the B2B digital marketing literature. Similarly, Wang and Wang (2020) investigated the effects of digital transformation on analytics in B2B. Wang et al. (2021) provided a development model to demonstrate the capability of social media analytics, which facilitates its use and integration in B2B marketing, while Wilson and Stephens (2023) resolved B2B challenges through marketing analytics. This study will provide a holistic framework of Marketing 4.0 analytics in the B2B sector through a hybrid systematic literature review (SLR) and thematic analysis (TA).

The literature review identified two significant gaps. First, the effects of data analytics on Marketing 4.0 were not explored in the B2B sector. Second, an integrated framework that examines the effects of Marketing 4.0 analytics in the B2B sector has not been provided. It is very important to provide an integrated framework showing the effects of data analysis on Marketing 4.0. Moreover, it is possible to learn about the effects of data analysis on Marketing 4.0 sectors. On the other hand, the B2B sector can understand the trends of each Marketing 4.0 sector through this framework. Therefore, using a systematic literature review and thematic analysis in Marketing 4.0 analytics, the current study strives to fill the research gaps and take a practical step toward current research trends. The main research question of this study are **RQ<sub>1</sub>**. What are the effects of data analytics on Marketing 4.0, and how can these effects be provided in an integrated framework?; and **RQ<sub>2</sub>**. What could be the future research directions that scholars can explore in Marketing 4.0 analytics?

In the subsequent section of this study, the literature is discussed. Then, the methodology is addressed. The analysis and classification of articles in the field of Marketing 4.0 analytics are placed in the fourth section. The fifth section provides the integrated framework of the effects of Marketing 4.0 analytics in the B2B sector. Finally, the gap analysis and answers to the research questions are examined along with the research results and limitations, directions for future research, and conclusions.

## Literature review

In this section, studies in marketing analysis in the B2B sector are discussed to clarify the need for this study. The analytics and Marketing 4.0 articles are separated into five classifications to manage a structured review.

In the first classification are studies that discussed Marketing 4.0 and its effects in general. For instance, Lies (2021) identified the capabilities of Marketing 4.0 in critical conditions. Székely et al. (2020) investigated Marketing 4.0 capabilities in communication channels, the role of sales forces, digital tools used in sales and distribution processes, and organisational purchasing behaviour. Moreover, Sugiyanto and Wicaksono (2020) used Marketing 4.0 to investigate the marketing strategy in Jakarta MRT software. Furthermore, Pardeshi and Gadekar (2020) identified the latest styles and recommendations related to Marketing 4.0 through a systematic review of 15 articles published in 2020. At the same time, Guven (2020) investigated Marketing 1.0 to Marketing 4.0 and identified the benefits of Marketing 4.0 in e-commerce. Even before, Vassileva and Ivanov (2017) researched how businesses adapt to Marketing 4.0 and the circular economy and examined Marketing 4.0 opportunities that benefit from digital disruption (Vassileva, 2017).

In the second category, some articles evaluated Marketing 4.0 in different industries. For instance, Akbar et al. (2020) analysed the obstacles in digital tourism marketing in Luak, Indonesia, and Dewi (2020) investigated Marketing 4.0 strategies in travel tourism businesses. At the same time, García-Haro et al. (2020) studied Marketing 4.0 and internet technologies in the field of tourism with the aim of co-creation in the tourism industry. Moreover, Polisetty and Manda (2020) investigated various asset management companies' use of the Marketing 4.0 concept to be superior to their competitors in the Indian mutual fund industry. Even before, Rahayu et al. (2017) investigated Marketing 4.0 methods to improve pharmaceutical industry strategies.

The third group examined the effects of Marketing 4.0 on customers. Recently, Yeğin and Ikram (2022), intending to empower green marketing practices in the Marketing 4.0 era, created a framework that sets and prioritises consumer performance evaluation criteria. At the same time, Ghonim et al. (2022) investigated the impact of Marketing 4.0 on customer behaviour in the Egyptian hotel industry. Moreover, Winarko et al. (2022) investigated Marketing 4.0 to increase customer satisfaction or intention to purchase online through e-commerce platforms in Indonesia. Kumar and Saroj (2022) investigated the impact of social media on the Marketing 4.0 process in B2B and B2C. A year before, Martínez-Ruiz et al. (2021) addressed the concepts and opportunities of consumer 4.0 in the Marketing 4.0 era. Also, Dash et al. (2021) investigated the evolution of Marketing 4.0 and explored its impact on customer satisfaction and purchase intention. Suleman et al. (2020) investigated consumer attitudes and decisions in the Marketing 4.0 era, which can affect the ease of purchase, trust, and risk factors, and Wereda and Woźniak (2019) investigated customer 4.0 relationships in the Marketing 4.0 era in innovative enterprises in Poland. Furthermore, Gau (2019) investigated Marketing 4.0 among senior citizens in Taiwan to identify relevant key strategies. Before all, Tarabasz (2013) studied important topics in marketing, including product-centric, customer-orientated, and value-driven marketing concepts, as well as Marketing 4.0 directions.

The fourth category discussed marketing analysis in B2B. Recently, Wilson and Stephens (2023) researched to identify the challenges faced by the digital ordering system in a B2B organisation and resolved them through marketing analytics. Before, Wang et al. (2021) provided a development model to demonstrate the capability of social media analytics, which facilitates its use and integration in B2B marketing. Some articles examined big data analysis in B2B. Hung et al. (2020) showed in an Asian commercial bank that big data analytics could be used for B2B to improve supply chain finance and its effectiveness in marketing campaigns. At the same time, Hallikainen et al. (2020) investigated big data analytics in customer relationship management and researched its effects on customer relationship performance and sales growth in B2B. Similarly, Wang and Wang (2020) investigated the effects of digital transformation on big data analytics in B2B and finally presented a conceptual framework. Also, Troisi et al. (2020) investigated the orientation of big data and its analytics in adopting B2B marketing strategies.

Finally, review articles are covered in this section. Confetto et al. (2020) examined the approach of all communication channels based on the integration of communication strategies between B2B and B2C in Marketing 1.0 up to Marketing 4.0. Moreover, Pandey et al. (2020) studied and reviewed the B2B digital marketing literature. Earlier, Başyazicioğlu and Karamustafa (2018) investigated the changes in Marketing 1.0, Marketing 2.0, Marketing 3.0, and Marketing 4.0 activities through a systematic literature review. Although the review articles in Marketing 4.0 are comprehensive, this study presents a comprehensive framework in Marketing 4.0 analytics in the B2B sector using a hybrid SLR-TA approach.

## Methodology

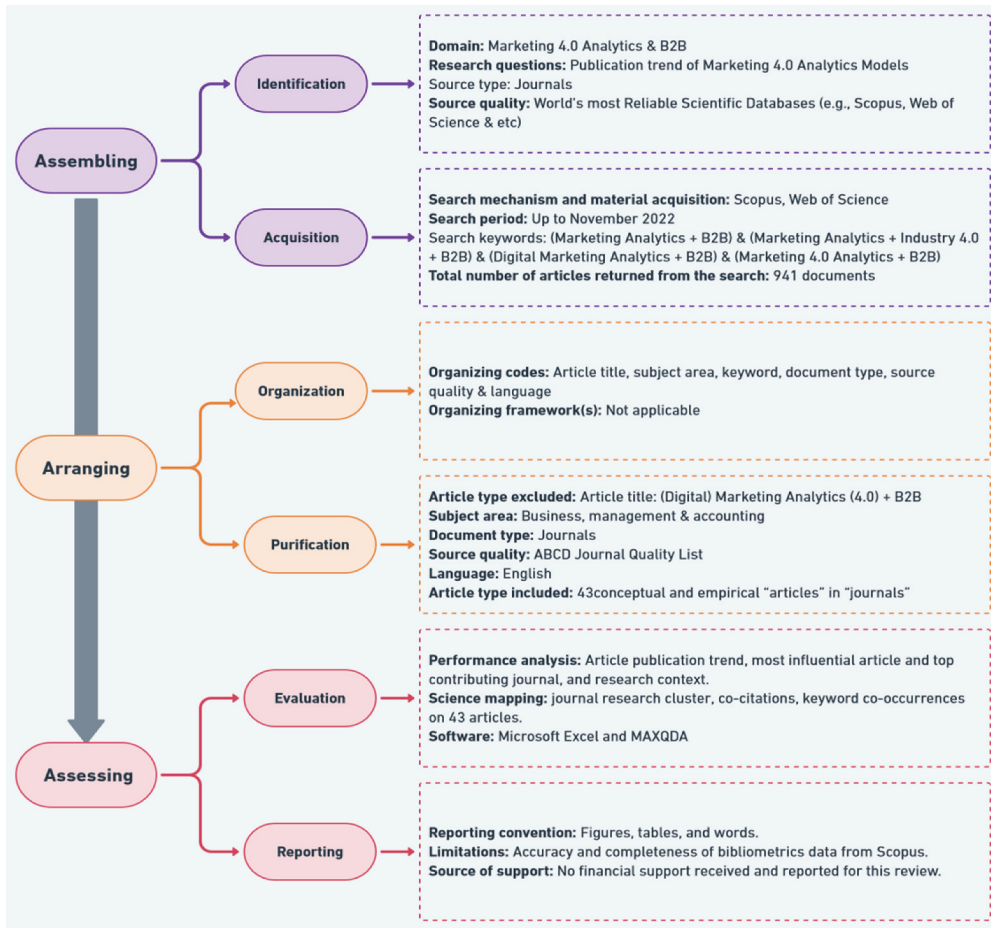
The objectives of this research included: (i) investigating the effects of data analytics on Marketing 4.0; (ii) providing a comprehensive, integrated framework that shows the effects of data analytics on Marketing 4.0; and (iii) specifying future research directions that scholars can do research in the field of Marketing 4.0 analytics. A systematic literature review (SLR) of existing data analytics and Marketing 4.0 literature was necessary to achieve these goals. SLR among academic communities is vital for reviewing research trends and providing a framework. SLR allows researchers to develop knowledge in their research area by evaluating the existing intellectual realm. The growth of research has led SLR to be considered and used as a reliable basis for decision-making and implementation for the stakeholders (Tranfield et al., 2003). Therefore, in this study, SLR was used so that the existing literature in the field of Marketing 4.0 analytics could be accurately and transparently analysed. The integrated framework of Marketing 4.0 analytics is presented to evaluate its models. Also, thematic analysis (TA) was used to evaluate the articles. Applying TA along with SLR clarified the themes and gaps in the Marketing 4.0 analysis. For these reasons, in this study, hybrid SLR-TA was employed.

In SLR, it is imperative to prepare a protocol to prevent confusion. Proper protocol brings detailed planning and ensures transparency by maintaining consistency in its execution. In this study, the authors employed the three-stage protocol for scientific procedures and rationales (SPAR-4-SLR) presented by Paul et al. (2021). This method comprises three main stages: (i) assembling, (ii) arranging, and (iii) assessing scientific literature. There are also six sub-stages: (i) identification, (ii) acquisition, (iii) organisation, (iv) purification, (v) evaluation, and (vi) reporting. These are fully explained in Figure 1. The SPAR-4-SLR protocol was developed over other protocols to remove the limitations of the others, including a lack of comprehensiveness and review decisions for researchers (Paul et al., 2021). According to the SPAR-4-SLR protocol, the authors first identified the data in the area of Marketing 4.0 analytics from the most reliable scientific databases (Web of Science and Scopus). They analysed these data using Microsoft Excel and MAXQDA software.

### Assembling

The first stage in the SPAR-4-SLR protocol is assembling, which includes identification (scope of research, research questions, type of source and quality of source) and acquisition (mechanism of search and material acquisition, search period, search keywords). In the identification stage, the publication process of articles (research questions) in Marketing 4.0 analytics (scope of research) was examined. In this review, articles (type of source) indexed in Scopus and Web of Science and journals with an acceptable rating based on the Australian Business Deans Council (ABDC) (source quality) were studied because the ranking criteria and methods are different in institutions and cause differences in the data. Therefore, ABDC was used in this study as one of the most reliable rankings and popular among academics (Paul et al., 2021). Scopus and Web of Science databases were used for data collection (search) in the acquisition stage. According to Paul et al. (2021), these databases are among the best and provide valuable information for analysing articles, such as year, country, and type of article. Articles with titles, abstracts, and keywords related to this study area have been searched, and 941 articles





**Figure 1.** Review of Marketing 4.0 analytics based on the SPAR-4-SLR protocol.

were initially listed (material acquisition). Papers investigated were published until November 2022 (search period) and had relevant keywords (search keywords) such as Marketing Analytics and B2B, Marketing Analytics and Industry 4.0 and B2B, Digital Marketing Analytics and B2B, and Marketing 4.0 Analytics and B2B. To ensure the most accurate results, the search used was formulated as 'TITLE-ABS-KEY(("Marketing" OR "Marketing 4". OR "Digital Marketing") AND "Analytics") AND (DOCTYPE(ar) AND NOT DOCTYPE(bk) AND NOT DOCTYPE(cp) AND NOT DOCTYPE(ed)) AND (LANG(English)) AND (PUBYEAR AFT 2012 AND PUBYEAR BEF 2022)'.

**Arranging**

In the arranging stage, organisation and purification should be considered. The filters classified by Scopus and Web of Science were applied. After searching in these two databases, 587 data items, including articles, conference papers, and book chapters, were found to be duplicates and they were removed. The filters of title, research scope, keywords, document type, source quality, and language were applied to 354 articles from



the Scopus and Web of Science databases (Paul et al., 2021). The same keyword filters from the assembling stage were applied in this stage, and 129 articles were excluded. In the purification stage, only journal articles were selected (document type), and conference articles, book chapters, and special issues were excluded. Among the remaining articles, articles that studied analytics in the field of Marketing 4.0 (article title) and those with the scope of research in business, management, and accounting were studied. Finally, by applying the language filter to consider only English articles and the quality of the source filter (ABDC rating), 43 articles passed the arranging stage. They were used for evaluation and analysis in the next stage.

### **Assessing**

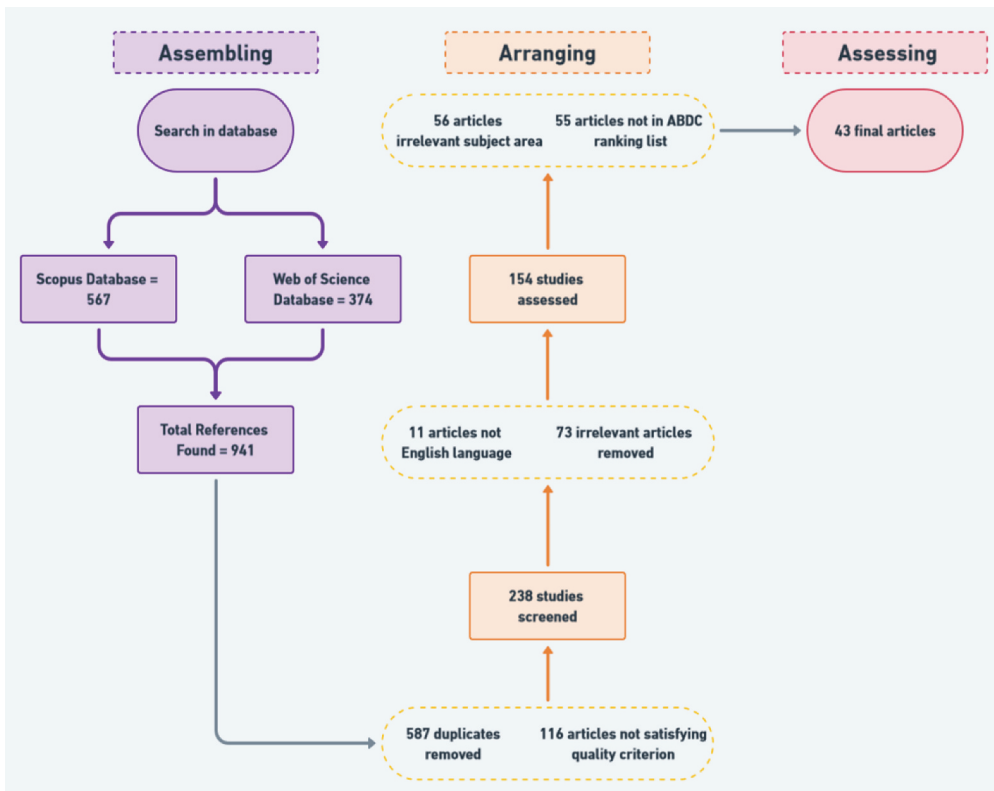
The last stage of the SPAR-4-SLR protocol is assessing through evaluation and reporting. The TA method was employed to evaluate the extracted (43) articles. The popularity of TA in SLR is due to its orientation to review the existing literature and understand intellectual structure. SLR-TA helps identify critical issues and subjects through an integrated literature review. Using TA analysis, data from articles are systematically extracted and analysed to achieve clear insights (Chaudhary et al., 2021). To check the publication process, journals, authors, etc., Excel and MAXQDA software were employed, and the reports and analyses are presented in charts and tables.

### **A descriptive review of the literature**

This section explores the findings of this study after analysing the 43 articles using the SPAR-4-SLR protocol. [Figure 2](#) illustrates the extraction of articles from Web of Science and Scopus databases. Initially, 941 articles were identified. There were 587 duplicated articles, conference papers, book chapters, and special issues in both databases that were removed. By focusing only on research articles, 116 conference papers, book chapters, and special issues were removed. Moreover, 56 articles were removed as they were irrelevant to the research objectives of this study. Furthermore, articles that were not related to the research area of this study (73 articles), not in English (11 articles), and not included in the ABDC ranking (55 articles) were also removed.

Using 43 finalised articles, the findings of this study are presented in two parts: (i) Bibliometric and (ii) TA. The first part refers to the year published, the type of articles, the area of study, and the articles mainstream. Secondly, using the findings of the reviewed articles in the first part and the MAXQDA software, a hierarchical figure between keywords was created, and a comprehensive and integrated framework was extracted. The articles extracted based on the SPAR-4-SLR protocol are shown in [Table 1](#) by author, year, type of article, journal, area of study, etc.

In [Figure 3](#), it is clear that research in Marketing 4.0 analytics started in 2012 and, after a 3-year break, it started again in 2016 and has been performed since. [Table 1](#) and [Figure 3](#) illustrate that the interest of academics and research institutions in marketing analytics has increased significantly. Moreover, in [Figure 3](#), theoretical and review articles accounted for 14% each (6), research articles took the largest share with 53% (23), and the lowest is 7% (3), which belongs to conceptual articles.



**Figure 2.** Literature search strategy.

*Industrial Marketing Management* and *Journal of Business and Industrial Marketing*, each rated A\* and A in the ABDC classification, published four articles each in the field of Marketing. Moreover, most articles were mainly published in business, management, and accounting journals (Figure 4).

Table 2 denotes the degree of importance (weight) of journals. Despite the growing research in marketing analytics, the top marketing journals (ranked A on the ABDC list) have an importance of 60% (26). This statistic demonstrates the importance of published research in prestigious marketing journals. As a case in point, Hossain et al. (2022), Akter et al. (2022), Cao et al. (2019), and Mora Cortez and Johnston (2017), who investigated marketing analysis, published their articles in *Industrial Marketing Management*.

### Thematic analysis

TA is discussed in this section in the continuation of the SPAR-4-SLR protocol. TA effectively understands the main and sub-themes of Marketing 4.0 analytics literature, making the integrated framework more detailed. TA is based on studying 43 finalised articles. Keywords and key terms were coded in the articles. Then, the codes were examined in terms of frequency, according to which MAXQDA categorised and displayed them. In total, 25 codes were applied for the hierarchical structure, and the

**Table 1.** Characteristics of the articles.

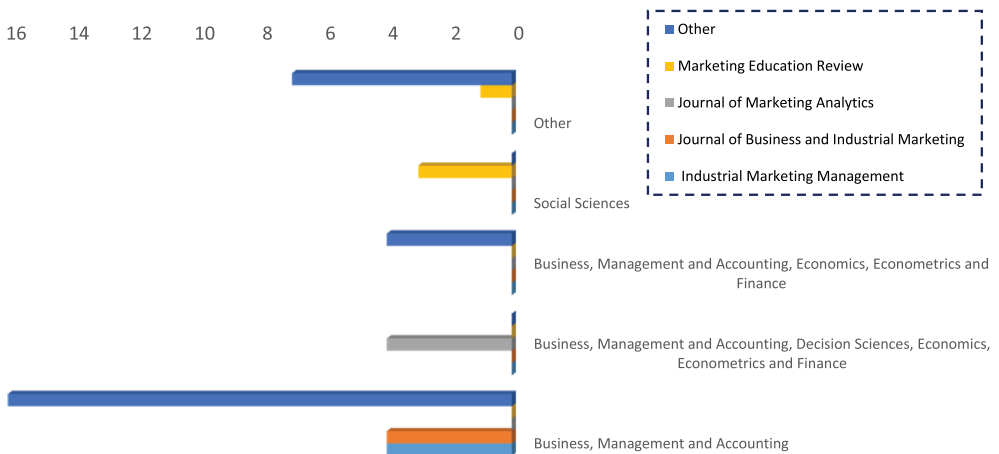
Authors	Year	Type of article										Journal					Area of Study					Main Focused
		RH	EM	RE	TL	CL	IMM	JBIM	JMA	MER	Other	BMA	BMADEEF	BMAEEF	SS	Other	Digital Marketing Analytics	Digital Marketing Analytics + B2B	Marketing Analytics	Marketing Analytics + B2B		
		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*						
Singh et al.	2022	*																				Digital Marketing Analytics
Addo et al.	2022	*																				Digital Marketing Analytics
Ghoniim et al.	2022	*																				Marketing 4.0
Hossain et al.	2022	*				*																Marketing Analytics + B2B
Cao et al.	2022	*																				Marketing Analytics
Liang et al.	2022	*				*																Marketing Analytics
Akter et al.	2022	*																				Marketing Analytics
Cluley	2022	*																				Marketing Analytics
Vollrath & Villegas	2022	*						*														Marketing Analytics
Wilson & Stephens	2023	*					*															Digital Marketing Analytics + B2B
Rahman et al.	2022	*																				Marketing Analytics
Zahay et al.	2022	*			*				*													Digital Marketing
Kim et al.	2021	*																				Digital Marketing
Wang, Deng, et al.	2021	*																				Digital Marketing
Dash et al.	2021	*																				Marketing Analytics
Sarkar & De Bruyn	2021	*																				Marketing 4.0
Davis et al.	2021	*			*																	Marketing Analytics
Kopalle & Lehmann	2021	*			*																	Marketing Analytics
Aljumah et al.	2021	*																				Marketing Analytics
Cao et al.	2021	*																				Marketing Analytics
Dar et al.	2021	*																				Marketing Analytics
Sheth	2021	*								*												Marketing Analytics
Wang, Rod, et al.	2021	*								*												Marketing Analytics
Pandey et al.	2020	*								*												Marketing Analytics + B2B
Cao & Tian	2020	*			*					*												Digital Marketing + B2B
Petrescu et al.	2020	*																				Marketing Analytics
Kim	2019	*			*																	Marketing Analytics
Haywood & Mishra	2019	*																				Marketing Analytics
Cao et al.	2019	*								*												Marketing Analytics
France & Ghose	2019	*			*																	Marketing Analytics
Kakatkar & Spann	2019	*																				Marketing Analytics
Iacobucci et al.	2019	*						*														Marketing Analytics
Weathers & Aragón	2019	*							*													Marketing Analytics
Wright et al.	2019	*			*																	Marketing Analytics + B2B
Liu and Burns	2018	*			*				*													Digital Marketing Analytics

(Continued)





**Figure 3.** Number of articles per year based on article type.



**Figure 4.** Field of research based on publication outlets and per journal.

neural network was drawn based on the main themes. Accordingly, an integrated framework model and an exploration and exploitation figure were drawn. Based on the literature review, [Figure 6](#) illustrates the main themes of Marketing 4.0 analytics at the second level. The main themes expand the integrated framework in the present research. Digital Transformation, Big Data, Marketing Analytics, Marketing, Analytics, and Customer are influenced by the third category and improve the effectiveness of Marketing 4.0 analytics. The sub-themes, or the third level, that indirectly affect the development of Marketing 4.0 analytics present the integrated framework in more detail in the current research.

**Table 2.** Journals included in the sample.

Journal	ABDC ranking	Marketing analytics articles	Weight (%)
Industrial Marketing Management	A*	4	9%
International Journal of Information Management	A*	1	2%
International Journal of Research in Marketing	A*	1	2%
Journal of Marketing	A*	1	2%
Marketing Science	A*	1	2%
Journal of Computer Information Systems	A	1	2%
Journal of Business Research	A	1	2%
Information Systems Frontiers	A	1	2%
Journal of Business and Industrial Marketing	A	4	9%
Journal of Business Research	A	3	7%
Journal of Consumer Marketing	A	1	2%
Journal of Enterprise Information Management	A	1	2%
Journal of Interactive Marketing	A	1	2%
Journal of Public Policy and Marketing	A	2	5%
Journal of Strategic Marketing	A	2	5%
Marketing Theory	A	1	2%
Business Process Management Journal	B	1	2%
International Journal of Educational Management	B	1	2%
International Journal of Hospitality and Tourism	B	1	2%
Journal of Business-to-Business Marketing	B	1	2%
Journal of Marketing Theory and Practice	B	2	5%
Management Decision	B	1	2%
Decision Sciences Journal of Innovative Education	C	1	2%
Expert Systems with Applications	C	1	2%
Journal of Marketing Analytics	C	4	9%
Marketing Education Review	C	4	9%

In addition, [Figure 5](#) denotes the countries that researched the fields of Marketing Analytics, Digital Marketing Analytics, Marketing Analytics + B2B, Marketing 4.0, Digital Marketing, Digital Marketing Analytics + B2B, and Digital Marketing + B2B. In total, 43 articles were reviewed, and the United States of America performed more research in this area (46%). Furthermore, North America, with 22 articles, and Europe and Asia, with nine studies, received the most attention, followed by Africa, with two studies, and Australia, with 1 study. Furthermore, it was revealed that 67% (29) of the articles investigated Marketing Analytics, Digital Marketing Analytics and Marketing Analytics + B2B.

The concepts and frequencies of the main themes presented in [Figure 6](#) are also presented in [Table 3](#). Digital transformations have been the most frequent, which indicates that this topic has played an important role in marketing analytics. The field of big data also plays an important role in marketing analytics and has had a high frequency in most articles. By using digital transformations and big data, positive changes can be made in marketing analytics, increasing the effectiveness of marketing processes.

According to the frequency of each theme and its codes in the literature, [Figure 7](#) depicts the theme map created by MAXQDA. This figure supports the integrated framework and contains 25 nodes representing the categories. The higher the number of categories, the larger the node. Digital Transformation, Big Data, Marketing Analytics, Marketing Analytics, and Customer are the main themes in Marketing 4.0 analytics. Sub-themes shown with a node smaller than the main themes are related to the main themes according to the literature and their affect on the main themes. It can be seen that the sub-themes affect the effectiveness of the main themes and indirectly improve Marketing 4.0 analytics. This model supports the development of the integrated framework of the current research in many ways. First, it reveals all the categories related to the factors involved in Marketing 4.0 analytics. Secondly, it presents the frequency and relationships

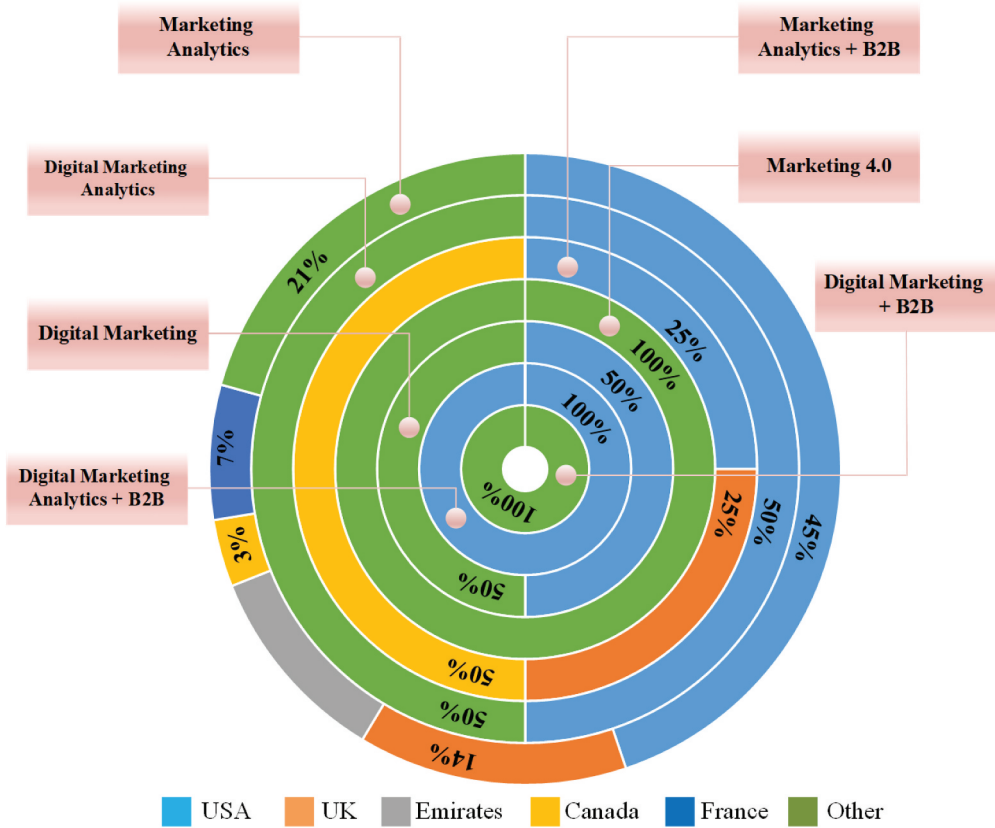


Figure 5. Articles per geographical location and field of research.

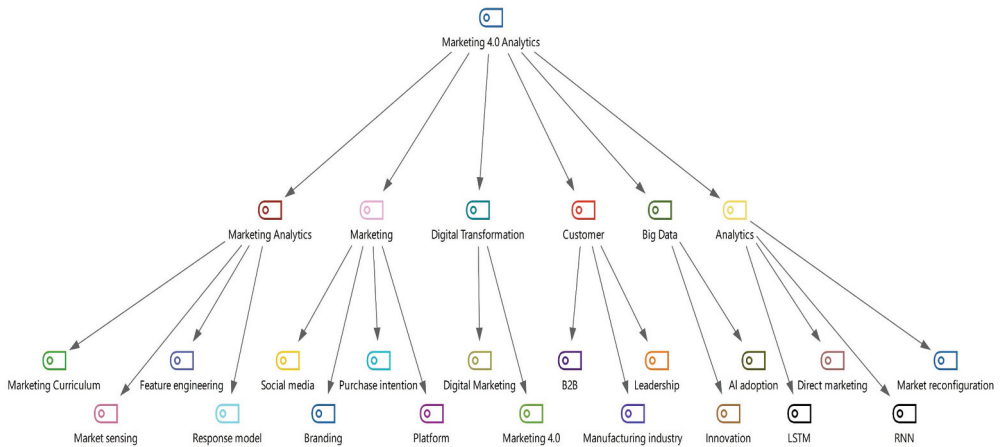


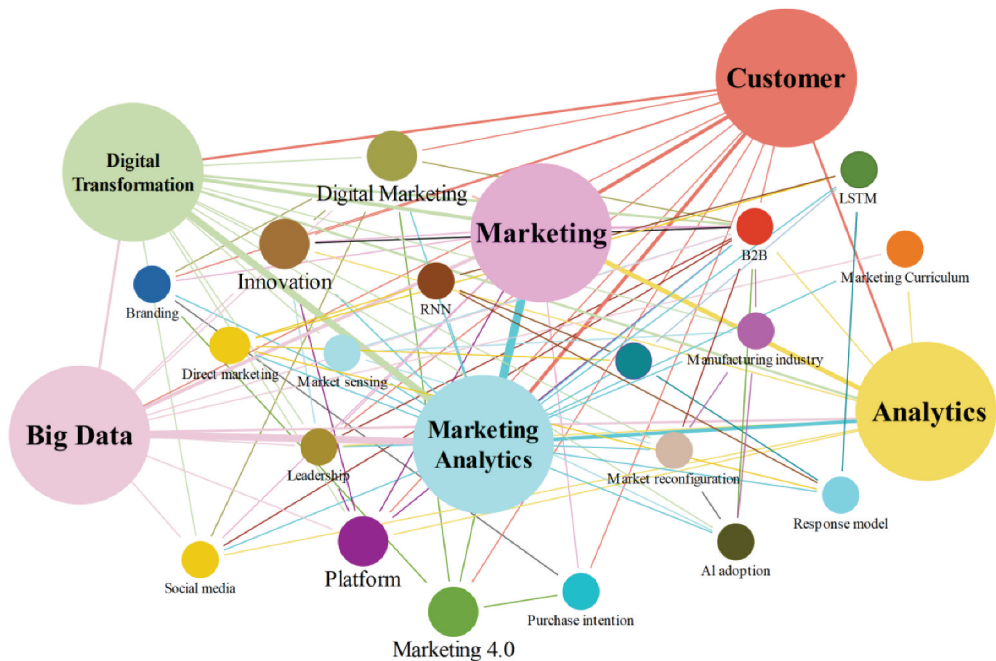
Figure 6. The hierarchical structure of the Marketing 4.0 analytics themes.



**Table 3.** Categorised Marketing 4.0 analytics themes.

Theme	Concept	Code	Frequency
Digital Transformation	Refers to using Digital Transformation technologies such as the Internet of Things (IoT), Big Data (BD), and Cloud Computing (CC) in marketing analytics.	Digital Marketing Marketing 4.0	26
Big Data	A huge volume of data is used for analysis and presentation. High volume, high velocity, high variety, and high veracity (4Vs) are the characteristics of big data. Big data is an important element in Marketing 4.0 analytics.	Innovation AI adoption	17
Marketing Analytics	It evaluates the market to know the internal weaknesses and strengths and the external opportunities and threats necessary to adopt a strategy.	Marketing Curriculum Response model Market sensing Feature engineering	35
Marketing	Using digital channels to market products and services and facilitate marketing processes by digital technologies.	Purchase intention Branding Social media Platform	33
Analytics	The advanced analysis makes more accurate information about the market, opportunities, and threats useful for managers and marketers.	Direct marketing RNN LSTM Market reconfiguration	18
Customer	If the marketing analytics processes are not parallel with the customers, the organisations will open the doors to their competitors.	B2B Manufacturing industry Leadership	19

RNN: Recurrent neural network, LSTM: Learning-short term memory.



**Figure 7.** Neural network model of research categories.

of the categories. Thirdly, the position of each category in the final integrated framework compared to other categories in Marketing 4.0 analytics is determined.

Exploration is a strategy that identifies opportunities and factors influencing Marketing 4.0 analytics in the B2B sector. In this way, the B2B sector can identify the new and innovative processes of Marketing 4.0 analytics and apply them in their strategies. Exploitation is also a strategy focused on the processes of the B2B sector. It seeks solutions for innovative methods and practices related to services that strengthen and improve the B2B sector. In the current research, by re-examining the literature of the finalised articles, it has been determined that some factors in Marketing 4.0 make data analysis compatible with Marketing 4.0 practices and methods. In addition, some factors must be applied in the B2B sector to make Marketing 4.0 analytics effective. To classify these factors more clearly, the exploration-exploitation strategy was used in this research. Figure 8 demonstrates that the themes of marketing analytics, big data, and data analytics have intensified towards Marketing 4.0. Therefore, the B2B sector should prioritise these themes in their strategies. The B2B sector must also embrace Marketing 4.0 analytics to identify business blind spots and avoid potential risks. By adopting Marketing 4.0 analytics, the B2B sector can better understand marketing trends, predict future results, and increase customer satisfaction.

## Discussion

According to the findings, research in Marketing 4.0 analytics has increased. Some countries, such as the USA, the UK, and the United Arab Emirates, show a higher adoption rate of Marketing 4.0 analytics than others. Also, high-ranking journals welcomed this issue. However, this study is the first to provide a systematic and comprehensive overview

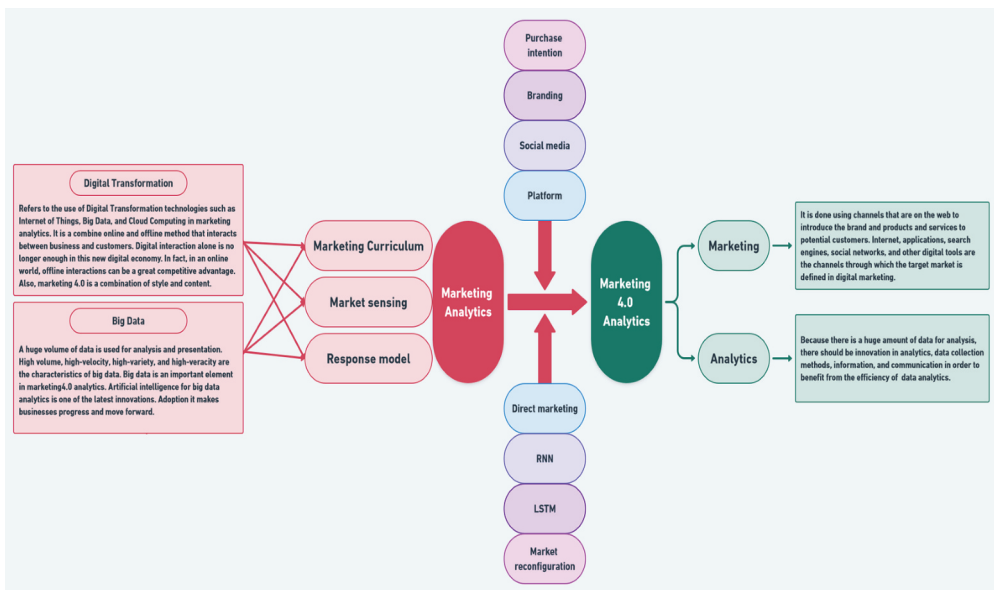
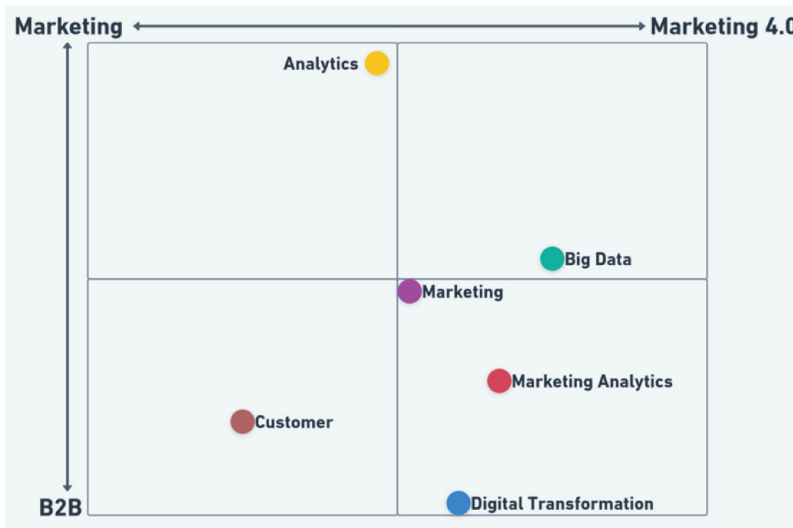


Figure 8. Integrated framework.

of the scope of Marketing 4.0 analytics in the B2B sector. Previous research dealt with the concept of Marketing 4.0 and examined the evolution from Marketing 1.0 to Marketing 4.0 (Başyazicioğlu & Karamustafa, 2018; Confetto et al., 2020; Dash et al., 2021; Tarabasz, 2013). Also, some research analysed marketing in B2B (Hallikainen et al., 2020; Hung et al., 2020; Wang et al., 2021; Wilson & Stephens, 2023). Therefore, this study investigated to fill the research gap in Marketing 4.0 analytics in the B2B sector and highlighted several knowledge gaps in Marketing 4.0 analytics. In particular, this review shows promising research areas in Marketing 4.0 analytics in B2B. Moreover, in this study, various moderating and contextual factors were considered at the intersection of research on Industry 4.0 to provide useful ways for future research.

According to the literature, many innovative and creative opportunities in Marketing 4.0 analytics can improve the B2B sector, such as digital transformation data analysis processes (Wang & Wang, 2020). Big data plays an important role in data analysis in B2B, which leads to providing strategy-oriented and forward-looking reports (Hallikainen et al., 2020). Moreover, by changing the analysis and marketing processes to Marketing 4.0 analytics, customer satisfaction can be increased, and a competitive advantage can be obtained (Martínez-Ruiz et al., 2021). In sum, by applying a comprehensive and scientific review method, this study identifies and summarises the various factors that play a vital role in Marketing 4.0 analytics, thus presenting the fragmented literature in an integrated framework.

In this study, the SLR-TA was used to determine the analysis of Marketing 4.0. According to the literature, it has many applications in Marketing 4.0 and is used as the main element in Marketing 4.0 (Başyazicioğlu & Karamustafa, 2018; Guven, 2020). By examining the effects in the scattered literature, an integrated scheme is presented in Figure 9, which provides new insights and furthers the existing literature. By analysing the final articles, the main themes and sub-themes were extracted (Figure 6). Then, using MAXQDA, a neural network model was presented that



**Figure 9.** Exploration and exploitation themes in Marketing 4.0 analytics.

determined the relationships and frequencies between the categories (Figure 7). The main themes and sub-themes were used at a certain level to create an integrated environment, as displayed in Figure 9.

The integrated framework helps managers formulate strategies for Marketing 4.0 analytics in their organisation to increase their competitive advantage. At a more general level, this framework is based on a sound theoretical basis. It provides a comprehensive perspective on Marketing 4.0 analysis regarding innovation and development of marketing sectors. The findings of this study provide the foundations of Marketing 4.0 analytics for B2B to understand the various direct and indirect links between different marketing departments. Researchers can identify the barriers and potentials of digital transformations in the B2B sector and adapt data analytics processes to this change. Security and transparency are one of the important issues in the field of big data. Researchers can investigate security and transparency in big data and increase its security in the B2B sector. The behaviour of customers towards the changes in marketing analytics in the era of Industry 4.0 in the B2B sector can be investigated by researchers, too. According to that, the future research direction has also been determined in Table 4.

**Table 4.** Direction for future research.

Theme	Future research direction
Digital Transformation	<ul style="list-style-type: none"> <li>● Identifying challenges and drivers of digital transformations in Marketing 4.0 analytics</li> <li>● Examining the role of digital transformation technologies such as the Internet of Things (IoT) and artificial intelligence (AI) on marketing analytics</li> </ul>
Big Data	<ul style="list-style-type: none"> <li>● Examining the consequences of adopting digital transformations in marketing analytics</li> <li>● Studying the consequences of using artificial intelligence (AI) in big data analytics</li> <li>● Providing a unified framework for the impact of big data on marketing analytics</li> <li>● Studying the role of big data in Marketing 4.0 decisions</li> <li>● Studying the challenges of accepting big data in Marketing 4.0 analytics</li> <li>● Providing solutions for the transparency and security of big data to increase the efficiency of Marketing 4.0 analytics</li> </ul>
Marketing Analytics	<ul style="list-style-type: none"> <li>● Studying the role of blockchain and its consequences in big data analytics</li> <li>● Examining how marketing analytics is changing to Marketing 4.0 analytics</li> <li>● Studying the consequences of moving toward Marketing 4.0 analytics in organisational decision-making processes and adoption of strategies</li> </ul>
Marketing	<ul style="list-style-type: none"> <li>● Studying the consequences of adopting Industry 4.0 on several marketing departments</li> <li>● Investigating marketing methods in Industry 4.0</li> <li>● Identifying the components of Industry 4.0 in marketing</li> </ul>
Analytics	<ul style="list-style-type: none"> <li>● Determining what the components are of innovation in analytics?</li> <li>● Investigating the adoption process of Industry 4.0 in analytics methods</li> <li>● Identifying the challenges of Industry 4.0 adoption in the analytics</li> <li>● Examining the consequences of organisational decision-making based on analytics 4.0</li> </ul>
Customer	<ul style="list-style-type: none"> <li>● Investigating customer behaviour and their feedback from marketing 4.0 analytics</li> <li>● Identifying customer expectations from marketing 4.0 analytics</li> <li>● Studying the consequences of not using marketing 4.0 analytics on customer behaviour</li> </ul>

## Conclusion

Industry 4.0 has made significant progress in the past decades and has attracted the attention of many researchers. Like other fields, marketing analytics has been subjected to the advancements of Industry 4.0 and has caused changes. By dealing with Marketing 4.0 analytics, this study tried to enrich the literature in this field. Through this, an integrated

framework of Marketing 4.0 analytics was presented, which supports businesses in their marketing decisions and adopting competitive strategies.

In this study, the SPAR-4-SLR approach was used to investigate the effects of data analytics on Marketing 4.0. However, other scholars can employ advanced techniques such as Random Projection (RP) and Term Frequency-Inverse Document Frequency (TF-IDF) to increase the accuracy of the data mining and information-gathering process. The sample size of the literature review section in this manuscript was limited to 43 relevant sources, which reveals the scant research in this field. Therefore, scholars are advised to investigate and examine the research directions recommended in this study, including (i) digital transformation, (ii) big data, and (iii) marketing analytics, which were implicitly highlighted in the literature and the findings. The deficiency of studies conducted in B2B was another limitation of this study. Experts' opinions were applied to overcome this limitation; nevertheless, these findings may differ from those of alternative experts. According to the findings, academic studies in B2B are increasing. Therefore, future research can increase the marketing analytics in this area by considering the technological and economic needs of B2B and identifying the drivers and barriers of Industry 4.0.

Marketing analytics in the age of Industry 4.0 has a lot of potential for improvement. This study examined the articles published in academic journals with a useful review in English in the field of Marketing 4.0 analysis and presented an integrated framework. Nonetheless, several gaps still exist regarding marketing analytics and Industry 4.0. For instance, books, conference papers, and other articles in non-English languages were not examined in this study. The authors hope this study will inspire researchers and executives and pave the way for more enlightening research on the multidisciplinary interaction between Industry 4.0 and marketing analytics.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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