The Impact of Artificial Intelligence on Branding:
A Bibliometric Analysis (1982-2019)

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ABSTRACT

Understanding the growth paths of artificial intelligence (AI) and its impact on branding is extremely pertinent of technology-driven marketing. This explorative research covers a complete bibliometric analysis of the impact of AI on branding. The sample for this research included all 117 articles from the period of 1982-2019 in the Scopus database. A bibliometric study was conducted using co-occurrence, citation analysis and co-citation analysis. The empirical analysis investigates the value propositions of AI on branding. The study revealed the nine clusters of co-occurrence: Social Media Analytics and Brand Equity; Neural Networks and Brand Choice; Chat Bots-Brand Intimacy; Twitter, Facebook, Instagram-Luxury Brands; Interactive Agent-Brand Love and User Choice; Algorithm Recommendations and E-Brand Experience; User-Generated Content-Brand Sustainability; Brand Intelligence Analytics; and Digital Innovations and Brand Excellence. The findings also identify four clusters of citation analysis—Social Media Analysis and Brand Photos, Network Analysis and E-Commerce, Hybrid Simulating Modelling, and Real-time Knowledge-Based Systems—and four clusters of co-citation analysis: B2B Technology Brands, AI Fostered E-Brands, Information Cascades and Online Brand Ratings, and Voice Assistants-Brand Eureka Moments. Overall, the study presents the patterns of convergence and divergence of themes, narrowing to the specific topic, and multidisciplinary engagement in research, thus offering the recent insights in the field of AI on branding.

KEYWORDS

Artificial Intelligence, Bibliometric Analysis, Branding, Chatbot, Neural Network, VOS Viewer

1. INTRODUCTION

Technological development transforms the extant marketing landscape. The extensive usage of the internet has brought marketing of products or services into the online platform emphasizing a brand's recognition in the global market (Davenport et al., 2020). The internet helps companies do their business in a digital platform like social media, e-commerce websites to increase the number of users to buy specific branded products (Chen, 2019). In the current scenario, artificial intelligence (AI) is used extensively to deploy operational marketing that includes identification of risks, targeting of customers, brand advertising and pricing to maximize the profits (Marinchak et al., 2018). In the digital age, AI brings a significant impact and transformation through marketing communication and channels (Qiao et al., 2019). Industry practitioners and academicians have argued that AI is gaining momentum through big data analysis, machine learning, social media analysis, algorithm decision making, simulation modelling, and other techniques that is used for brand visibility in the global market (Singh et al., 2019; Syam & Sharma, 2018). Hence, AI is substantially changing brand preferences, marketing strategies and customer attitude. Moreover, these impending shifts in the global gig economy (i.e. based on flexible or temporary jobs, often involves connecting with clients or customers through an online platform) has a considerable impact on marketing activities (Wang et al., 2020; Chen et al., 2012).

AI is a set of algorithm-based machines are designed or coded to individual learning from data helps for predictions and exceptional performances via artificial neural networks, machine learning, robotic process automation, and text mining (Huang & Rust, 2018). Further, AI acts smartly with the integration of business and marketers to create, organize, and knowledge used in marketing to sell their brands across the globe (Davenport & Ronanki, 2018). AI in marketing has been addressing the administrative, legal and strategic planning process of sales, advertising, branding, pricing in the management domain (Gentsch, 2019). Accordingly, the prime focus of the current study is to discuss AI implications on branding and marketing knowledge that bring business optimization (Paschen et al., 2019). AI is very efficient in responding to practical problems and entering decisions in real-time or near to that by the replacement of a human being (Amershi, 2019; Rai et al., 2019). For example, chatbots are an AI-assisted robot established by Bookings.com provides around the clock customer service with the support of 43 languages to answer travel-related questions to their respective customers (Cross et al., 2019). This highly involved language processing capability helps chatbots able to interact with customers and offer those customized recommendations. It helps Boooking.com to increase sales with simplified work (Cross et al., 2019). For business to business (B2B) companies, AI helps to transform big data into reliable information and knowledge that might be required to develop effective marketing and sales strategies (Paschen et al., 2019). Although the recent literature has discussed the impact of AI on supply chain, retailing, B2B and customer relationship management (CRM), (Muhuri et al., 2019; Parveen, 2018), there is very limited research on AI in branding (Schultz & Block, 2015).

The impact of AI on branding has gained significant popularity in recent years (West et al., 2018). Brands are achieved by wrapping unexceptional products with emotional and social associations with the help of AI to drive *organizational success* (Galloway, 2016). Recent advancements in AI have entirely changed the search of brands using *keywords* or *voice search* (Yoganarasimhan, 2014). A virtual assistant helps to improve search functionality more precisely and efficiently to find out the right brand. In addition, experts argued that AI would drive *product innovation* (Domingos, 2015), and customers able to identify the right brand of the products through *product line extensions* (West et al., 2018). The earlier studies explored the importance of AI recommendations on products (Lee & Hosanagar, 2018), which is associated with brands in the digital world (a combination of human intervention, technology, big data, cloud) (Swaminathan et al., 2020). Despite these, vital efforts to synthesize the extant literature about the impact of AI in branding appear uneven and lack of clarity (Stone et al., 2020). AI can be applied in segmentation, personalization, pricing and sales forecasting of a brand (Columbus, 2019). However, many marketing practitioners are still unaware of the role of

AI in developing brand equity. Due to its infancy, there is not even a single framework to know how AI should be aligned with branding research. Therefore, it is critical to understand how to deploy the AI systems in branding to meet marketing objectives. In addition, there is no evidence of research on systematic (bibliometric) analysis in branding to date. Thus, the study illuminates the impact of AI in branding by considering journals, keywords, authors and countries given much prominent to AI. The study put forward the research question: *What is the impact of AI on branding to enhance firm performance?*

The current study addresses the above research question by applying a bibliometric analysis on the literature of AI in branding. The bibliometric analysis examines a complete set of research in a specific area from a quantitative perspective (Merigo et al., 2015). In this article, the authors have drawn structured discussions and phases of articles that are as follows. First, the study describes the conceptual background- how AI works in branding and hence proposed a conceptual framework (in Figure-1), and - how AI aligned with the business (summary presented in Table-1). Second, the research explains about bibliometric methodology/protocol. Third, the study provides the findings of bibliometric analysis by using co-occurrence, citation and co-citation analysis. Finally, this study discusses contributions, research implications, and directions for future research and conclusions.

2. CONCEPTUAL BACKGROUND AND METHODOLOGY

The concept of AI existed earlier. The reference of AI can be discovered during 1950s since English polymath Alan Turing started a test to verify if the machine can mimic human functions (Batra et al., 2018). There is a possibility which might help to invent of higher computing processing power (Akter et al., 2020). The term AI is defined as a science of training machines to perform human work by using the big data and identifying their patterns to demonstrate intelligence through machine learning, natural language processing, neural network etc. (Davenport et al., 2020; Kumar et al., 2020; Shankar, 2018). It is all about computers to do things that require human intelligence, understanding language, reasoning, navigating the physical world (Hosanagar, 2020).

AI is more into automated machines that act like humans, describes the process includes perspectives/views, set of instruction/commands, remembering, problem solving on goal-oriented behavior (Paschen et al., 2019). AI is a forefront revolution in global business and society. AI helps a firm to understand better, predict, and engaging customers in their brands (Keller, 2020). Hence, the implementation of AI in brand management can contribute to firm performance (Rautrao, 2020).

Based on the previous studies on AI and its implications in marketing with relevant examples (Campbell et al., 2020) helped to develop a novel concept of how AI-enabled tools used in branding during each phase and represented in Table 1.

2.1 Bibliometric Protocol

In order to explore the various clusters of the field of branding in present study, we stick to a systematic process to identify relevant academic sources. First, the search query includes the words in the title or keywords using the Scopus Online database. The possible combination of words in the search query:

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(TITLE-ABS-KEY ("Artificial Intelligence" AND brand*) OR
TITLE-ABS-KEY (ai AND brand*) OR TITLE-ABS-KEY (chatbot AND
brand*) OR TITLE-ABS-KEY ("Interactive Agent" AND brand*) OR
TITLE-ABS-KEY ("Expert system*" AND brand*) OR TITLE-ABS-KEY
("Computer system*" AND brand*) OR TITLE-ABS-KEY (robotics
AND brand*) OR TITLE-ABS-KEY ("Machine learning" AND brand*)
OR TITLE-ABS-KEY ("Intelligent retrieval" AND brand*) OR
TITLE-ABS-KEY ("Neural network*" AND brand*) OR TITLE-ABS-KEY
("Natural language processing" AND brand*) OR TITLE-ABS-KEY
("Knowledge engineering" AND brand*)) AND (LIMIT-TO (DOCTYPE,
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Table 1. AI in Branding aligned with marketing and illustrations

What AI Can Offer	Types of big data	Examples of AI implementation
Phase1: *Macro - environment analysis* Analyze the current scenario involves the understanding of macro environments factors which affects the brands in the global market	Customer data, demographic information, sales, advertisement, offers discounts on e-commerce and social media websites	1.Online retailing Birchbox predicts what customer wants to buy in online shopping (Davenport et al., 2020) 2.Cultfit app free fitness training session due to COVID -19 and recommends the users to go for a workout (Simoski et al., 2019) 3. Stock-Market behavioural analytics increases the macro economy forecasting by predicting the different AI models in the brands (Campbell et al., 2020)
Phase2: *Micro - environment analysis* Understanding the brands in the global markets and customers of micro environmental factors like brand loyalties, consumer behaviour, purchase pattern, customer attitude, brand personality	Internal data includes sales data, customer data, and market research on customer feedback about the brands, advertisement assessment. External data includes market share, brand love index, pricing, competitors, product demand, social media analysis or customer sentiment analysis	1. 1. Under Armour (UA), fitness app uses AI by tracking and record the health-based data from social media posts, smart watches, data enter by users directly and recommends for them to personalize their diet and exercise advice to users. 2. 2.In this app, AI helps to capture consumer sentiment analysis and provides information about the brand what consumer thought about this and how it differ from other brands 3. (Kreutzer & Sirrenberg, 2020).
Phase3*: STP Analysis* Segmenting, Targeting and Positioning of the brands comprises of promotions, advertising, and clusters	Internal data comprises of brand loyalty, customer loyalty/ satisfaction, brand perceptions External data includes demography and location	1.Big Billion Sale of Amazon targets on Indian specifically metropolitan cities to increase their sales and also recommends to buy more brands on that day (Dumaine, 2020)
Phase 4: *Strategic Planning* Strategic Planning from the companies to set the objectives to push the brands in the global market by using virtual assistants/ chatbots to provide information to the customers about product price and its specification	Internal data are brand recognition, brand loyalty and brand perceptions External data are customer data, demographic data	1.Chatbots are used in banking sector Erica(Bank of America) Amex(American Express), Eva (HDFC), Amy (HSBC) helps to create sales lead generation, brand loyalty, customer support and feedback (Akter et al., 2020; Davenport et al., 2020)
Phase 5: *New Product Development* Developing strategies for brand line extension and new product development based on marketing trends	Data includes past data where customers are associated with specific brands from the last 5 years, new customer profiles, social media ads, print media ads	1. New product development in Stitch fix in the fashion industry, AI helps to design the clothes based modern fashionista for customers. 2. Stitch fix virtual assistant understands both numeric and non-numeric information of customers. Customized the clothes by AI customer measurements (Kim, 2020)
Phase 6: *Pricing Decisions* Pricing Decisions/ Strategies to increase sales in the brands	Both historical and present sales data of the brands	1.Amazon uses algorithms that automatically to increase their prices when the brand is on-demand (Shang & Kauffman, 2020)
Phase 7: *Distribution Channels* Developing distribution channels and Inventory Management	Historical and real-time sales data, web traffic data, individual customer data, their responses and customer satisfaction on their brands	1. Sephora can able to notify customers either by mail or direct mail or text message when their favourite product is in stock or sale when the customer is near to the retail store (Campbell et al., 2020). 2.In retail stores AI Café X, automated baristas respond to the customer queries and provides the services also inform the customer when the product is available in the store automatically, Afesh AI-driven stock and inventory management (Davenport et al., 2020; Campbell et al., 2020)
Phase 8: *Integrated Marketing Communication* Developing integrated marketing communication and customer feedback. Creation of advertisement/promotion of brands in specific adwords, key words and bidding in the google, yahoo, bing, facebook, instagram twitter, LinkedIn helps the companies in business optimization and cost reduction	Both historical data and current data of brands their promotional information, texts, jingles, images, brand performance, brand recognition, customer purchase data	1.Tesla AI enabled driverless cars has to create a significant impact on insurance sectors, taxi services, and customer (Girasa, 2020) 2. Mazda implemented AI to promote a new car model CX-5 at the SXSW festival in Austin. So with the help of AI Japanese Automobile brand connected the customers based on the festival fan base in social media exclusively (Cornwell, 2020)

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"ar")) AND (LIMIT-TO (SUBJAREA, "BUSI")) AND (EXCLUDE
(PUBYEAR, 2020)) AND (LIMIT-TO (LANGUAGE, "English")).
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Second, we chose the medium to be the English language. Third, we filtered academic journals (peer-reviewed) by excluding trade publications, magazines, and books. Lastly, we examined publications for the duration between 1982 to 2019. This search process finally yielded 117 papers published. More recently, a sudden outbreak in terms of publication has been noticed, started with

Figure 1. Framework of AI in branding
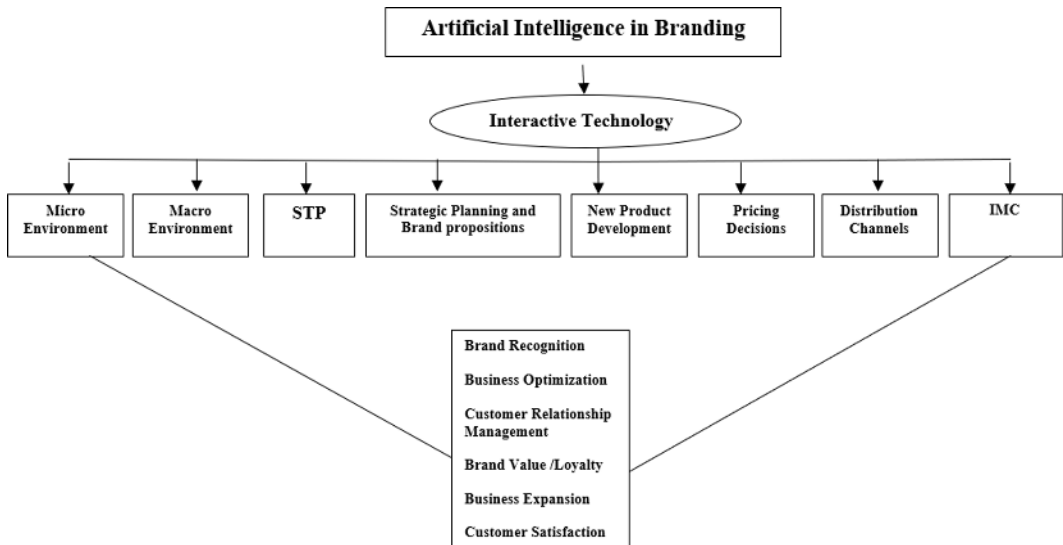
AI concepts and then spread to another field like business and management studies. Therefore, we included all three fields of studies in our search process.

The fundamental preliminary analysis revealed an exponential growth of the field of AI in branding in recent decades (as shown in Table 1). Other analysis includes most frequently cited journals (Table 2), top ten most cited articles (Table 3), and top countries working on the area of AI in branding research (Table 4) for the duration 1982-2019.

The bibliometric analysis identifies the main authors, organizations and provinces for their contributions to the extant literature on a particular topic (Xu et al., 2018). Hence, the present study considers the bibliometric analysis in the field of artificial intelligence and branding. In this study, author keywords - co-occurrence, citation analysis, co-citation analysis is incorporated. Further, the initial phase starts with explaining the topic of academician interest and then follows the subsequent step to provide future study on the research topic. However, the empirical analysis provides data on AI in branding using bibliometric analysis is very rare to till date. Bibliometric analysis study provides more significant insights to study AI in branding. However, the overall analysis was not comprehensive. The research gap is addressed above in the literature section and contribution made in the AI in the branding period of 1982 and 2019 by using the bibliometric technique. In this study three major tools are co-occurrence (authors based), citation analysis (authors and sources) and co-citations (sources) is incorporated, and their respective clusters summarise it in Table 5

3. FINDINGS

3.1 Co-Occurrence (Authors Based)

VOS viewer co-occurrence analysis (VCA) (Van Eck & Waltman, 2009) is used to retrieve the relevant articles in the area of AI in branding by using the VOS viewer software package. VCA helps to recognize the AI and aggregate the key terms into specific clusters, which indicates the research domains and directions of future research in the field. The novel review helps to know the insights and applications of AI in branding as theoretical underpinnings and methodological perspectives (Ali & Golgeci, 2020). The period is considered for the more exceptional analysis of co-occurrence, i.e., 1982-2019. The co-occurrence analysis comprises nine clusters that are explained in detail.

Table 2. Most frequently cited journals (1982-2019)

No.	Journal Name	No of Articles	Citations
1	Decision Support System	5	293
2	International Journal of Research in Marketing	4	193
3	Knowledge Based Systems	2	190
4	Technological Forecasting and Social Change	1	97
5	Journal of Retailing	1	76
6	Journal of Retailing and Consumer Services	5	70
7	Cornell Hotel and Restaurant Administration Quarterly	1	68
8	Management Science	1	56
9	Journal of Business Research	5	50
10	Journal of Forecasting	2	50
11	Manufacturing and Service Operations Management	1	47
12	Journal of Travel and Tourism Marketing	2	34
13	Business Horizons	1	32
14	Journal of Consumer Research	1	31
15	Industrial Marketing Management	2	28
16	Omega	2	28
17	Journal of Marketing Research	2	25
18	International Journal of Retail and Distribution Management	1	23
19	Decision Sciences	2	22
20	Journal of Management Information Systems	2	1

3.1.1. Social Media Analytics and Brand Equity

The rise of social media usage for both the companies and customers recommends promising data sources to know consumer behaviour (Qiu et al., 2015; Zhang et al., 2016). Social media data helps to notify the company strategy and creates business optimization (Luo & Zhang, 2013). The recent research examines the impact of user-generated content of nuances of brands in Twitter followers on the brand image (Kuksov et al., 2013) and product sales (Goh et al., 2013) to achieve brand equity. Further study also analyses social structure of the brands on social media to create information or content for brand perceptions (Culotta & Cutler, 2016). The benefits of social media analytics help to know the data blast, capacity, and ambiguity of data sources raises the challenges, which helps to frame the effective algorithmic decision-making. Advanced research calls to increase the choice of analysis on the interface of social networking web and equity of brands in all the social media platforms (Erdogmus & Cicek, 2012; Labrecque, 2014). In addition, the dynamics of social media and brand equity termed as a theory of brand equity (Aaker, 1991; Keller, 1993).

The evolution of social media data is primarily categorized into firm generated content (FGC) and user-generated content (UGC) (Colicev et al., 2018). FGC is generated through social media pages or accounts and used by companies as a marketing channel (Hutter et al., 2013) to improve customer relationships (Luo et al., 2013). This can be achieved through many posts including texts, videos, or photos through a social network (Kumar et al., 2016). On the other hand, user-generated content (UGC) explains the social network web activity of customers focusing on particular brands. UGC is a network-based, distributed, and nonlinear phenomenon (Brodie et al., 2013) to measure the firm's

Table 3. Top ten most cited articles (1982-2019)

No.	Article Name	Author/year	Journal	Total citations	Methodology
1	Identification of Influencers –Measuring influences in customer networks	Kiss & Bichler (2008)	Decision Support Systems	228	Simulation/ Quantitative Analysis
2	Sentic patterns: Dependency-based rules for concept-level sentiment analysis	Poria et al. (2014)	Knowledge-Based System	177	Empirical / Quantitative Analysis
3	Estimating aggregate consumer preferences from online product reviews	Decker & Trusov (2010)	International Journal of Research in Marketing	155	Empirical/ Quantitative Analysis
4	China's manufacturing locus in 2025: With a comparison of "Made-in-China 2025" and "Industry 4.0"	Li (2018)	Technological Forecasting and Social Change	97	Empirical/ Quantitative Analysis
5	Positioning analysis with self-organizing maps. An exploratory study on luxury hotels	Mazanec (1995)	Cornell Hotel and Restaurant Administration Quarterly	80	Empirical/ Quantitative Analysis
6	Market share forecasting: An empirical comparison of artificial neural networks and multinomial logit model	Agrawal & Schorling (1996)	Journal of Retailing	76	Empirical/ Quantitative Analysis
7	Advertising content and consumer engagement on social media: Evidence from Facebook	Lee et al. (2018)	Management Science	56	Empirical/ Quantitative Analysis
8	Coordinating supply chains by controlling upstream variability propagation	Balakrishnan et al. (2004)	Manufacturing & Service Operations Management	47	Empirical/ Quantitative Analysis
9	Using an artificial neural network trained with a genetic algorithm to model brand share	Fish et al. (2004)	Journal Business of Research	45	Empirical/ Quantitative Analysis
10	A great place to work!? Understanding crowd sourced employer branding	Dabirian et al. (2017)	Business Horizons	32	Empirical/ Quantitative Analysis

content in social media. This phenomenon includes the valence or sentiment of user content (Colicev et al., 2018), user likes (Srinivasan et al., 2016) or user comments/posts to achieve brand equity (Goh et al., 2013). Also, future direction suggests that different practitioners and scholars study social media analytics through AI with the help of a marketing mix to achieve brand equity in the global market.

3.1.2. Chatbots Driven Brand Intimacy

Machine Talk or chatbots help consumers to make decisions and buy the products. The advancement of Natural Language Processing (NLP) and the implementation of chatbots allow the consumers to interact with the firms (Dale 2016; Hirschberg & Manning, 2015). The usage of messenger systems

Table 4. Top countries working on this particular area of research (1982-2019)

No.	Country Name	No of Articles	Total number of citations
1	United States	35	701
2	Germany	7	469
3	France	5	232
4	Singapore	5	188
5	United Kingdom	12	148
6	Spain	8	74
7	China	4	58
8	Sweden	4	56
9	Australia	4	39
10	India	16	31
11	Hon Kong	4	15
12	Italy	6	5

Table 5. Summary of Bibliometric Patterns in AI in Branding (1982–2019)

Classification Of Scientometric Analysis	Summary of Findings	Observation
Topic Mining i.e., Co-occurrence Clustering	1982-2019 (i.e., 9 topic cluster, refer Fig 3) In total, 9 topics clusters exist for the entire 1982-2019 1. Social Media Analytics and Brand Equity 2. Neural Networks and Brand Choice 3. Chatbots-Brand Intimacy 4. Twitter, Facebook, Instagram-Luxury Brands 5. Interactive Agent-Brand Love and User Choice 6. Algorithm Recommendations and E-Brand experience 7. User-Generated Content –Brand Sustainability 8. Brand Intelligence Analytics 9. Digital Innovations and Brand Excellence	Pluralistic topics; some topics weakened, or deviated or merged to a slice of other topics, some themes were evolving
Author-based Citation Clustering	An explosion in the author-based citation clusters occurred in 1982–2019, with 2 topics: (Refer Fig 4) 1. Social Media Analysis and Brand Photos 2. Network Analysis and E-Commerce	Topic diversification of author citation clusters represents various advance research topics
Source-based Citation Clustering	A diverse and complex source-based citation cluster occurred in 1982-2019 with 2 topics (Refer Fig 5) 1. Hybrid Simulating Modelling 2. Real-time Knowledge-Based Systems	Source citation clusters indicating pluralistic research themes
Source-based Co-citation Clustering	A diverse and complex source-based co-citation cluster occurred in 1982-2019 with 4 topics (Refer Fig 6) 1. B2B Technology Brands 2. AI Fostered e-Brands 3. Information Cascades and Online Brand Ratings 4. Voice Assistants -Brand Eureka Moments	Mixed journal co-citation clusters represents indicating pluralistic research studies

Figure 2. Co-occurrence (Author based) (1982-2019)
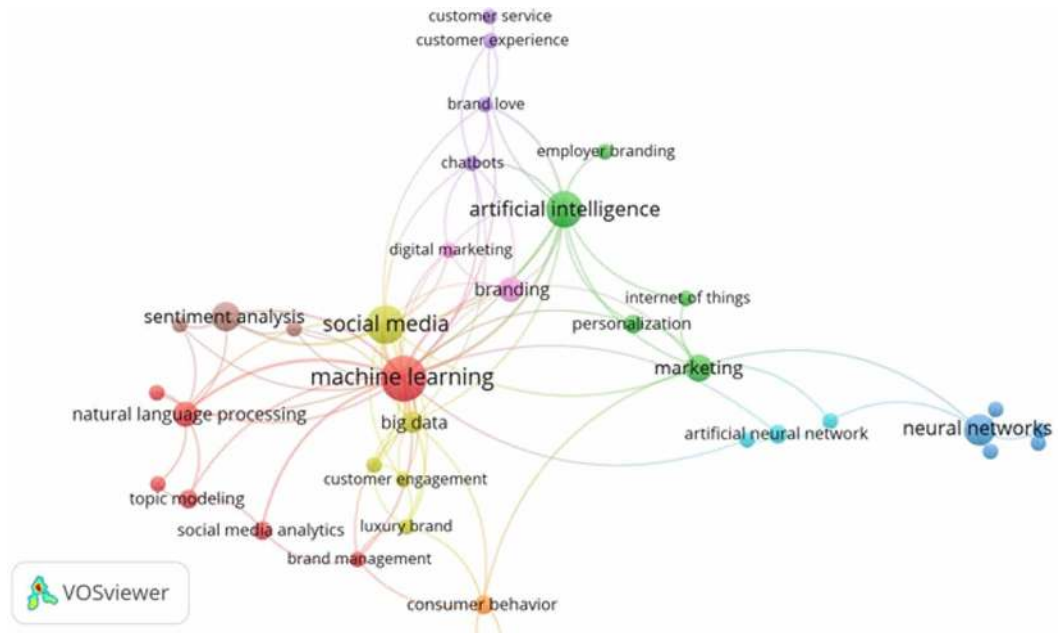
as a unique and novel interaction paradigm between consumers and intelligent bots referred to as the next operating system in business management and commerce. It is transforming changes how humans search, shop and express their preferences on particular brands (Suri et al., 2017; Netzer et al., 2012; Tang & Guo, 2013). These novel forms of interaction between the consumer and technology-related businesses help the value creation of business and to analyze consumer behavior. Research in this stream explains factors associated with system designs features (Lokman & Zain, 2010), users views and acceptance (Boden et al., 2006; Comendador et al., 2015) and unsupervised learning through user-interactions (Cuayahuitl et al., 2019).

Automated conversation supports consumers in how they understand a conversational interface similar to human-based traditional interfaces. It also increases the humankind's interaction, which creates more intimate consumer-brand relationships.

3.1.3. Artificial Neural Networks and Brand Choice

The initiation of barcodes and scanners made it easy for retail stores to keep track of their customers' purchase behaviour. The customer data provides information about the products that they have purchased. Nowadays, supermarkets or hypermarkets use loyalty cards that is used to understand the preferences of individual customers and forecast their future purchase decisions. This prediction helps the retail industry to maximize profit. It is a nonlinear statistical model created for the human brain and can be programmed and trained to identify data patterns (Kaya et al., 2010).

The applications of an artificial neural network are used in the market for the optimization of business. Agarwal and Schorling (1996) forecasted choice of probabilities to gain market share of each brand of the three grocery products. Studies indicate that by using simple artificial neural networks can help to increase the accuracy of customer preferences, forecast their brand evaluation and avoids fake data.

3.1.4. Twitter, Facebook, Instagram – Luxury Brands

It is important to know the adequacy of social media for luxury brands with usage intensity and engagement. The growing prevalence of social media platforms, including Twitter, Facebook, Instagram, and Google+, has profoundly shaped consumer behavior. Nowadays, social network users are able to exchange brand information (Liang et al., 2011). In addition, social media apps allow consumers to express their attraction or aversion to goods and services offered by different brands (Lipsman et al., 2012). These social media websites influence purchasing decisions at the global level (Afrasiabi et al., 2011). The advent of social web networks to design new business models and distribution channels in e-business called social trade (Liang & Turban, 2011). Social media helps to engage the users while promoting products, services and brands in online markets and communities (Stephen & Toubia, 2010, p. 215). These results increase social trade in social media (Liang & Turban, 2011).

3.1.5. Interactive Agent and Brand Love

Consumers have to get the right details through interactive agent with personalized solutions. In addition, these agents attend the individual customer queries in in the companies to provide suitable answers (Limaheluw, 2020). Shawar and Atwell (2007) define an interactive agent is a programming window able to chat or communicate with a human in the English language. In other words, interactive agents are used for programs using AI or algorithmic structures to communicate with users predict own solutions for specific questions and services developed in a text application (Eltinger, 2017). These executions are able to create interfaces and enable e-users to receive and send information to other users who are using the corresponding application. Several names have been used for interactive agents are software agents or chatbot (Kar & Haldar, 2016). The first virtual agents are 'Eliza' was created in 1966 and made several advancements over many years such as Parry (Colby, 1999), CONVERSE (Batacharia et al., 1999), and ALICE. Before 2016, recent study signifies that 60% of the companies do not get awareness or knowledge about interactive agents and further 54% of the web developers not worked on this same digital technology. Since the interactive agent has gained visibility in 2017, and 75% of the companies have stated that they were implementing these agents to deal with customers (Chandan et al., 2019).

Brand love is an emerging theme that provides a better insight of relationship of consumer and brand (Huber et al., 2015). It is a degree of the passionate and emotional attachment of a satisfied consumer for a specific trade name by using interactive agents. These interactive agents help the brands to communicate to their consumers without any intervention of employees for the specific task (Xu et al., 2017). The virtual agent provides the data, customization and purchase decisions for the customers. Thus, brand love signifies that attitude, trust, self-expression, best customer satisfaction, sentiment bondage has been created by virtual agent (Sarkar et al., 2016).

3.1.6. Algorithm Recommendations and E-Brand Experience

In the present era, due to the quick progress of e-commerce, the use of algorithm recommendations enhances both views and conversion rate among the customers for all buying products in e-commerce, also increases review ratings. In this context, customer trusted e-brands in the online space made their life easy on a selection of brands while e-shopping increased the high rate of customer satisfaction. E-businesses and e-brands help the customer to meet their demands, enhances the quality of services, increases customer excellence and loyalty. During this situation, algorithm recommendation has emerged and flourished across the e-brands (Chen, 2019).

The rapid growth and intricacy of big data on the internet or worldwide web have led to creating a complication of data explosion (De Pessemier et al., 2016). Thus, the algorithm recommendation process is an essential technique for each user or individual or customer to select the right e-brands. The algorithm suggestions are able to frame customer files based on behaviour pattern of selection/ search of customers. The diversified data able to recommend an exact match to the customer selection preferences (Araibi et al., 2016). E-brands help the companies to use algorithm recommendations to

increase the sales, achieve a high acceptance of customer experience, and brand loyalty (Han et al., 2019). With the help of an algorithm recommendation, the neural network helps the brand promotion model for e- brands like sports (Zeng, 2019). Future research direction proposes that algorithm recommendations on consumer ratings on different e-brands to quantify the perceived value and perceived quality of brands.

3.1.7. User Generated Content (UGC) - Brand Sustainability

Media channels more often foregrounded the merits of user-generated branded content. Forbes has suggested the industries to initiate and make decision-making pace to motivate the UGC (Olenski, 2017). Further, in the article of online advertising journal, Adweek recommended that user-generated content (UGC) is much cheaper to incorporate and its more effective tool for brands for long term sustainability (Mayrhofer et al., 2020). Citing metrics like hashtags usage and retweets of the Adweek later publications explained the importance of user-generated brand images (Mayrhofer et al., 2020). According to the MIT Sloan Management Review, trade and commerce are instructed to restructure social web network business strategies of brands, which means customers posts their branding hashtags helps the company's return on investment (Hoffman & Fodor, 2010). Researchers have studied the purposes why users promote and frame the brand aligned content posts on social media platforms to identify user or customer personal identity and social interaction (Mayrhofer et al., 2020). Many users upload pictures with display brands to showcase their brand image and fame in social media (Muntinga et al., 2011). Such frequent posts are considered as brand selfies (Sung et al., 2018) has increased visibility of user post in social media. Further, content analysis motivates social media to provide personal identity, integration, and social collaboration of the customers or users to help the brand sustainability (Smith et al., 2012).

Sustainability is an emerging and evolving topic for the last five decades. This brand sustainability is validated by the brands' ability to maintain or enhance their marketplace rankings compared to their competitor brands. Hence, the average growth rate becomes a crucial measure of brand sustainability (Schultz & Block, 2015).

3.1.8. Brand Intelligence Analytics

In today's AI-driven world, several web applications are designed to evaluate the brand image, positioning and importance through textual data analysis (Colladon, 2020). For this, there is an app calculates the Semantic Brand Score (SBS) to measure brand visibility (Colladon, 2018). The leveraging capability of big data signifies that managers to revise trends in their customer patterns and perceptions to monitor the positive or negative associations of the brands (Colladon, 2020).

The SBS is a unique concept and access of brand importance by using analytics in customer data (Colladon, 2020). It is framed to calculate the significance of more than one brand by contemplating the dynamic longitudinal trends with the help of data from multiple online sources from different perspectives. This measure is appropriate for the data analysis on different culture and languages. These SBS concepts mostly helped familiar brands to achieve brand equity through brand recognition and its awareness (Keller, 2016).

A brand may be a person or politician, or several keywords used in a concept to create brand value. The SBS is used to access the changeover dynamics when a new brand supplants old brand (Colladon, 2018), evaluates the contenders, and forecasts trends of share markets, a few examples. In addition, the SBS comprises three dimensions and they are generality, diversity, and connectivity. Generality measures the frequency of usage of a brand name leads to brand awareness and brand recall. Diversity access the mix of texts connected with a brand like lexical embedding. Connectivity helps the brand's ability to provide bridge connections between other texts (Colladon et al., 2020). Lastly, future research could consider the more functionality in SBS for the enrichment of brands and diversification of adjustments in the prevalence, diversity, and connectivity that might describe the new metrics of the brands.

3.1.9. Digital Innovations and Brand Excellence

Digital innovations, with the help of technology, created a value chain for sustainable development. By the extensive usage of digital tools, even in the manufacturing sector, can reduce waste to achieve one of the sustainable development goals (Nagel, 2019). Digital innovations include the areas of big data, online and mobile advertising, online privacy, online reviews, platforms for digital transactions, and the impact of retail analytics. Further digital innovations help the brands for marketing strategy through online advertising, and algorithmic recommendations are transmitted to consumers via various platforms like Amazon, Spotify, Google, and many more (Ratchford, 2019).

Digital innovations and brand excellence are a multifaceted phenomenon in all the sectors of the digital or gig economy. It comprises of artificial intelligence, blockchain, cryptocurrency to achieve a competitive advantage. This phenomenon is collaborative with data sharing, partnerships, platforms, and acquisitions to achieve the companies brand excellence. Digital innovations are integrated into various sectors agri-food sector, the automotive industry and retail sectors to optimize the brand excellence (OECD, 2020). Besides these, future research direction proposes that the study can conduct on digital innovation in specific like the service industry, software industry, and new start-ups for both brand and organizational excellence for the view of optimization of business.

3.2 Citation Analysis

3.2.1 Citation Analysis (Author Based)

Our citation analysis includes both author-based and source-based citations between 1982 and 2019. Of the 12,000 authors, 36 met the threshold value of 15 (i.e. the minimum number of citations of an author is 15). These are further classified into two different clusters. The network visualization of author-based citation clusters is presented in Figure 3.

3.2.1.1: Social Media Analysis and Brand Photos

Users upload the above 350 million photos on social media websites like Facebook, Instagram, Twitter, and LinkedIn (Kaiser et al., 2019). The research has examined that text-based user-generated content will have a low impact on social media. Further research analysis shows that the photos uploaded with brand logo/name in social media signify the brand love, brand loyalty and marketing is done through word of mouth (WoM). The analysis can be done with these photos by coding hybrid machine learning algorithms, genetic search, and artificial neural networks. The outcome of the algorithm able to predict or influence the customers to get more engaged in brand user profiles get attention and indirectly increases the sales and brand popularity (Kapidzic, 2013). Future research can study how brand photos associated with companies and their performance can be measured from user-generated content in social media.

3.2.1.2. Network Analysis and E-Commerce

Figure 3. Citation Analysis (Author based)

Network Analysis could be one of the major benefits, especially to the e-commerce companies in helping them to increase their sales. When it comes to how e-commerce companies would learn from customers' experience, recognize behavioural patterns and predict trends, with the help of what people respond to, what should be changed and what should be eliminated from a marketing campaign than a popular machine learning technique used is neural networks. This is a broad subset of AI science, integrating neural networks (Sze et al., 2017). Artificial neural networks are influenced by biological brain processing (Goodfellow et al., 2016) and learning mathematical theories that enable machines to learn from input data (Guo et al., 2011). The applications of the neural network used in data mining methods have impressive success in fabric design (Liu, 2018), fashion model recognition (Krishnan, 2019), appliance-related decision-making (Sirovich et al., 2018), and fashion retailing on an experimental basis (Ren et al., 2018). Hence, future research using artificial neural networks can validate accuracy and reliability of data used to forecast sales in the specific brands.

3.2.2 Citation Analysis (Sources based)

Similarly, out of the 9960 sources, 64 met the threshold value of 20 (i.e. the minimum number of citations of a source is 20). These are further classified into two different clusters. The network visualization of source-based citation clusters is presented in Figure 4.

3.2.2.1. Hybrid Simulation Modelling

The hybrid simulation techniques are able to help the brands to increase their sales in the global market. In this approach, strategic planning is aligned with the threat-opportunity-weakness- strength (TOWS) matrix which helps to evaluate the retail sectors like a supermarket to increase their company shares and sales in the online shopping (Gu & Kunc, 2019). Further future research can focus on big data and business analytics to examine the customers shopping experience and satisfaction.

Figure 4. Citation Analysis (Sources based)
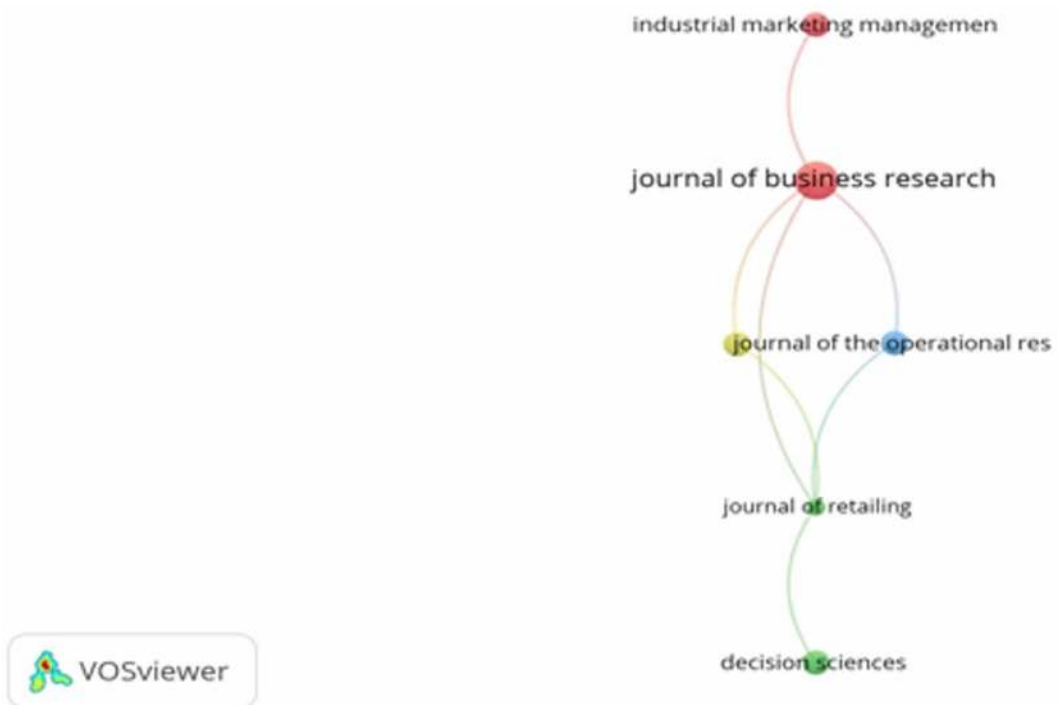
3.2.2.2. Real-Time Knowledge-Based Systems

AI contributes knowledge-based marketing includes customer knowledge, user knowledge and external marketing knowledge with the help of big data (Paschen et al., 2019). AI in customer knowledge explains the activities of framing, encoding, sharing information and applying knowledge on brand preferences, purchase decisions, and customer satisfaction (Abbate et al., 2016). AI in user knowledge identifies customer attitudes, values, and future prerequisites have to be aligned with coding. Lastly, external marketing knowledge consists of external market forces and stakeholders (players, legislators, new organizations) impacts on customer or user preference and their behaviours (Kohli & Jaworski, 1990). AI is able to analyze the content of the brands/products/organizations, which is posted in e-commerce sites, blogs and social media. The AI helps to validate the content of the brand, which is reliable or fake. This mechanism helps to the emergence of new product development, innovation and process enhancement (Paschen, 2019). Further future research can be explored how AI is leveraged to build marketing intelligence and brand value creation for companies.

3.3. Co-Citation Analysis

Similarly, out of the 9960 sources, 64 met the threshold value of 20 (i.e. the minimum number of citations of a source is 20). These are further classified into four different clusters. The network visualization of journal-based co-citation clusters is presented in Figure 5.

3.3.1. B2B Technology Brands

The digitalization and the emergence of new technology have increasingly changed the value development in B2B (Paschen et al., 2019), and more precisely, how information and knowledge are handled by B2B companies (Gupta et al., 2017). AI can allow B2B marketers to gain competitive intelligence by recognizing keywords or trends from news may have major players in social media accounts and other raw data. This experience will advise a B2B firm's positioning plan, support deposition rivals during the selling process, and be a valuable tool for new product growth. Hence,

Figure 5. Co-citation analysis
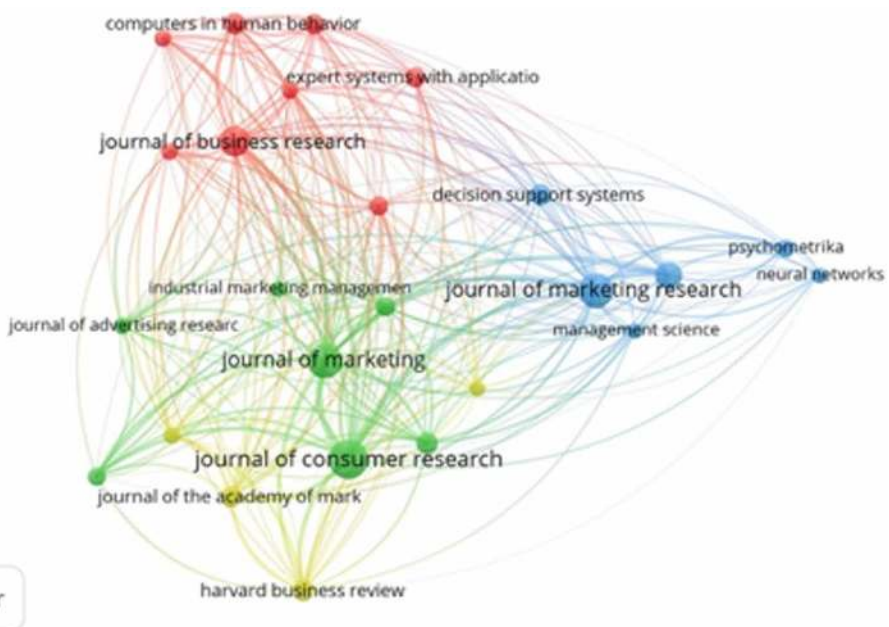
the future direction of research to understand the B2B companies begins with integrating proprietary technology into their services in the organizations to communicate with customers.

3.3.2. AI Fostered e-Brands

AI fostering e-brands like Amazon, Netflix, Alibaba, and eBay have significantly transformed the market. Branded products are essential to markets, whereas customers are critical to brands. Accordingly, businesses will develop customer-centric brands and deliver consumers value-based services to achieve high brand equity and value. Companies are in continuous innovation of brands to provide sustainable differentiation in the marketplace over competitors (Rajagopal, 2020).

The success of AI in e-Brands is often measured through click-through rate (CTR), personalized pricing, and augmented reality. Click-through rate (CTR)–provides the insights about the customers who click on an ad divided by the number who saw the ad–is a vital metric for measuring ad success in e-brand ads on online. As a result, ML algorithm-based click-prediction systems were developed to optimize the effect of supported advertisements and online marketing campaigns. Personalized pricing allows e-brands to deliver prices that continuously adapt to customer behaviour and preferences. At the same time, the laws of supply and demand, benefit conditions, and external pressures could be met by e-brands. ML algorithms can predict a consumer would be paying the top price for a brand in online platforms (Waid, 2018) and the products customized. AI, on the one hand, can exploit competitive pricing to the advantage of customers. Personalized pricing, on the other hand, is likely to be negative if it entails market manipulation, distortion, or exclusion (Brodmerkel, 2017). The computer-generated images of the e-brand adjusted accordingly, enhancing consumer service and the probability of purchase (De Jesus, 2018). Augmented reality could increase the online shopping market and thus improve the revenue from online advertising for e-brand. Thus, a future research study for all e-brands: how can they ensure a sufficiently secure environment to foster trust in a data-driven future in the mind of customers?

3.3.3. Information Cascades and Online Brand Ratings

The information cascades are a process where customer choices are monitored or driven can able to suggest new brands to buy in a digital platform. This information cascade has been examined in the domains like technology adoption online rating (Lee et al., 2015), online purchase behaviours (Li & Wu, 2018), P2P lending (Zhang & Chen, 2017), social network (Pramanik et al., 2017), and online music community (Dewan et al., 2017). The information cascades mainly depend on customer ratings on the brands and helps in customer purchase decisions.

3.3.4. Voice Assistants brings Brand Eureka Moments

Voice Assistants help the customers to buy the right products. The voice assistants are capable of capturing mainstream media headlines, which are used more frequently in Google, Apple and Amazon (Chaudhuri & Terlep, 2018; Galloway, 2017). Voice assistants influence the customer to buy a product with quick decisions. In addition to this, few reports recommend that 21% of U.S. smart speaker owners have purchased music or movies, 8% household items, and 7% electronic devices in a short time (eMarketer, 2019). Further voice assistants become smarter to understand consumer preferences and habits in the global market (Simms, 2019). Due to the rapid change in marketing dynamics from the perspective of voice shopping helps the brands' recognition with an increase of sales creates brand eureka moments.

4. DISCUSSION, CONTRIBUTION, IMPLICATIONS & FUTURE RESEARCH DIRECTIONS

This study attempted to analyze how a brand is recognized and positioned in the global online market with the help of AI. In addition, the findings focus on the AI dimensions of branding to

assess the present market scenarios, strategic planning, new product development, pricing decisions, distribution channels and IMC. Managers are able to understand real-time scenario of the market, provide alternative solutions for product visibility and availability of channels in digital space. Due to automation, customized products and services can be offered to customers based on brand choices in social media and online forums. Customer engagements help to enhance brand image. Further, AI facilitates the organization to identify the customer data by voice recognition, social media interaction, body gesture, facial expression; emotional appeal helps the companies to understand the customers' preferences. In addition, AI also provides benefits to the organization on segmentation, targeting and postponing to understand heterogeneity of customers taste and preferences. In addition, it recommends buying decisions. Applications of AI in strategic planning improve customer satisfaction with increase of brand value. AI assistance in the firms able to develop new product by identifying gaps, customization and trending posts in social media. With the help of big data, marketers can incorporate dynamic competitive pricing for the brands to compare their competitors. Further, the marketers allow AI to facilitate the intense distribution channels with the help of robots and drones to serve better customer services to attain brand loyalty. A vast opportunity created by AI in integrated marketing communication to enhance the brands in front of the customers by conducting keywords bidding, ad testing, contextual ad targeting and re-targeting and product customization (Campbell et al., 2020). In a similar vein, AI in predictive analytics can help in forecasting sales, tapping the new customers and optimizing on pricing decisions (De Bruyn et al., 2020). In addition, short and long-term prediction of AI increase both customer and brand loyalty. In short term, AI aids the personalization of products by creating excellent brand experiences and values providing more offers with dynamic prices, quality service delivery, right advertisement recommends the customers with positive emotions. Similarly, long-run prediction of firms enhances customer relationship management, retention and increase of brand values and customer equity (Kumar et al., 2019). By implementing the prediction analytics in the firms able to create marketing trends like interactive bots, recommendations, real-time optimizations to create a brand value in the global market (Ma & Sun, 2020).

The study uses a bibliometric analysis tool consists of co-occurrence, co-citation, and citation analysis in advance the knowledge of the field, and thus enriching the validity of the research (Wen et al., 2017; Kevin et al., 2017). To the best of our knowledge, this is the first attempt in research that combines co-occurrence, citation and co-citation analysis altogether to identify work on important authors, journals, countries and collaboration in the study.

The theoretical contributions is summarised in the table below.

Technological advancements are the most interesting and promising domain in marketing and AI interventions in the firms able to change the business scenario. Hence, authors have mentioned some of the prominent managerial implications. AI helps to improve quality (brand performance) to achieve economic growth of country. Managers are able to make strategic decisions to enhance transparency in CRM and customer loyalty through social media interaction. The company facilitates the customization of products provides the standard offers based on customer preferences. In addition, machine helps the manager to understand the consumer behavior in pricing, content-based advertising campaign and new product development. Further, with the help of big data, AI able to develop predictive models and algorithm recommendations helps to analyze the advertising data for retargeting process and brand sustainability. In addition, reinforcement learning algorithms helps the brands to balance both human and machine collaborations to achieve firm's success. Hence, AI is a game changer in the marketing firms by implementing new algorithms for making better decisions helps to tackle the data privacy and ethical issues to achieve SDG GOAL 9 – *Industry, Innovation and Infrastructure.*

By keeping this perspective, future research can be considered to study the impact of AI in B2B service branding using bibliometric analysis. Future studies, researchers can look on how bibliometric analysis can be focused on AI intervention of brand audit, brand experience in neuromarketing and customer brand relationships. Further academicians can explore the bibliometric analysis by using bibliographic coupling overlay visualization and prestige analysis of AI in product differentiation,

Table 6. Marketing/ branding theories helps to tackle the challenges of AI in branding

Theory	Explanation	Tackle the challenges	perspective
Theory of Consumer based brand equity (CBBE) – Keller & Lehman (2006)	This theory emphasis the impact on brand acquisitions, extensions, to measure firms' financial results	This theory helps to measure the strategies of firm's performance by using the customer data to tackle the challenges from the competitors to reinforce to maintain brand identity, loyalty and values	Financial and strategic perspective
Consumer Psychology of brands – Schmitt (2012)	This framework describes the customers mental representations like emotions, trust and loyalty towards the brands	This model helps to know the brand awareness, image, coolness and experience by using the sensory, purchase behavior pattern/ action/ data from the customers to establish successful brands with tackling negative reviews on social media	Psychological (Behavioral) and Strategic Perspective
Consumer Culture Theory on brands - Arnould & Thompson (2005)	This theory addresses the dynamic link between the customer, marketplace and culture settings for iconic brands	Brands indulge with the culture for consumption in the market with constant conversation/ engagement with customers on social media to create brand capital with minimizing the negative spillovers from competitors	Culture and Strategic perspective
Theory of brand personality – Aaker (1997)	The theory of brand personality explains the five dimensions (sincerity, excitement, competence, sophistication and ruggedness)	Five dimensions help the organization to sell their brands by providing personalization, automatic service delivery, right advertisements, CRM, machine to human interface, customer values to create brand value in business and reduce the product error	Customer and Firm Perspective
Managing Marketing Relationships with intelligent systems - Daskou & Mangina (2003)	In this theoretical framework the emergence of software helps to integrate the intelligent systems to establish relationship between customers and retailers	This theory help creating in database loyalty programmes to improve the new product development, Good communication b/w intermediaries and consumers bring more trust about the products and helps in brand positioning and equity. This theory tackles the competitor sales and minimizes the negative feedback about the brands	Strategic, Firm and Technologic perspective
IAT (Intelligent Agent Technologies) in Marketing – Kumar et al. (2016)	IAT is mainly focused on to enhance marketing applications	IAT in marketing able to tackle the competitors, understand changing of consumer behaviour in dynamic marketplaces. Further information can able to search, acquire, analyze the brands and capable of interact, negotiating and collaboration to enhance customer experiences in products which leads to brand loyalty	Strategic and Technological perspective
Technology Marketing Framework – Parasuraman & Grewal (2000)	In this theoretical framework, technology integrates the quality, value and loyalty chain represents pyramid model which emphasis the relationship between technology, customer and company	This framework able to tackle data mainly minimizing the risks in the decision-making. This framework helps to improve the customers satisfaction/ loyalty, employee well-being, firm's performance in the marketing space	Firms and Technological perspective
Computer Mediated Environment (CME) -Yadav & Pavlou (2014)	CME in marketing able to label bigdata, to improve website designs and analytical models	This framework helps to tackle complex data set in the dynamic marketing environment settings.	Firms and Analytical perspective

emotional advertising and developing specific business models in marketing, health care, tourism and education sector.

The limitation of the study is in terms of the research is confined to AI and branding, restricted to secondary data available in the Scopus database. However, this database consists of top-tier journals of various domains it is difficult to retrieve the relevant articles. The citations of the article restricted to 2019 and excluded recent published articles. Further, bibliometric analysis is a data driven depends on algorithm recommendations with visualization method. In addition, the search article in this analysis is not narrow down to brand related journals. The analysis was restricted to use VOS viewer software tool. Moreover, we have incorporated limited techniques co-occurrence, citation and co citation analysis.

5. CONCLUSION

The bibliometric analysis brings a novel and exciting topic to understand the concepts of AI and its applications in branding. By applying a bibliometric analysis, new findings has been observed in the field of marketing with the interface of technology, provided the application of such analysis to the other fields such as *big data analytics and enterprises (*Khanra et al., 2020), *manufacturing* (Caviggioli & Ughetto, 2019), *sustainability* (Fahimnia et al., 2015), *finance* (Xu et al., 2018), *emerging technologies* (Li et al., 2018), *innovation* (Van Oorschot et al., 2018), *entrepreneurship* (Chandra, 2018), *customer brand relationship* (Fetscherin & Heinrich, 2015). This study provides a unique understanding of AI in brand recognition, an increase in sales, promotion through social media marketing and customized pricing. Further, it extends and enriches the bibliometric studies of the field by including several units of analysis (i.e., micro = word/term, meso =articles/author, and macro = journal sources) by utilizing a more extensive, more abundant and new dataset (number of articles 117; for the entire duration of 1982-2019), and with the focus on scholarly journal articles (i.e., only certified knowledge). In addition, this article also discovers that industry practitioners and academicians are adopting AI in data research field to know about data privacy, digital storage, the security of data and big data. This is one of the reasons that practitioners adopt AI to implement their business in various domains. In the country perspective, the top three countries published more work in the AI domain are the United States, Germany and France. This study also revealed that it was one of the emerging technology that increases research in the future across the globe. Hence, bibliometric study is a one-stop solution for recent literature AI on branding. This study helps the organizations for digital business transformation by providing an in-depth overview of AI in branding to serve their specific purpose. The main agenda of the research by considering academicians, firms and policy experts should aware that AI has an impact on marketing. It will increase substantially and will have more impact on the future but still much to do in this domain. Subsequently, the novel research help the firms to focus on continuous innovation to build a strong technology aligned with the digital economy growth by creating the data scientists with adequate skills can achieve sustainable development goals. We hope that this research agenda motivates researchers to continue the research on AI and marketing.

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