



The role of generative artificial intelligence (GAI) in customer personalisation (CP) development in SMEs: a theoretical framework and research propositions

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Abstract

Based on the dynamic capabilities (DC) theory, the aim of this study is to investigate the contribution of generative artificial intelligence (GAI) to the development of customer personalisation (CP) within business organisations, particularly SMEs. This paper also explores how the function of GAI in the development of CP is supported by technological advancements like deep learning (DL), smart data (SD), and the Internet of Things (IoT). Using a theoretical framework based on DC theory and an analysis of the literature on GAI, DL, SD, IoT, and CP, the relationship between GAI and CP is theoretically studied. The dependent variable in this theoretical framework is CP, and the independent variable is GAI. Furthermore, while DL and SD just mediate the connection between GAI and CP, IoT moderates the relationship between GAI and SD. Figure 1 presents the theoretical framework and research propositions. On the basis of the constructs in this study, research propositions were developed and discussed. Eight significant research propositions on the relationship between GAI and CP development were developed using the theoretical framework used in this study. According to the suggested theoretical framework and research propositions, context-oriented CP can be created by GAI using DL and SD in conjunction with IoT when high-level customer attributes are retrieved in a structured, accurate, and real-time manner. Additionally, it results in important marketing outcomes including interactive marketing, value co-creation, and consumer loyalty. This study develops a theoretical framework and research propositions that theorise the relationship between GAI and CP which is rooted in literature and also based on DC perspective. The mediating roles of DL and SD on the relationship between GAI and CP, and the moderating role of IoT on the relationship between GAI and SD, provide support to GAI in the development of CP. This study also provides insight into SMEs' adoption of GAI to generate context-oriented CP that may impact on their marketing development in areas such as interactive marketing, value co-creation, better targeting and customer loyalty.

Keywords Generative artificial intelligence (GAI) · Customer personalisation (CP) · SMEs · Theoretical framework · Research propositions

1 Introduction

Generative artificial intelligence (GAI) technologies are currently a major component of personalised customer experiences [6]. The strategic application of GAI is significantly altering how business organisations, particularly small-and-medium enterprises (SMEs), produce customer personalisation (CP) through the use of smart data (SD), Internet-of-Things (IoT), and deep learning (DL). The significance of

GAI has been acknowledged in a variety of application areas, including marketing, consumer markets that are undergoing swift change, and marketing operations. Guha et al. [22] contend that customer-facing AI is the foundation of a larger share of research on the use of AI, such as GAI, in the field of marketing. Therefore, employing CP, GAI like ChatGPT and generative adversarial network (GAN) directly engage with customers to change their interactive marketing experience [17]. Mondal et al. [38] argue that GAI has the power to completely change a variety of industries, including SMEs, by producing new and distinctive marketing content that can be utilised to boost customer interaction, personalise suggestions, and increase the precision of personalise interactive marketing directed at specific target audiences. Similar to

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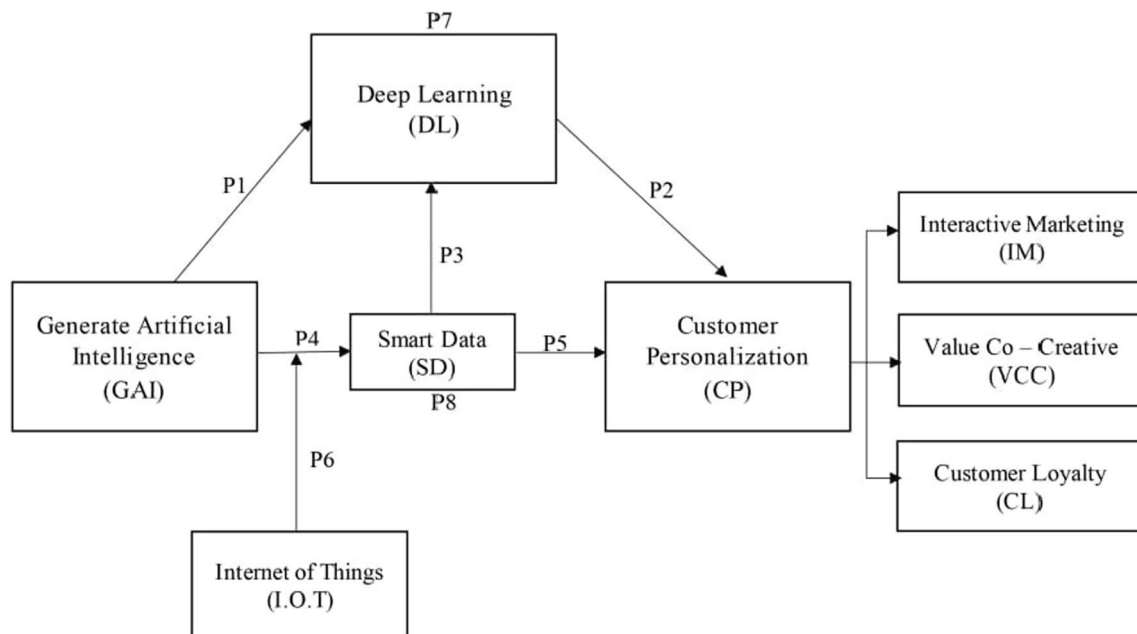


Fig. 1 Theoretical framework of the role of GAI in CP development. Source: Author's own work

this, Canhoto et al. [11] emphasised that GAI-enabled CP benefits customers because personalised marketing messages produced by GAI stand out to customers in the middle of a barrage of other marketing communications. Due to this, sales rise and customer connection, participation, and loyalty are strengthened.

According to Striuk and Kondratenko [48], current artificial intelligence technologies like DL, SD, and IoT are essential tools that allow GAI to implement CP. In addition to enhancing the customer experience and making customers more productive when interacting with brands on computers, these capabilities enable CP to reduce customers' costs associated with information acquisition. Aheleroff et al. [3] highlight that standardisation of marketing initiatives such as interactive marketing is no longer required for advancements in the age of GAI because AI technology has progressed to the point of producing personalised marketing. Therefore, business organisations like SMEs may tailor products and services through personalised marketing as a result of GAI-enabled CP paradigm. However, strategic capabilities such as DL technologies, SD, and IoT are also necessary for delivering GAI-enabled CP.

Extant literature on GAI has predominantly focused on domains such as human resource management (HRM) [10], user motivation affects and trust [6], metaverse era [35], new context for management theories (Korzynski et al. 2023). For instance, the study by Budhwar et al. [10] offers a debate that summarises the literature on AI and GAI and links it to various aspects of HRM processes, practises, connections, and outcomes, helping to shape the direction of HRM

research in the future. On the other hand, the gap on how user motivation for ChatGPT usage affects perceived creepiness, trust, and the intention to continue using AI chatbot technology was addressed by the study of Baek and Kim [6], which focused on user motivation to use GAI. However, research studies on how GAI influences CP based on the mediating roles of DL and SD is still rare in literature. Also, theoretical framework and research propositions on how GAI generates customer personalisation for interactive marketing, co-creation and customer engagement in SMEs is very limited.

Consequently, the primary objective of the current study is to address this research gap by examining the role of GAI in CP in SMEs through the mediating effect of DL and SD using theoretical framework and research propositions.

Therefore, the current research aims to address the following research questions:

- Q1. What is the nature of association between GAI and DL?
- Q2. What is the nature of association between DL and CP?
- Q3. What is the nature of association between SD and DL?
- Q4. What is the nature of association between GAI and SD?
- Q5. What is the nature of association between SD and CP?
- Q6. What is the mediating role of IoT on association between GAI and SD?

- Q7. What is the mediating role of DL on the association between GAI and CP?
- Q8. What is the mediating role of SD on the association between GAI and CP?

The current research study seeks to make two main contributions to literature on GAI and CP. First, the current study contributes to the development of CP through the application of GAI that results in sustained interactive marketing, brand engagement, and co-creation of personalised products and services among SME. Second, in order to support GAI in achieving greater CP, business organisations, in particular SMEs, need to understand how to harness strategic capabilities like DL, SD, and IoT.

2 Literature review

2.1 Theoretical background

According to Warner and Wäger [53], dynamic capabilities (DC) are innovation-focused and give business organisations the ability to generate, extend, and alter their current resources. DC theory is an effective lens for evaluating the function of GAI in CP development in SMEs through the mediating effect of DL and SD because of the disruptive nature of GAI. By restructuring the company's digital capabilities, digital transformation and adoption help business organisations like SME to exploit marketing possibilities in a changing market environment.

A vital requirement from a vibrant digital economy is for CP. SMEs must adapt their digital capabilities by implementing GAI to produce various types of original marketing content that results in personalised interactive marketing if they are to fulfil the digital needs of consumer markets. The creation of targeted marketing output by GAI, such as text, voice, photos, and videos, enables SMEs to interact personally with their customers. For instance, Lalli [31] note that when used for marketing purposes in the hospitality and tourism sector, GAI can make personalised travel recommendations for visitors and even create personalised virtual tours of hotels and attractions, generating value for both businesses and customers.

When it comes to adapting to shifting customer behaviour, which is a derivative of a dynamic market, GAI-enabled capabilities can produce creative insight into marketing portfolio optimisation techniques that SMEs can use to fulfil those demands [14]. As a result, for a strong DC, SMEs must be able to discern how the market environment is evolving and whether personalised marketing is still necessary. This enables SMEs to take advantage of these opportunities by adapting GAI to their current capabilities and creating

digital infrastructure like IoT, SD, and DL to support the creation of CP by GAI.

2.2 Generative artificial intelligence

In contrast to standard AI models, which are usually taught using controlled learning, GAI models are usually trained using uncontrolled learning, where the model learns to identify significant characteristics from the data without specific instruction [2]. This ability enables GAI to interpret and create natural language that is comparable to human dialogue. As a result, GAI is now a crucial technology for the development of CP due to its capacity to integrate various datasets (such as customer datasets) to produce precise summaries of customer-related trends and create compelling customer profiles for personalisation. Mondal et al. [38] assert that SMEs can further enhance customer experience and offer personalised services by employing GAI. Additionally, GAI may assist SMEs in developing marketing campaigns that are more effective and personalised using capabilities like SD, DL, and IoT (e.g., Internet-of-Things-IoT). SMEs can utilise GAI, for instance, to create personalised product/service recommendations for specific customers. Customer engagement and retention may increase as a result.

Previous research on GAI has mostly relied on qualitative and bibliometric techniques and has focused on topics including organisational adoption of GAI [2], business decision-making [12], benefits, difficulties, and future research agenda. Additionally, past studies on GAI have a strong focus on the travel and hospitality sectors [14] as well as the fashion sector [46]. There is, however, a dearth of research on studies that concentrate on the use of GAI in personalised marketing, notably CP directed towards SME sectors. Therefore, using a theoretical framework and research propositions, the current study explores the impact of GAI in customer personalisation through the mediating influence of DL and SD.

2.3 Deep learning

Deep learning (DL) is a new form of multilayer neural network learning algorithm and a type of machine learning technique [27]. Furthermore, because DL is an uncontrolled feature learning approach, it enables the identification of customer characteristics from smart datasets. According to Liu (2022), DL is a component of representation learning, which is an aspect of machine learning, which is a subset of GAI in its broadest sense. The ability of DL to more accurately and immediately retrieve high-level customer attributes is one of its primary capabilities. As a result, GAI can carry out CP tasks like text, audio, chat, and creating personalised marketing content more accurately [47].

However, Feng and Zhou [16] contend that the size of the smart dataset needs to be expanded for DL to support the GAI-created CP. This is due to the fact that DL algorithm performs better with larger smart datasets, but DL algorithm performs less with smaller smart datasets. On the other hand, Schmitt [42] noted that there are barriers to DL adoption in SMEs, such as computer complexity, infrastructure, a shortage of experienced people, and the absence of a causal basis for DL's conclusions. However, the value contribution to CP, which should take the form of improved customer forecast accuracy based on smart dataset, appears to be overlooked in many studies on the use of DL in business organisations.

Research on DL in the field of marketing has previously concentrated on the relationship between DL and factors including marketing analytics [50], production [59], and multi-level capital market linkage (Jing et al. 2019). Studies on the mediating role of DL on the relationship between GAI and CP are rare in the literature. Therefore, the focus of this study is on how DL influences the interaction between GAI and CP in SMEs.

2.4 Smart data

In accordance with Triguero et al. [49], the term “smart data” (SD) refers to the creation of technologies that can handle vast amounts of unstructured data and disclose their worth. Following the acquisition of SD, GAI may use deep learning to learn these data (such as customer data) and produce CP through personalised text, marketing material, and interactive marketing. According to Garcia-Gil et al. (2019), the purpose of SD is to help organisations transition from being data-focused to learning organisations where the emphasis is placed on extracting customer knowledge rather than battling with customer data management. One significant advantage of GAI with regard to SD is the potential for a transparent and seamless transfer of smart data between all facets of the business organisation that adhere to the value of CP (i.e. personalised interactive marketing, value co-creation, and customer loyalty) [51].

Past studies on SD have focused on domains such as artificial intelligence of marketing information [33], SD enablement [18], data-driven smart customisation [58] and transformation of big data into SD [49]. However, studies that focus on SD as a mediator between the relationship of GAI and CP is limited in literature. Therefore, the current study focuses on the mediating effect of SD on the association between GAI and CP.

2.5 Internet-of-Things

The Internet-of-Things (IoT) is a network of objects connected to the internet or a local network with the purpose of gathering, interacting with, and exchanging data [54]. The

innovative ability of IoT to extract, interact with, and share data allows the intelligent tools of GAI to build personalised marketing content to create CP. Shar and Chircu [43] note that IoT transmits data on customer characteristics, such as customer preferences for products and services and digital involvement, and offers real-time data analysis to produce intelligent CP actions. For instance, the operation of GAI is supported by IoT technologies such as radio frequency identification (RFID), WIFI, cellular, cloud computing, wireless sensor networks (WSN), Bluetooth, and IoT application software through interaction and customer data exchange. In order to quickly learn a vast volume of customer datasets and provide CP, GAI uses deep learning. As a result, IoT is crucial for gathering and maintaining customer data, while GAI is in charge of analysing vast volumes of this data and implementing CP strategies depending on what it discovers using deep learning techniques [13]. IoT technologies enable SMEs to gather customer data continually. GAI systems with deep learning can help analyse this data to spot changes in customer behaviour towards products, services, and digital marketing content. They can also offer possibilities for CP. As a result, SMEs are able to develop their interactive marketing capability which helps to support customer loyalty, enhance value co-creation outcomes, and hasten the identification of growing customer needs.

IoT studies in the past have mostly used quantitative, bibliometrics, and qualitative research methodologies, with an emphasis on domains including healthcare [43], market orientation [54], and open technology innovation [34]. However, there is a paucity of literature on studies focusing on the function IoT plays in the link between GAI and CP to produce marketing outcomes including interactive marketing, value co-creation, and customer loyalty in SMEs. As a result, the current study uses a theoretical framework and research propositions to evaluate how IoT might help GAI create CP in SMEs.

2.6 Customer personalisation

Customer personalisation (CP) is a customer-focused marketing strategy that tries to send the appropriate marketing content—such as communications based on presumed consumer behaviour and special offers—to the appropriate individual at the appropriate time [5]. According to Canhoto et al. [11], customers greatly benefit from CP. For instance, CP offers better customer choice matching in terms of products, services, communication, and individualised experience and also helps SMEs lessen information saturation for customers. On the other side, Gao and Liu [17] also pointed out that CP has a good impact on how well SMEs perform in terms of premium prices, a higher rate of customer response, a customer base that is loyal and satisfied, and distinction from rivals. This makes marketing automation, including

the use of GAI, IoT, SD, and DL, a crucial strategy to draw in, cultivate, and keep trust with both current and potential customers by automatically personalising pertinent and helpful marketing content to suit their particular demands [44]. According to a study by Vesanen and Raulas [52], it is essential to integrate the process phases of customer-related personalisation, such as customer interaction, data analysis, customisation based on customer profile, and targeting of marketing initiatives. However, Kumar et al. [30] contends that previous to AI and GAI, CP was constrained by the quantity and quality of customer data, the business organisation's capacity for insight generation, and the organisation's capacity for insight implementation. Because of this, CP initiatives in marketing were constrained to following a set of predetermined guidelines established by specialists. One of the most widely used GAI-enabled CPs is recommender systems (RS), which gives personalised product and service recommendations to meet the demands of customers.

Past research on personalisation has concentrated on areas like AI-enabled interactive marketing personalisation [17], AI-driven banking services [44], AI-enabled personalised customer service [25], and AI-enabled personalised engagement marketing [30]. There is, however, a paucity of research on studies that specifically address the function of GAI in CP in the SME sector. The purpose of this study is to investigate the function of GAI in the growth of CP in SMEs using a theoretical framework and research propositions.

3 Theoretical model and research proposition development

The relationship between GAI and CP is theoretically investigated using a framework built on DC theories and a study of the literature on GAI, DL, SD, IoT, and CP. GAI is the independent variable in this theoretical framework, and CP is the dependent variable. Additionally, while IoT moderates the relationship between GAI and SD, DL and SD just mediate the interaction between GAI and CP. In Fig. 1, the theoretical framework and research propositions are presented. The development of research propositions based on the constructs in this study is discussed in the following sections.

3.1 Generative artificial intelligence and deep learning

GAI capabilities can help SMEs improve their CP and marketing strategies. By using deep learning techniques (such as natural language processing (NLP)), GAI can provide immediate assistance, intelligent customer knowledge, and expedited interaction with stakeholders [59]. The GAI system is built using deep learning techniques like NLP algorithms. These deep learning algorithms allow GAI

to comprehend CP elements (such product inquiries and order processing), appropriately reply, and learn continuously through customer engagement. According to Maa and Sun [36], there are GAI-driven developments in the SME sector where companies focus more on every step of the consumer buying process, which includes regular and media-rich relationships, and carry out substantial, digitised context-specific personalisation. The advancement of the ever-more-powerful deep learning techniques is facilitated and driven by these trends, creating a cycle of beneficial feedback that is revolutionising all facets of CP. According to Liu [32], factors including growing generative model development in AI (like GAI), notably in the CP domain, and the computational advances of DL algorithms that have attained human-grade efficiency on numerous applications like CP have had an impact on the digitalisation of CP. In light of the preceding discussion, this study proposes that:

Proposition 1: Generative artificial intelligence is influenced by deep learning towards customer personalisation.

3.2 Deep learning and customer personalisation

CP, which is used extensively in marketing and many other industry domains, is one of the important applications of deep learning [19]. CP was formerly viewed as a superfluous luxury but has quickly evolved into a commodity that buyers expect in a variety of products and services. The interactive aspect of this area of deep learning for CP and suggestions, as well as its significant impact on customer reaction, have led to unusual development paths lately. Deep learning applications provide improved performance in CP applications, which frequently require more complicated problem-solving when setting learning objectives and putting them into practise. Deep learning is used in recommendation systems (RS) by many companies to personalise suggestions for customers. For instance, Google uses broad and deep learning to anticipate click-through counts [26], and Twitter employs deep learning to anticipate customer purchases for CP [29]. Deep learning is an area that focuses on improving CP applications and developing algorithms that are ever-more precise in their decision-making and prediction processes. Zanker et al. [57] contend that RS have been recognised as the most widespread CP applications within the DL domain. For example, key internet services, such as Amazon, YouTube, Facebook, and Netflix, depend on DL-enabled RS technology. In light of the preceding discussion, this study proposes that:

Proposition 2: Deep learning is an influenced element in customer personalisation.

3.3 Smart data and deep learning

Bhattacharya et al. [8] argue that DL is a method based on machine learning that can be used successfully to analyse customer behaviour patterns from SD, get customer knowledge from SD, and categorise or forecast the SD related to customers. Similarly, Bouzidi et al. [9] highlighted that DL has been used widely on the SD produced by IoT sensors in a smart city. The automated learning system known as DL in GAI is built on continuous neural network that have been taught with long short-term memory. These neural networks are employed because of their capacity to learn. They use integrated roles and projected data (e.g., customer behaviour towards product/service) as inputs while employing SD to target the capturing of different search outcomes. GAI can personalise marketing actions including text, audio, and product and service suggestions attributable to the CP knowledge that DL algorithms have learned from SD regarding customers. According to Najafabadi et al. [39], the appeal of DL as a useful tool for assessing SD is due to its capacity to obtain high-level, sophisticated customer ideas and customer data representations from enormous amounts of SD. More precisely, DL can be used to better address data issues including language indexing, data categorisation, and quick information recovery. As a result, DL offers advanced representations of smart consumer data that are appropriate for GAI functions while also enabling GAI systems to be free of human expertise, which is the principal aim of AI. Based on the preceding discussion, this study proposes that:

Proposition 3: Deep learning is an influential element in smart data analysis.

3.4 Generative artificial intelligence and smart data

According to Liu et al. [33], GAI in marketing is increasing popularity as a result of developments in smart data mining models, big data availability, rising processing power, and declining computing costs. According to recent studies, the use of SD by GAI has produced CP analytics outputs such automated text analysis, marketing insight and prediction, and customer preference assessment [7, 24]. In order for GAI to acquire smart data about customers, it must first locate and extract new and relevant customer information (i.e. SD) from enormous data sets using a technique called knowledge discovery (KD) or smart data mining (SDM). GAI can discover previously undiscovered characteristics, features, or connections within a set of consumer data by utilising a range of approaches. The study by Yau et al. [55] indicates that in order for GAI to convert unstructured data into smart structured data and learn the SD for CP, GAI must go through all five levels of the 5Vs characteristics (i.e. velocity, volume, value, variety, veracity). First, GAI gathers

a sizable amount of customer- and prospect-based data from a variety of digital platforms, including social media and IoT platforms. Second, the GAI also produces a significant volume of customer-focused data at a rapid pace in real time. Third, a wide range of customer information is recorded in formats like text, image, audio, and sensing results. Fourth, the high veracity of customer data necessitates a high level of correctness and reliability, necessitating the processing of unstructured data into SD and the removal of extraneous data. Fifth, increasing CP has the potential to have positive social and economic effects due to the high value SD generated by GAI. Based on the foregoing discussion, this study proposes that:

Proposition 4: Generative artificial intelligence is an influential element in the generation of customer-focused smart data.

3.5 Smart data and customer personalisation

Structured and smart data (SD) are essential to customer personalisation (CP). As a result, gathering comprehensive SD about customers is the first and most important stage in the CP process. Purchase history, demographic information, online interaction behaviour, social media activity, and sentiment analysis may all be included in a detailed SD [15]. Deep learning (DL) technique that can be enabled by GAI are then used to examine this data in order to provide personalised customer experiences. According to Afshar [1], customer data must be examined in order to yield actionable insight after being obtained with the aid of technology capabilities like IoT. This could entail locating customer patterns, tastes, and behaviours that can forecast upcoming personalisation activities. The application of SD enables GAI to advance CP above immediate changes and actions, empowering companies like SMEs to forecast and produce content that accounts for anticipated future customer choices and behaviours. This includes designing customised promotional offers, individualised shopping lists, or distinctive customer experiences. By enabling GAI to further increase CP's proactiveness in this way, SD dramatically improves customer engagement, interactive marketing, value co-creation, and customer loyalty [4]. Based on the preceding discussion, this study proposes that:

Proposition 5: Smart data is an influential element in customer personalisation.

3.6 The moderating role of Internet-of-Things on the relationship between GAI and smart data

The Internet-of-Things (IoT) is powering a linked world where billions of devices are constantly generating data and

communicating with one another. Growingly intelligent systems are needed to process and extract value from enormous, complicated IoT data streams [23]. This is where artificial intelligence (AI)—more particularly, GAI’s innovative techniques—comes into play. DL capabilities enable GAI models like ChatGPT and GAN to integrate novel customer-related contents, knowledge, and recommendations. To create whole new IoT applications and capabilities, GAI may analyse trends and situations rather than evaluating IoT data. Managing the enormous volume of unstructured data generated by devices and infrastructure is a key IoT challenge [45]. It is crucial to apply GAI to data processes, which entails tasks like (a) data description, in which GAI intelligently identifies inbound data flows from IoT devices with description so they may be properly processed. Improved data analytics are made possible for DL towards CP through this process, as well as (b) compression and synthesis, where vital customer insight (SD) is derived from IoT device data and summarised in small formats for effective archive and dissemination for DL towards CP [34]. Since IoT makes it possible to gather enormous volumes of customer-related data from countless IoT devices, GAI is the catalyst driving the smart analysis and utilisation of that data to create SD towards CP [20]. In light of the preceding discussion, this study proposes that:

Proposition 6: Internet-of-Things moderate the relationship between generative artificial intelligence and smart data.

3.7 The mediating role of deep learning on the relationship between generative artificial intelligence and customer personalisation

Khakhlari [28] asserts that CP has become a cornerstone of digital marketing experiences, being essential to interactive marketing, value co-creation, and customer loyalty. Deep learning is being used by GAI to enable business organisations, such as SMEs, to provide personalised marketing experiences and content to customers on a large scale [32]. GAI can produce personalised recommendations, personalised content, and customer-specific adverts due to its deep learning technology. This results in improved customer connection and satisfaction, which raises interaction rates between SMEs and their customers. In order to anticipate customer demands and provide personalised marketing experiences in an instant, the deep learning application in GAI is taught to learn smart data such as customer behaviour data, past transaction data of customers, and background information of customers [59]. As a result, DL, a GAI system, is trained on a sizable amount of SD, enabling the creation of CP content of the

highest quality in a variety of formats, including text, pictures, as well as videos. The quick development and uptake of GAI for CP have been further accelerated by the deep learning approaches. DL has the potential to improve the procedures used to create personalised marketing content, especially in GAI systems [27]. GAI models can produce extremely relevant and captivating marketing material that is specifically targeted to target customers because of DL’s capacity to assess and learn from vast marketing data acquired from IoT devices [56]. In light of the preceding discussion, this study proposes that:

Proposition 7: Deep learning mediates the relationship between generative artificial intelligence and customer personalisation.

3.8 The mediating role of smart data on the relationship between generative artificial intelligence and customer personalisation

According to Roy et al. [41], CP is developing quickly along with technological innovation and is quickly becoming one of the crucial components for providing better customer experiences. SMEs are able to improve the personalisation of marketing activities with the use of GAI-enabled technologies. GAI provides the best CP solutions by learning about the preferences, demands, and choices of their customers through the collection of numerous customer data points (i.e. IoT). In order to deliver CP, smart data from the customer is used to anticipate their needs and requirements, with data processing and the integration of GAI-technology playing a vital role [21]. Therefore, the customer makes the ultimate decision, and GAI only serves as a facilitator of CP. On the other hand, the procedure is a repetitive cycle in which customer data points are gathered and enhanced at each level of the GAI-enabled personalisation process to provide enhanced-personalised marketing. According to Gao and Liu [17], GAI-enabled CP enables business enterprises to use fine-grained data or SD acquired by GAI at the granular level to comprehensively characterise a customer and accurately forecast the behaviour for every single customer. IoT devices can be used by GAI-enabled CP to gather structured and unstructured data about specific customers. Because of this, GAI-enabled CP creates profiles by gathering and analysing data from a variety of electronic platforms, including social media and e-commerce [37]. GAI relies on technology like deep learning for the generation of CP profile development. To put it another way, GAI-enabled CP necessitates personalised profiling, which primarily entails customer data gathering, SD analysis, and customer profiling [40].

4 Conclusion

Based on a theoretical framework and research proposition perspective, the current study used deep learning (DL) and smart data (SD) as mediators to evaluate the contribution of generative artificial intelligence (GAI) to the development of customer personalisation (CP) in SMEs. This study argues for GAI-driven advances in the SME sector where businesses concentrate more on each phase of the consumer purchasing process, including regular and media-rich relationships, and carry out significant, digitised context-specific personalisation.

These tendencies are both a catalyst and a driver for the development of the ever-more potent deep learning approaches, revolutionising every aspect of CP in a circle of positive feedback. The generative model development in AI (like GAI), particularly in the CP domain, as well as the computational developments of DL algorithms that have achieved human-grade efficiency on multiple applications like CP have all had an impact on the digitising of CP.

GAI's deep learning applications boost performance in CP applications, which usually call for more difficult problem-solving when establishing learning objectives and putting them into practise. Many businesses utilise deep learning in recommendation systems (RS) to customise advice for customers.

Important customer insight (SD) is derived from data collected by IoT devices and summarised in compact formats for efficient archiving and transmission for DL towards CP. Due to the fact that IoT enables the collection of massive amounts of customer-related data from uncountable IoT devices, GAI is the catalyst guiding the smart analysis and utilisation of that data to produce SD towards CP.

Additionally, the use of SD enables GAI to expand CP beyond short-term adjustments and actions, empowering businesses like SMEs to foresee and create content that takes into account projected future customer preferences and behaviours. Creating personalised promotional offers, personalised shopping lists, or unique customer experiences are examples of this. By enabling GAI to further boost CP's proactiveness in this manner, DL and SD significantly raises customer engagement, interactive marketing, value co-creation, and customer loyalty.

4.1 Theoretical implications

This is one of the first studies on theoretical framework and research propositions to use the dynamic capabilities (DC) theory to examine how generative AI (GAI) contributes to the creation of customer personalisation (CP) in

the SME sector, with the help of deep learning (DL) and smart data (SD) acting as mediators. Again, in this study, the moderating impact of the Internet-of-Things (IoT) on the interaction between GAI and SD in the development of CP was also investigated.

Due to the disruptive nature of GAI, DC theory is a useful lens for assessing the role of GAI on CP development in SMEs through the mediating effect of DL and SD. Digital transformation and adoption enable business organisations like SME to take advantage of marketing opportunities in a changing market environment by reorganising the company's digital capabilities. CP is a crucial necessity for a thriving digital economy. If SMEs are to meet the digital requirements of consumer markets, they must adjust their digital capabilities by utilising GAI to develop various sorts of unique personalised marketing content that results in personalised interactive marketing. A targeted marketing output produced by GAI, such as text, voice, images, and videos, enables SMEs to communicate with their customers directly.

Strong DCs require SMEs to be able to assess how the market environment is changing and whether CP is still required. This makes it possible for SMEs to seize these chances by customising GAI to fit their existing capabilities and setting up digital infrastructure like IoT, SD, and DL to facilitate the production of CP by GAI. Thus, it is anticipated that this will lead to CP benefits including efficient interactive marketing, value co-creation with customers, and ultimately, customer loyalty.

4.2 Practical implications

This study has consequences for how GAI is used and spread in the growth of CP among SMEs. By using GAI, SMEs may offer personalised products/services and further improve customer experience. Additionally, GAI could help SMEs create more personalised and effective marketing strategies through utilising capabilities like SD, DL, and IoT. For example, SMEs might use GAI to generate personalised product or service suggestions for certain customers. As a result, customer engagement and retention can rise.

Through CP-enabled value co-creation, GAI may economically offer accelerated product development processes in a competitive climate marked by brief life cycles of products and an ever-shifting marketplace, which may produce competitive benefits that improve market share and profitability. In order to enable the development of CP as a strategic marketing competency that may produce interactive marketing, value co-creation, and customer loyalty, SMEs must invest additional financing in GAI and IoT infrastructure as well as the development of expertise.

Hence, it is essential for SMEs to create products/services that conform to customers' preference profiles (e.g., aesthetics, emotional) by utilising value co-creation, which

is a derivative of CP, due to the personalised preferences and values that customers associate with products/services such as aesthetic and emotional values. This enables products and services to change from being valued functionally to being valued according to the interests of customers. Additionally, interactive marketing which is a derivative of GAI-enabled CP, promotes customer experience. In order to create context-based CP, it is crucial to use customer data produced from existing GAI-enabled IoT customer data sources.

4.3 Limitations

This study introduced the concept of GAI-enabled customer personalisation, which may be a significant marketing strategy for influencing customer personalisation (CP), especially among SMEs. The integration of GAI, DL, SD, and IoT for the development of CP was discovered in the current study based on theoretical framework, research propositions and a thorough analysis of literature review. However, because there was no empirical evidence for this study, future research, particularly in the context of SMEs, may adopt an empirical technique (i.e. qualitative or quantitative methodology) to give empirical results for this study. Future research may also examine GAI-enabled CP in the context of the metaverse environment.

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Declarations

Competing interests The authors declare no competing interests.

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