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# Collaborative AI Enabled Place Branding: A Hybrid-Narrative Review and Prospects for Future Research

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## Abstract

Place branding is undergoing substantial transformations fueled by Artificial Intelligence (AI) technology. Effective Collaborative AI could build up a synergy between men and machines to achieve goals. Collaborative AI enabled place branding (CAIEPB) has profound implications and draws attention from scholars, practitioners and consumers for various tourism destinations to delineate place complexity. Based on hybrid-narrative review, we identified 7 key research themes-the origin, definition, technology affordance, spatiotemporal changing patterns, antecedents and formation mechanism, outcomes and impact mechanism, and research method of CAIEPB. The review of 207 studies provided a holistic view of future research directions from seven dimensions. Building on the Stimulus-Organism-Response (S-O-R) framework, we proposed an integrated theoretical model of Stimulus-Organism-Response-Moderating (S-O-R-M) to synthesize CAIEPB literature, which would shed light on more fruitful theories and move diverse venues in research and application forward.

## Keywords

Collaborative Artificial Intelligence (AI), Place Branding, Collaborative AI Enabled Place Branding (CAIEPB), Affordance, S-O-R-M Framework

## 1. Introduction

Along with the proliferation of Artificial intelligence (AI), the capability of a machine or computer system to perform tasks that typically require human intelligence (Achmat, 2019), some scholars have noticed early the man-machine symbiosis relationship (Kelley, 1967; Simon, 1965). Licklider (1960) foresaw human computer collaboration and provided a vision for collaborative intelligence

in which men and computers could work together to make decisions and control a complex situation. Rather than the technology only vision of the AI research, the later emerged terms—"augmented intelligence" (Hurwitz, Morris, Sidner, & Kirsch, 2019), "human-machine interaction" (Moring, 2022), "collaborative AI", are created to search for new ways to achieve better outcomes through human-machine symbolic partnership. Collaborative AI means perspective that goes beyond human's cognition to incorporate goal-driven strategic and operational interactions of people with others (including other non-human cognitive agents) to create far superior collective intelligence through computational modeling/evaluations of such interactions/engagements among the collaborating agents (Pimplikar et al., 2017). The goal of collaborative AI is to enable an effective human-machine synergy to accomplish positive outcomes that neither machines nor humans alone can achieve.

AI is helping brand marketers explore new frontiers. The increased interest in AI technology led to $66.8 billion investment in 2021, a year-on-year increase of 108% (CBInsights, 2021). The digital intelligence shaping and dissemination of place brand will improve the international influence and communication power of place. In practice, AI affordance is adding value to traditional human-centric place branding process from different dimensions.

Collaborative AI enabled place branding (CAIEPB) refers to the process of image communication to the relevant market through AI and HI (human intelligence) synergy so that the place can compete with other places for people, culture, heritage, economic resources and business in a dynamic environment. Based on the premise that neighborhoods, cities, regions, destinations and countries can be branded, collaborative AI perceives and comprehends new information, shares required resources and responsibilities with other peers to resolve place branding problems (Pimplikar et al., 2017). AI and HI complement in diverse ways at different levels of intelligence for branding tasks. Its study, sporadic and fragmented originated decades ago, but efforts to guide the collaborative use of AI in place branding are limited. The absence of an integrated analysis framework makes it difficult to develop a theoretical system, and the vague understanding of CAIEPB has a limited role in guiding the practice. We systematically review and summarize related research on CAIEPB. Based on the classic analysis framework of S-O-R (stimulus-organism-response), S-O-R-M (stimulus-organism-response-moderating) of CAIEPB is constructed. With a big picture framework integrating various theories, this paper contributes to deeper understanding of CAIEPB and better guide for sustainable development of place branding while optimizing the blending benefits of AI and HI.

## 2. Literature Search Method

We have adopted the hybrid-narrative literature review method, which aims to summarize and synthesize the research work on a particular topic. First, we conducted an online search in "Elsevier Science", "EBSCO", "ProQuest", "Web of Science" databases. "Artificial Intelligence" OR AI OR chatbot OR "Interac-

tive Agent" OR "Expert system*" OR "Computer system*" OR robotics OR "Machine learning" OR "Intelligent retrieval" OR "Neural network*" OR "Natural language processing" OR "Knowledge engineering" were combined with brand* as keywords, respectively and 994 papers were retrieved by topic. 52 papers were retrieved by title. Secondly, we validated the collection by searching for keywords such as "artificial intelligence" AND brand* on Google Scholar. Next, we read the titles and abstracts and screened based on the following principles: 1) research content related to AI and associated with place brand; 2) exclusion of research on AI and company brands or product brands; 3) exclusion of research using AI merely as a literature search method; and 4) exclusion of non-academic literature such as book reviews and journal calls. At last, all papers were read through, sorted and classified according to topics, which constitute the literature sources of this paper. Finally, 207 references were obtained. As Figure 1 shows, the study in CAIEPB is sparsely distributed and limited prior to 2014 and increasing after 2015, especially since 2018.

Next, this research explored the meaning, connotation and its application of CAIEPB in the real world in section 3, and section 4 examined the antecedents, outcomes as well as research methods of it.

## 3. CAIEPB and Application

### 3.1. Definition and Classification

The CAIEPB literature, in its infancy, is evolved from a group of familiar terms, such as AI fostered place branding (Varsha, Akter, Kumar, Gochhait, & Patagundi, 2021), E-branding in place (Grzesiak, 2015), place branding 4.0 or Web 2.0 place branding. But most definitions failed to essentially recognize the technology influence on place branding from strategy, practice and process perspectives, and did not elucidate the specificity of a series of emerging ideas. Because

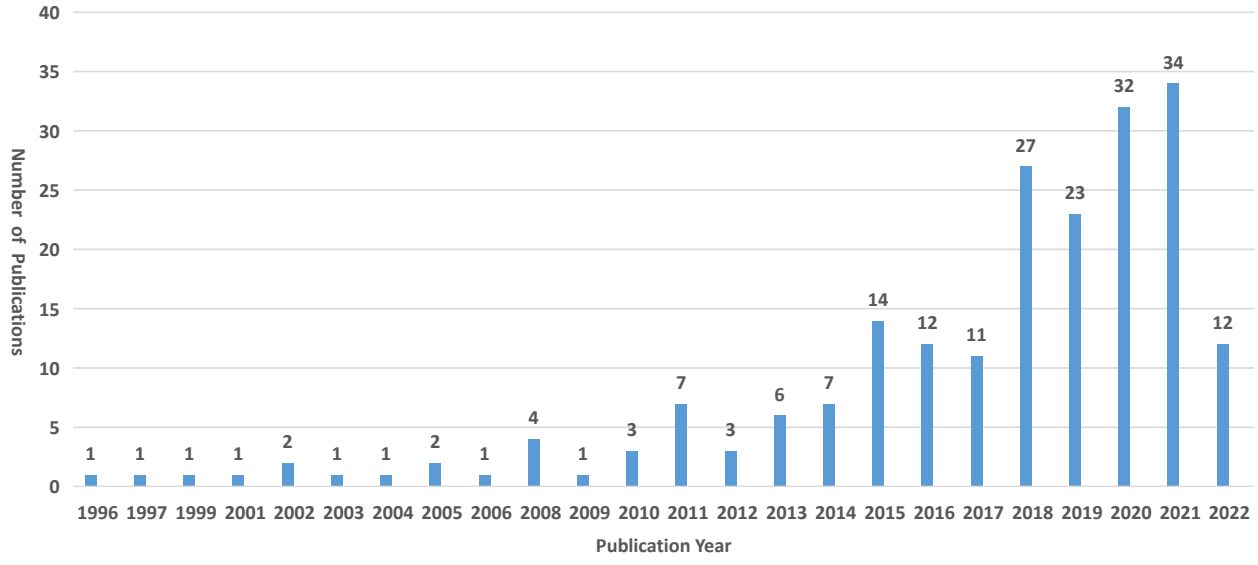


Figure 1. Distribution of literature by year.

of the diversify of research contexts and perspectives, the connotations and denotations of these terms demonstrate subtle variances. Generally, these terms could be classified into three types (**Table 1**), collaborative AI enabled place branding, virtual place branding and digital place branding (Pohjola, Sihvonen, Lemmetyinen, & Nieminen, 2021b; Rowles, 2022). To date, there is no consensus on the definition of place branding, with more than 100 definitions, not to mention definitions of place branding facilitated by recent and more advanced technologies. We summarize the typical definitions in **Table 1**, most of which come from marketing, management, psychology, ecology, etc. Furthermore, Huang and Rust (2022) promoted the construct by seizing the competitive advantage of both human and artificial intelligence to collaboratively marketing management. Collaborative AI ranges from weak collaboration to strong collaboration. Weak collaboration can enhance and augment operations by making the tasks more efficient and cost-effective. Strong collaboration combines AI with human assessment to change business processes (Hurwitz et al., 2019). Depending on the comparative advantages of AI and HI, the internal collaboration structure may vary widely. AI mechanical and analytical intelligence outperform those of HI, while the comparative advantages of HI are contextual intelligence, intuitive intelligence, and sensory intelligence, which give marketers advice on how to optimize collaborative intelligence, as well as consumers' need to understand human spending power (Huang & Rust, 2022).

### 3.2. Key Affordances

The technical capabilities of AI hardware and software create various affordances (Dincelli & Yayla, 2022). The term affordance was coined by Gibson (1977) from the perspective of ecological psychology to explain the symbolic relationship between object or artifact and the actor as well as evaluate usability, and gradually it has been used in computer science, sociology, human computer interaction and other domains. The affordances come not only from the technology, but also from actors, contexts, and complex human-machine relations (Canhoto, 2021). Here affordances mean the possibilities of goal-directed actions afforded to specified groups of users by technical artifacts in particular contexts. In parallel with the unprecedented growth of AI implementation in new media, advertising, and branding, there is a need to delineate and update the action possibilities provided by AI. To conceptualize what AI action possibilities afford to the users, we follow an affordance theory perspective.

The assemblage of AI technology creates different affordances. Among AI affordances studies, it reveals a major source of disarray between "true" affordances, attributes, and results of an affordance. Using Evans, Pearce, Vitak, and Treem (2017)'s threshold Criteria for Substantiating Purported Affordances, we identify 5 key affordances of AI (**Table 2**). The assistability affordance means AI technology's ability to assist users in transactions, operations or processes as it provides smart support and facilitation of action possibilities. AI can facilitate

**Table 1.** CAIEPB related terms and definitions.

| Terms | origin | definition | literature |
|---|---|---|---|
| CAIEPB | marketing | the process of image communication to the target market through AI and HI synergy so that the place can compete with other places. | Huang and Rust (2022) |
| | marketing | AI fostered place branding means applying AI technology, marketing techniques and brand strategy to the economic, social, cultural and political development of places and destinations. | Varsha et al. (2021) |
| Virtual place branding | marketing | Virtual place branding is that virtual worlds have been recognized as three-dimensional spaces where place stakeholders can communicate with current and potential customers, build brand presence. | Barnes, Mattsson, and Hartley (2015) |
| | marketing | Virtual place branding is in an internet-mediated environment where virtual experience occurs, the dynamic process of destinations constructs telepresence in relation to different types of information sources to gain virtual affective, cognitive and global image in the target market. | Hyun and Cai (2009) |
| | management | Virtual (place) branding refers to the ability of a website to gain the approval of users and the public, and to build an image in their minds. | Simeon (1999) |
| Digital place branding; E-branding in place; Place branding 4.0 (or Web 2.0 place branding) | marketing | Create more attractive spaces for all by augmentation of physical locations through location-specific digital services, products or experiences. | Calvium (2018) |
| | psychology | The digital place branding process is about the sum of all the consumer on-line experiences for a place. Although these experiences may be influenced by logos and sponsorships, the digital branding should be understood as something beyond visual identity | Rowles (2022) |
| | ecology | The digital platform ecosystem constructs a virtual "place" that supports and diversifies the traditional place brand of the city and the wider province. | Pohjola, Grönman, and Viljanen (2021a) |
| | marketing | E-branding in place means creating a specific brand image by the internet, characterized by constant presence, interactivity, speed, constantly expanding audience, building trust etc. | Grzesiak (2015) |
| | marketing | Place branding 4.0 is the strategy to cultivate highly hyper-customized experiences in places, which make consumers feel unique and meet their demands for social belonging, self-esteem, and self-fulfillment with the aid of mass customization, artificial intelligence, and supply chain management etc. | Yan, Gupta, Licsandru, and Schoefer (2022) |

**Table 2.** Key technology affordances and enablers of AI.

| affordance | description | Technology enabler | literature |
|---|---|---|---|
| assistability | Ability to assist users in transactions, operations or processes as AI can provide smart support and facilitation of action possibilities. | Google AdSense, New York Times Perspective, Customer segmentation system, machine learning iterative optimization | Stoeckli, Dremel, Uebernickel, and Brenner (2020) |
| customizeability | Ability to provide tailored experiences and responses to specific needs of different users. | Automated customer service agent, Deep learning for personalized point-of-interest recommendation, Ali ruban system, Adaptive personalization systems | Lippert, Gatewood, Cai, and Graesser (2019) |
| predictability | The possibility to anticipate the behavior of users, markets, machines and other forces. | artificial neural networks, Amazon's predictive analytics, Semantic Brand Score (SBS) app | Achmat (2019) |
| interactivity | Ability to provide users action possibilities for reciprocal or non-reciprocal interactions. | Machine talk, chatbots, virtual anthropomorphic advisors | Lunberry and Liebenau (2021) |
| adaptivity | ability to learn and adapt to various contexts, data and tasks | deep learning, Cognitive Simulation, semi-autonomous vehicles' advanced algorithms, sensors, cameras, visual displays | Wang et al. (2020) |

real-time monitoring and evaluation, and data mining and machine learning effectively change the marketing process from post-monitoring to real-time surveillance. Moreover, instantaneous data feedback and machine learning iterative optimization technique make dynamic capability upgrading possible for organizations, for example Google intelligent advertisement platform AdSense records and monitors various data of advertising, smartly analyzes the causal relationship among ads, brand and performance, offering critical information for advertisers' decision. Likewise, the New York Times uses AI tool Perspective to examine and distinguish spiteful remarks, which serves as a basis for evaluating public opinion trend and risk assessment. They liberate humans from tedious and voluminous routine and repetitive tasks.

The second affordance, customizeablity, refers to the ability to provide tailored experiences and responses to specific needs of different users. Customization means AI can be more appealing to various actors. Based on machine learning, AI enables users to learn from previous interaction which further continually enhances customization. Some AI plays the role of automated customer service agent with the help of voice recognition and natural language processing (NLP). The intelligent robotics and artificial assistants receive user's message and understand user's inquiry or after sales service problems and demand by

analyzing sentence structure, semantic meaning and contexts, consequently personalized solution can be offered. To meet the rising demand for e-commerce advertising from thousands of merchants, Ali ruban system designed 400 million posters on Nov 11 (Single's Day, a discount online shopping day promoted by Alibaba) in 2017 to suit different e-shops.

The third affordance, predictability, is the possibility to anticipate the behavior of users, markets, machines, and other forces. Using artificial neural networks can improve the accuracy of customer preference data, predict customers' evaluation of brands, and filter false data (Varsha et al., 2021). It was proved machine learning technology could be more accurate in predicting e-word-of-mouth than sentimental analysis (Vermeer, Araujo, Bernritter, & van Noort, 2019). Brand intelligence analytics app Semantic Brand Score (SBS) is designed to measure brand visibility through identification of dynamic brand share changes over time.

The fourth affordance interactivity is the ability to provide users action possibilities for reciprocal or non-reciprocal interactions. Supported by AI facilities, users can perform interactions with other actors, machines, or robotics, such as providing more useful information, expressing emotions, identifying individuals, recalling interactions (Seymour, Riemer, & Kay, 2018). The application of NLP in chatbots makes human machine interaction possible. Machine talk or chatbots assist users in decision-making and consumption of products and services. The smart bots transform the paradigm of humans to search, shop, experience, and express their preferences for a particular brand.

Adaptivity, the last affordance, refers to the ability to learn and adapt to various contexts, data, and tasks (Wang et al., 2020). Theoretically, AI systems are able to adjust and learn like humans as they make decisions, i.e., adjusting parameters or updating optimization models with modifications. Supervised, unsupervised, and reinforcement learning (Geetha & Bridjesh, 2020) aims to build extensive and deep digital connection and expansion, realizing the evolution and iteration of machine objects and even human subjects, so that the system has adaptiveness, flexibility, and scalability to cope with the ever-changing environment. Semi-autonomous vehicles, for example, use facilities such as advanced algorithms, sensors, cameras dashboards, and visual displays, instead of human involvement, to inform drivers and vehicles about the environment or other potential road obstacles. The "experience" they have achieved is immediately and fully transferable to other vehicles with similar configurations.

### 3.3. Application of CAIEPB

Collaborative AI can be implemented throughout the process of place brand creation, delivery, and performance monitoring. Mainstream players have made plans for AI+ branding and marketing. On one hand, they utilize AI technology to enrich media resources and optimize the brand delivery effects. On the other hand, they are open to customers and directly empower customers in the platform ecosystem. As shown in **Table 3**, four major dimensions of CAIEPB are identified.

**Table 3.** Main application streams in CAIEPB.

| topics | elements | literature | Key affordances |
|---|---|---|---|
| Brand content management | Popular theme matching | Intelligent Advertisements (Li, 2019); | assistability |
| | Creative screening and testing | algorithmic brand culture building | assistability; customizeability |
| | Material integration and adaptation | Deep learning for personalized point-of-interest recommendation and content adaptation; learned decision tree model to differential brands (Witschel, Loo, & Riesen, 2015); | assistability; adaptivity |
| Brand advocacy | Brand Resonance Content Identification | Conversion Rate Optimization Systems; | assistability; customizeability |
| | Artificial Brand influencer creation and maintenance | Virtual nation branding (Bengtsson, 2011); AI influencers as brand endorsers (Thomas & Fowler, 2021); destination AI influencers (Zhang & Huang, 2022); | interactivity; customizeability |
| Customer brand experience management | Scene and customer identification | Customer Segmentation Systems (Tsiptsis & Chorianopoulos, 2011); Conversion Rate Optimization Systems; | assistability; predictability |
| | User comprehension and recommendation | automated Insights for Customer Relationship Management; | interactivity; customizeability |
| | User interaction facilitation | Swedish virtual embassy; persona of spokes-avatars in brand communication (Jin & Sung, 2010); voice assistants in influencing consumer brand engagement (McLean et al., 2021); automated Customer Service; Second Life; | interactivity; customizeability |
| Brand intelligence management | Network Public Opinion Monitoring and Analysis | Brand Marketing Decision Support System (Liu & Li, 2022); big data analytics for branding insights; | predictability; assistability |
| | We Media Data Automatic Analysis | Using social media content to predict Brand Personality; Propensity Modeling; | predictability; assistability |

- Brand content management

Intelligent Advertisements utilize real-time AI innovations to predict consumer behavior, preferences, and particular touch points, empowering the capacity to convey personalized and popular theme matching content (Li, 2019). Several creative screening and testing systems have proven useful in creative idea formation, for example, the algorithmic brand culture building based on the

participatory affordances and information processing ability of digital media can anticipate and evaluate the genuine concurring response to particular parameters. Personalized recommendations and content adaptation based on AI could facilitate the branding and advertising material integration and adaptation.

- Brand publicity

The use of Recommendation Systems and other technology allows for the identification of resonance contents. AI systems are able to supply pertinent and personalized suggestions to customers, and easily identify the most appealing branding characteristics to potential consumers. To gain brand resonance, the learned decision tree model was used to differentiate brands according to the right customers. Artificial Brand influencer creation and maintenance have attracted much attention. In a virtual nation-branding project, the Swedish virtual embassy was created to promote nation brand through the virtual environment of the second life experience (Bengtsson, 2011). The AI influencers produce positive brand benefits compared to those delivered by human endorsers of celebrity (Thomas & Fowler, 2021).

- Customer brand experience management

Scene recognition and customer identification are supportive, since Client Segmentation systems that utilize AI computations can help distinguish behavior and characteristic clustering of clients inside big data (Tsiptsis & Chorianopoulos, 2011). Conversion Rate Optimization Systems may efficiently test and evaluate web site designs in real-time. AI could create automated Customer Relationship Management insights to improve user comprehension. A great number of user interaction facilitation have been invented. Spokes-avatars personalities was discussed in brand communication. Similarly, voice assistants' perceived value, social presence, perceived intelligence, and social attraction would influence the process of consumer brand engagement (McLean, Osei-Frimpong, & Barhorst, 2021). Second life studied the immersive experience in metaverse world (Chandra & Leenders, 2012). Automated Customer Service requires human-like metrics of accuracy, credibility, and competence compared to human needs.

- Brand intelligence management

Data have become a fundamental competitive barrier and the source of intelligence in AI+ branding marketing competition. Social network public opinion monitoring and analysis employs a mixed machine learning algorithmic design, obtaining brand identity from social media content, which empowers professionals the capacity to cultivate branding procedures by utilizing big data assets (Pamuksuz, Yun, & Humphreys, 2021) or by big data analytics for branding insights. Computer vision and parallel computing can offer assistance for brand competition and cost saving (Liu & Li, 2022). More importantly, deep learning based on social networks, photo-, video-sharing platforms advertisements can be utilized to predict the uniqueness of brand positioning. Similarly, propensity modeling showed evidence of prediction of potential customer value.

## 4. Synthesis of CAIEPB Literature

This research synthesized the literature related to CAIEPB to lay a solid foundation for the overall framework in the next part.

### 4.1. Antecedents of CAIEPB

To facilitate the application of collective AI in place branding, identifying and verifying antecedents and consequences becomes the focus of this research. Kelley (1967)'s 3-dimension attribution framework implied that people followed 3 types of clues, and assigned reasons to objective stimuli, actors, environment, and relationships. Following these same criteria, we classify the current research on antecedents of CAIEPB into 3 facets-AI characteristics (objective stimuli), multiple stakeholders' engagement (actors), and place complexity (environment and relations).

- AI Characteristics

The main characteristic of AI is intelligence, which relies heavily on machine learning. It means giving machines artificial intelligence so that they can learn from previous computation and adapt to context and environment through experience. AI simulates and expands human intelligence through five core technologies: computer vision, machine learning, NLP, robotics, and voice recognition, and they are combined to acquire, process, manipulate, store and disseminate information from audio, imagery, text, digital and sensor signals. AI factor is the major technological antecedent for CAIEPB. Anthropomorphized brand agents have attracted a great deal of attention, such as AI influencers as brand endorsers (Thomas & Fowler, 2021), brand spokes-avatars (Jin & Sung, 2010), AI-powered voice assistants (McLean et al., 2021). And more complex AI technology, gamification (McLean et al., 2021), smart tourism (Gretzel, Sigala, Xiang, & Koo, 2015), augmented and virtual reality (Govers, 2015), neuro-marketing (Zahopoulos, 2020) etc., all produce positive and negative impacts.

- Multiple stakeholders' engagement

The Place, where values conglomerate, is a certain space collaboratively created by individuals and groups' interaction with deep connotation and rich meaning, so it is the locus of collective human memory and experience. Consolidation of stakeholders engagement has been propelled as an important tool for involving multiple parties in the complex place branding process (Buhalis, 2020). The stakeholders include government organization and agency (Hereźniak & Anders-Morawska, 2021), organization (Hereźniak & Anders-Morawska, 2021), residents, customers (Nenonen & Storbacka, 2018).

- Place complexity

Since the complexity of place (Hanna, Rowley, & Keegan, 2021), both quantitative (Zenker & Petersen, 2014) and qualitative (e.g., "ambiguity" and "degrees of entropy") (Zenker, 2021), varies and changes in different space, it is crucial to carefully select from and clearly prioritize its many available themes, topics, policies, and target groups to address place. Place complexity can be delineated

from functional, symbolic, and experiential attributes (Hanna et al., 2021). Functional attributes embrace infrastructure (built environment, public space, architecture, etc.), and landscape. Symbolic attributes stem from signs, symbols, and representations linked to tangible and intangible place components (Kalandides, 2011). Experiential attributes contain service, social cohesion, social capital (Richelieu, 2018), events and festivals (Richards, 2017) etc.

### 4.2. Stimulating Mechanism

Due to the complicated interrelationship of people-AI-place, previous studies have shown the stimulating mechanism of CAIEPB is multifaceted. We divide the theories into three categories, namely, the cognitive, contextual, and activating dimension (**Table 4**).

**Table 4.** Representative research of influencing factors and stimulating mechanism of CAIEPB.

| Type | Theory | Purpose | Theoretical application | Findings | Reference |
|---|---|---|---|---|---|
| Cognition stimulation | Multiple Intelligence Theory | Suitable areas for different AI intelligence | mechanical, thinking and sensory AI for different marketing tasks. | provide direction for design and development of AI | Huang and Rust (2022) |
| | AI job replacement theory | Predicting how AI will affect human service labor | based on AI job replacement theory, it explores how companies should make service task decisions between human intelligence and AI machines | AI job replacements occur more at the mission level than the job level, and first on "less intelligent" tasks. | Huang and Rust (2018) |
| | Service Dominant Logic | value co-creation for digital transformations in service ecosystems | examine how SD logics can improve understanding of how value is co-created for place branding | The use of AI is likely to have consequences of digital servitization for consumers, service provider companies, and other ecosystem stakeholders. | Payne, Peltier, and Barger (2021) |
| Context stimulation | Anthropomorphism theory | the impact of AI on service performance and consumer response | explore the positive and negative effects of AI anthropomorphism based on anthropomorphism theory and investigate how to appropriately exploit the anthropomorphic features of AI. | People will use human characteristics to evaluate AI. | Tussyadiah and Park (2018) |

**Continued**

| | | | | | |
|---|---|---|---|---|---|
| | Consumer Culture Theory | the dynamic relationship between consumer behavior, markets and cultural meaning | iconic brands or brands infused with cultural referents, how to Promote Culturally Constrained Consumption Practices | CCT Giving meaning and pleasure to the product and winning consumers for the brand. | Payne et al. (2021) |
| | Social-technical system theory | the relationship between technology use and place branding | based on Social-technical system theory, exploring socio-technical aspects of the design field, and the impact of the environment on the environment and technology. | Society and technology are a system, both have to be optimized at the same time. | Appelbaum (1997) |
| Activation stimulation | Technology Acceptance Model | user psychology and behavioral response in AI Marketing | development and validation of new measurement scales for determinants of user acceptance | Perceptible ease of use and perceived practicality are critical to the intent to use the technology. | Davis (1989) |
| | AI device use acceptance theory | explain user acceptance of AI | based on AI device use acceptance theory, capturing the psychological complexity and hidden dimensions of consumers' integration of robots into hotel services. | Customer acceptance behavior is generated in three stages: primary, secondary and outcome evaluation. | Hoc (2000) |
| | Unified Theory of Acceptance and Use of Technology | technology acceptance and use | assess the likelihood of successful introduction of new technologies and help understand the drivers of acceptance | factors influencing user acceptance of AI include four core variables: performance expectations, effort expectations, community influence, and convenience. | Venkatesh et al. (2012) |

Multiple intelligence theory assumes that humans think and act in many ways, so AI can also be designed to be versatile for different tasks. Huang and Rust (2021) combined the strengths of multiple AI (mechanical, thinking, and sensory) intelligence in marketing. According to the service-dominant logic, the success of co-creating value in digital service ecosystems depended on a variety

of resource-integration actors, basic mechanisms, and systems. Building on anthropomorphism theory, De Visser et al. (2016) demonstrated through three experiments that anthropomorphic features in AI improved trust resilience, reduced the impact of trust violations, enhanced trust, and relationship among agents. The consumer culture theory explored the dynamic relationship among consumer behavior, markets, and cultural meanings (Swaminathan, Sorescu, Steenkamp, O'Guinn, & Schmitt, 2020). It focused on how iconic brands (Holt, 2004) or brands infused with cultural referents contribute to culturally constrained consumption practices. Technology acceptance model outlined the perceived ease of use and perceived usefulness of technology systems were critical for users' intentions (Davis, 1989). Likewise, the acceptance theory of AI device use and Unified theory of Acceptance and Use of Technology are gaining popularity in recent study. Lu, Cai, and Gursoy (2019) developed a SRIW scale to reveal the characteristics of consumers' integration of AI in routine service transactions. Technology-related theory activates user brand engagement experience.

### 4.3. Outcomes of CAIEPB

AI in place branding is gradually gaining great momentum, but the implications appear uneven and unclear. We sort the extent literature into 4 facets—AI-enabled customer experience, sustainable brand building, place transformation and organization performance. Generally, most studies put customer experience as the most significant outcome. Besides the traditionally discussed topic (i.e., customer brand loyalty, purchasing intention), specific AI context embedded outcomes have been emerging, for example richer brand experience (brand selfies, immersive and metaverse experience), dynamic and real time interaction, customer brand relationship reshaping (brand intimacy, user attitude and acceptance; brand love, Co-created brand journey, E-WOM). Another prominent stream of research is sustainable place brand building, such as digital and virtual brand equity (Keller, 2016), intelligent brand manifestation, brand excellence, brand popularity, brand value, brand engagement, co-branding (Simões, Filipe, & Barbosa, 2019) etc. The next outcome involves place transformation, topics such as public value enhancement, place regeneration, place prosper, influx of tourists and investors (Bose, Roy, & Tiwari, 2016), changes in public space, smart city etc. have been elaborated. Place branding differs from company or product branding in the invisibility of organizations, and it seems to rely heavily on engagement and involvement of cooperative power and forces of agents and crowds to form synergism. Some research acknowledged the unique function of leading organizations in place branding, for example, destination management organization, public linkage of partners (Hanna & Rowley, 2015), place sector marketing groups. Key to the argument in this domain is the disjuncture of branding to serve tourists/customers or to engage residents. Topics, such as governance of autonomous intelligence systems efficiency, government as a platform, public operation performance (Eshuis, Braun, & Klijn, 2013) have been discussed.

### 4.4. Impact Mechanism

In the same vein, the impact mechanism of CAIEPB consists of cognitive, contextual and activating dimensions (**Table 5**). Use and gratification theories are more commonly used in the relationship between AI and user brand experience. It differs from technology acceptance theory since the former assumes that motivational variables directly influence behavior without the mediating role of attitudes or behavioral intentions. In addition, diffusion of innovation theory assumes AI spreads (or diffuses) over time within a particular society or social system (Rogers, Singhal, & Quinlan, 2014). Perceived characteristics of innovation theory extends diffusion of innovation theory by introducing three other features: image, volition, and behavior (Moring, 2022). Dynamic capability means new forms of competitive advantage are realized by upgrading capabilities (organizational resources) to keep pace with the changing business context (Wheeler, 2002). Wheeler (2002) considered net-enablement opportunities as a dynamic capability. Social facilitation theory suggested that the presence of robots in teams could facilitate human interaction and ease conflicts between other human teammates (Hohenstein & Jung, 2018). The robot's indefatigable and efficient nature can encourage other members to continue contribution. Hwang and Won (2021) found that when participants viewed their collaborators as AI, they produced more ideas and better-quality ideas. In a real robot state, participants also paid more attention to how their ideas were generated, demonstrating more logical connections between their own ideas. Chen (2014) constructed a scientific measure indicating a regional innovation capacity system based on the theory of sustainable regional economic development and the theory of regional technological innovation, which played an important role in promoting local economy and achieving sustainable development goals.

### 4.5. Spatiotemporal Varying Patterns

The continuous collaborative AI diffusion in place branding reveals highly variable nature relying on different scales of place and phase of development, thus it is a dynamic and multistage process. Proper understanding and adherence to dynamics patterns and rules are crucial to achieving improved performance and results in technology applications for sustainable place branding. The changing pattern of CAIEPB could be categorized into two groups.

- Time-varying patterns of CAIEPB

Place brand development is a necessary but insufficient condition for sustainable place branding. It has several stages of change that show a structured transition of local economic, political, technological, social, and environmental components. Since 1980s, a group of studies have elaborated the rebranding process, and rebranding cities and places through regeneration programs have been prominent policies (Raco, 2003). As many traditional industrial cities are eagerly dedicated to redefining themselves with the help of advanced technologies. Hakala, Lemmetyinen, and Nieminen (2020) studied rebranding implementation of a city in Finland from the very beginning to the end over 5 years. Researchers

**Table 5.** Representative research of CAIEPB outcomes and impact mechanism.

| Type | Theory | Purpose | Theoretical application | Findings | Reference |
|---|---|---|---|---|---|
| Cognition impact | Use and Gratifications theory | the impact of CAIEPB on brand experience | building a better consumer experience by analyzing audience's motivation to use AI and get their needs met | member selection and continuance use of AI is based on their needs or use satisfaction and gratification | Sangwan (2005) |
| | Social Cognitive theory | identify ways in which behavior can be changed and modified | AI use was assessed through the constructs of self-efficacy, outcome expectancy, performance, anxiety, affect, and outcome expectations | It is developed on three factors: behavior, personality and environment, which interact to predict the behavior of groups and individuals in both directions | Moring (2022) |
| Context impact | Co-creation theory | impact on Stakeholder Value; Co-creation of CAIEPB | exploring how AI affects the process of co-creating value | AI-enabled digital services escape creates opportunities for multiple players to participate in service ecosystems, creating a competitive and collaborative environment | Payne et al. (2021) |
| | Diffusion of innovation theory | the impact of AIIPB on brand communication | diffusion of innovation theory assumes AI once introduced into a social system, it is continuously transmitted in the whole social system over time | AI can enhance brand communication | Rogers et al. (2014) |
| | Dynamic Capabilities theory | customer value creation | Measure, predict and understand the ability of an enterprise to create customer value through digital networks | AI enables a firm to gain new forms of competitive advantage | Wheeler (2002) |
| Activation impact | social facilitation theory | the impact of working with AI | the presence of others may motivate and enhance the performance of individuals | Robots can facilitate human interaction and ease conflicts between other human teammates | Hohenstein and Jung (2018) |
| | Technical Innovation Theory | measure levels of place technology innovation ability | identify effective indicators to measure the level of technological innovation capacity in a region | place technology innovation ability can reflect the degree to which the technology innovation system is in place | Chen (2014) |

discussed destination brand maintenance over time and showed why no single stakeholder can possess the qualities required to sustain a destination brand with time (Sarkar & Banerjee, 2019). Facing the worldwide COVID-19 crisis, there is evidence that AI has been highlighted as a practical transformation tool to upgrade and overcome the difficulty of large-scale lock down and limited mobility and offline interactions. As a result, the adoption of AI in branding is accelerating in most places. Besides, AI technology can enhance consumer perception of brand value from the very early stage of consumer journey. Stocchi, Pourazad, Michaelidou, Tanusondjaja, and Harrigan (2022) focused on the application of Mobile apps among customers' process of pre-adoption, adoption, post-adoptions. Most research pays close attention to the post-adoption impact on branding while neglecting the two previous stages.

- Space-varying patterns for CAIEPB

From the space scale, extant studies have touched almost all fields, from nation, region (urban region, rural region), megacities, large cities and capitals, small and medium-sized cities, tourist destinations, villages, to communities and neighborhoods. Global and major cities are often the focus of place branding research as their dominance of worldwide resources, talents and drawing capacity in capitals. Comparatively few works explore neighborhood-scale branding (Madden, 2017). A few researchers gazed at alternative and interesting places (Rhodes, 2019), which may serve as the peripheral, marginal, and subordinate parts to the global urban systems. However, most studies do not look inside the place, treating the place from the homogeneity angle, leaving the heterogeneity largely ignored.

### 4.6. CAIEPB Research Method

As for research method, the previous CAIEPB studies can be divided into three categories: quantitative, qualitative, and mixed method research. Quantitative method studies basically use literature search methods to collect data and analyze data by bibliometric analysis (**Table 6**). For example, Mustak, Salminen, Plé, and Wirtz (2021) conducted a quantitative assessment of relevant literature by means of thematic modeling and scientometric analysis to establish a comprehensive synthesis. A small number of scholars have also applied empirical analysis. The data collection methods of quantitative methods are mostly questionnaires and semi-structured interviews, and a few applied case studies and experimental studies, and the data analysis methods are mainly descriptive statistical analysis and structural equation modeling. For example, Canhoto (2021) investigated the way techniques and machine learning algorithms assisting in money laundering detection through a case study in the financial industry. Mixed methods mainly collected data through qualitative methods and econometric methods such as factor analysis. In addition, the sample size in quantitative studies vary greatly, with the largest reaching 3404 and the smallest 62. Cross-sectional data constitute the majority in terms of data nature and sample size, while longitudinal and panel data remain scarce.

**Table 6.** Research method of CAIEPB.

| Method | Data collection methods | Data analysis methods | Data nature/ sample size | References |
|---|---|---|---|---|
| Quantitative | sample extraction | meta-analytic approach | 3404 | Parsons and Duffield (2020) |
| | database Search | topic modeling and scientometric analysis | 214 | Mustak et al. (2021) |
| | field study | constructing prediction models | 3345 | Suh, Wilson, and On (2023) |
| | online anonymous invitation link | structural equation modeling | 1072 | Cheng and Jiang (2022) |
| | questionnaires | partial least square analysis; | 841 | Tussyadiah and Park (2018) |
| | online consumer samples | development scale | 1348 | Lu et al. (2019) |
| | experiment; questionnaires | relevant analysis and regression analysis | 270 | Xu, Zhu, Metawa, and Zhou (2022) |
| Qualitative | literature Search | systematic review of literature | 19 | Achmat (2019) |
| | semi-structured interview | grounded theory approach | 15 | Yan et al. (2022) |
| | case study | grounded theory approach | / | Chung and Byrom (2021) |
| mixed | Interviews; questionnaires | descriptive statistical analysis; structural equation modelling | 21; 724 | McLean et al. (2021) |
| | semi-directed interviews | coding and statistical analysis | / | West, Clifford, and Atkinson (2018) |
| | semi-directed interviews; questionnaires | descriptive statistical analysis | 240 | Ray, Mondada, and Siegwart (2008) |

## 5. Review of Extant Literature

### 5.1. Definition and Attributes Not Explicitly Constructed

AI has had a rather ambivalent relationship to humans—swinging between their augmentation and replacement (Sreedharan, Kulkarni, & Kambhampati, 2022). There has been insufficient research on effective ways for AI to interact, team up and collaborate with humans, and not so many studies combining place branding and collaborative AI in the mainstream marketing or branding journals. Given that collaborative AI has gradually become a technical term, its application in place branding would correspondingly be a tendency. While most studies clarified the technological features of collaborative AI, they did not explore its appropriateness in place branding context. In particular, the current studies seem to interchange similar terms, for example, virtual place branding, AI fostered place branding, which actually exhibit differences to a greater or lesser extent, further confounding the definition of CAIEPB. It possesses multiple cha-

racteristics, classifications, and affordances. They may interact in distinct context and thus produce different effects on mechanisms. The scope of collaborative AI and Human intelligence for specific context was not fully elaborated. Further explanation of the synthesis of AI characteristics and affordances study is still needed.

### 5.2. Limited Knowledge about Spatiotemporal Varying Patterns

Current researchers have been aware of the dynamics of varying patterns of CAIEPB over different phases of place development and different space scales, which have revealed some regular patterns. However, studies on this changing pattern is relatively few and rudimentary, especially the lack of formation process, leading to inconsistent or even contradictory findings. In fact, collaborative AI's attributes, user's profile, technology acceptance attitude, local technology governance policy may act as important moderating factors for impacts, and stakeholders' involvement, and other place brand's co-creating may also exert considerable influence on outcomes. All these variables play a significant role in the process of place branding. Some of the few studies touched on the results of periodical or spacial branding, while neglecting the moderating variables' functioning mechanisms for changes. Without an integrated framework, it is impossible to get a panorama of varying patterns of CAIEPB over time and space.

### 5.3. Insufficient Research Methods

Given CAIEPB's features such as multi-dimensionality and multi-attributes, it is objectively necessary to use multiple methods and give full play to the benefits of each method to research. More diverse methods such as longitudinal survey, grounded theory, and empirical studies are needed to explore the changing patterns of CAIEPB, but the current studies are mostly limited to systematic literature review methods, and some case studies. In addition, when exploring the impact of AI technology on customer experience, the vast majority of studies use semi-structured interview methods and questionnaires, and few studies adopt experimental research and other methods. The enhancement strategy of collaborative AI on brand marketing is studied through data-driven research. From Table 6, it shows that cross-sectional research is the dominant method in the CAIEPB study, and longitudinal research on the lasting impact of AI on brands is lacking.

### 5.4. Obscure Stimulating Mechanism

Clarifying the formation mechanism of CAIEPB is an important prerequisite for place branding enhancement strategies. Most studies use user technology acceptance and AI job substitution theory, and lack a specialized theoretical foundation in this field. Dissecting consumer attitudes can explain CAIEPB's preconditions to some extent, but most existing studies ignore the local context specificity. Meanwhile, AI with different characteristics in different places does not face

the same stakeholder involvement (participants) and location complexity (environment and relationships), and existing studies do not clarify the boundaries of AI use in different scenarios.

Moreover, although there are attempts to explore the formation process of CAIEPB from the perspectives of customer experience, stakeholders and applications in different domains, existing research mainly concentrating on corporate brands, while research on place branding is limited. In particular, there is a dearth of literature that uses social dominant logics and service dominant logics as theoretical perspectives to study CAIEPB formation mechanisms, and the two theoretical perspectives above are broader than the product, service, customer, and consumer dominant perspectives and attempt to synthesize the factors that influence social meaning and public value. As a result, existing research has not opened the black box of CAIEPB formation mechanisms. We suggest that future research introduce more diverse theoretical perspectives that extend beyond marketing disciplines to further advance CAIEPB theory.

### 5.5. Outcomes and Impact Mechanism to Be Clarified

Collaborative AI can be constructed as a place branding resource and is a key driver of important attractiveness and sustainability of place. However, most previous studies have confined the outcomes generated by CAIEPB to how it contributes to data analysis and service delivery, and only some scholars discussed urban sustainability and livability, environmental governance (Nishant & Corbett, 2020). Thus, the results generated by CAIEPB need expanding and amplifying.

At the same time, existing studies have mainly explored the impact mechanisms of CAIEPB based on theories of use and satisfaction and value co-creation theory. However, the use and satisfaction theory was originally proposed to explore people's motivation for using information technology, focusing on the social and psychological aspects of users' consumption and their associated motivation and satisfaction activities (Moring, 2022). Whether the theory is applicable to collaborative AI in place branding remains to be verified. Studies on value co-creation theory emphasize co-creation of value with customers and residents, while overlooking broader stakeholders such as government agencies, community, and not-for-profit organizations within the analysis framework. Most other theories aimed at explaining the impact mechanism fail to comprehensively depict the different effects of collaborative AI on place branding and its process. Thus, the outcomes of CAIEPB and its impact mechanism are yet to be explored.

Based on the above analysis, we reviewed the literature of CAIEPB and outline 5 aspects under research. This study attempts to thoroughly probe into CAIEPB's connotation and attributes, deeply integrate interdisciplinary theories and paradigms. It is imperative to establish an overarching framework to explore the research themes of CAIEPB, facilitating the advancement of in-depth studies in this domain.

## 6. Discussion and Future Research Agenda

Ubiquitous AI provides a vast space for users, institutions, and organizations with a rich research agenda in marketing, IS or strategy. We propose 7 key areas for future research. To have an overview of the internal relationship between the main variables, we adopt and extend the typical S-O-R framework (Mitchell, 1971) and build up an overarching S-O-R-M theoretical analysis framework (**Figure 2**). To reveal the formation mechanism of human behavior, Mehrabian and Russell (1974) advanced stimulus-response theory to the stimulus-organism-response model, illustrating that the effect of stimulus on response should go through an internal transformation in the object, and the object's cognitive affective states (O) of the external stimulus (S) are formed in this process, which, in turn, elicit corresponding behavioral tendencies (R). The S-O-R theoretical analysis framework is widely used in high-tech industries (Lee, Ha, & Widdows, 2011), Internet industries (Laroche, 2010), and service industries. The organism goes further beyond the organic beings and is widely applied to organizations and systems that possess similarity to organism in the complex inner and outer mechanism. For branding research, the S-O-R theoretical analysis framework also shows good applicability. Most studies found links among people/place environment, place branding and customer's behavioral or relational responses, merely focusing on unitary variables and overlooking the dynamics among technology, people and place, especially for the stimuli and responses elements. We make further efforts to apply the framework in a synthetic way, incorporating multiple stimuli and responses.

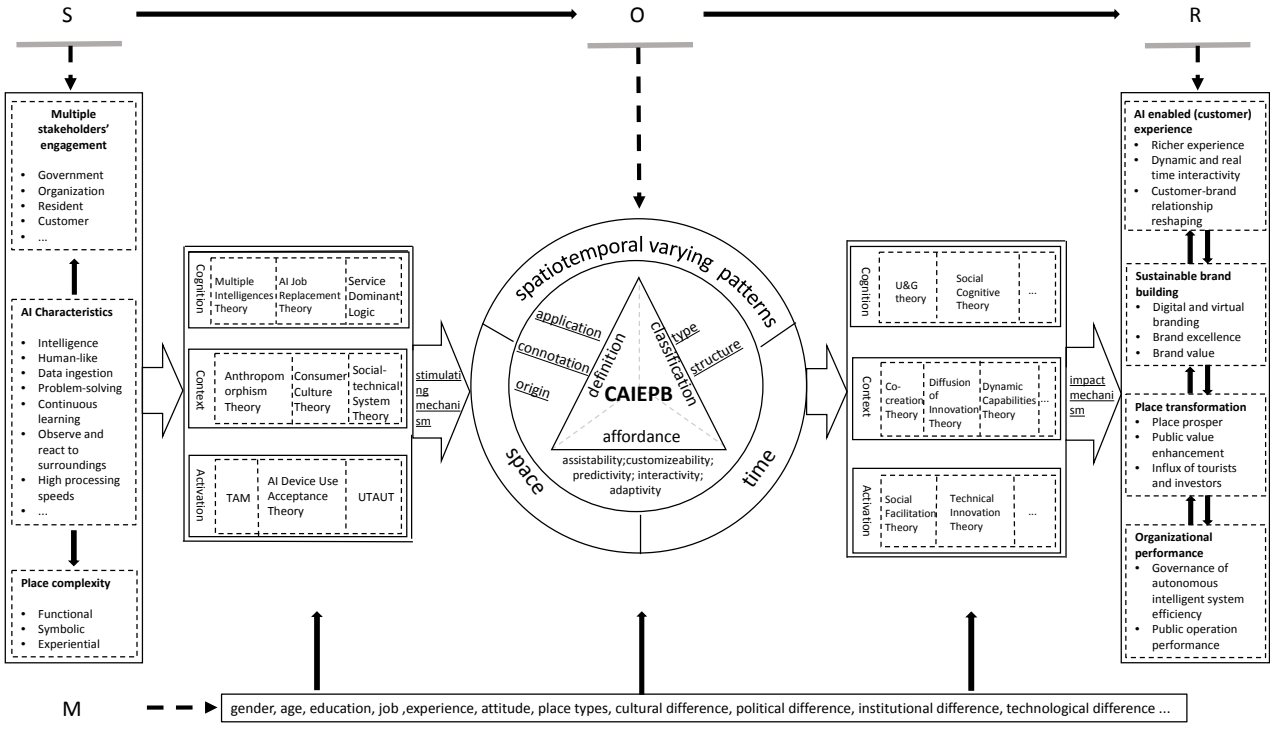


**Figure 2.** S-O-R-M theoretical model of CAIEPB.

### 6.1. The Need for Conceptual Clarification and Consolidating the "O" Module

Understanding the essential attributes of CAIEPB sets the fundamental basis for future studies. We speculate four main areas. First, AI-HI augmentation-replacement duality need to be depicted considering the particularity of different places, customers, residents, other stakeholders and place consumption (Huang & Rust, 2022). As multiplicity and heterogeneity dominate the coming place brand, most works rely on human-machine collaborative strengths (Keller, 2021). Its place-specific connotation remains to be clarified. Instead of indiscriminately imitating from IS literature, it is necessary to distinguish the definition of CAIEPB from other disciplines. Secondly, the dimension and structure of CAIEPB should be elaborated to enlighten the academia and industry. Collaborative AI or AI and HI collaboration seems to have been used quite liberally. What dimensions precisely embodied in the term, the evaluation of relative importance for dimensions, generally applicable scale development and its internal structure on account of place background are the first step to define the construct. Thirdly, the varying pattern dynamics studies have been limited in the past. In light of place personality or particularity, for example, places at different scale, and the collaborative phases or processes, it's imperative to demonstrate the gradual changes through meaningful branding interventions using time series analysis or panel data research. And historical sketch in business has indicated that machine-human relationship evolves dynamically as for augmentation and/or replacement (Huang & Rust, 2022). With the accelerating of technology iteration, the machine can successively augment, replace, and even outsmart human. There is no reason we still adopt rather static perspective while ignore the ever-changing new normal. In view of the above-mentioned three facets, the O (Organism) module is constructed for the integrated S-O-R-M theoretical framework. This module is a double-layer spherical structure, inner circle consisting of the key basis of CAIEPB—definition, affordances, classification, and outer circle showing the superficial manifestation of the spatiotemporal varying patterns.

### 6.2. Identifying the Interrelationships of Antecedents and "S" Module

To enrich the trinity "People-Technology-Place", the future study needs to thoroughly investigate the interrelationship of the three types of critical antecedents. AI's characteristics have received the greatest research attention in IS and management. With widespread application and growing affordances, it is challenging to convert interplay of technologies into actual branding benefits. As for stakeholders, much of the progress has been made in customer and resident co-creating and participating process, while DMO, local marketing agency, creative class of free-lancers, and a large number of other actors in the wider stakeholder web are also indispensable actors, which have not yet received equal consideration. Technology interventions can fundamentally alter place complex and require deeper

reflection on the close interweaving of elements. Considering the above analysis, we figure out the "S" module in the integrated S-O-R-M framework, and classify the antecedents into three types, among which technology affects the other two antecedent categories.

### 6.3. Probing the Stimulating Mechanism and S → O Module

The stimulating mechanism is another fundamental building block of the CAIEPB theoretical system. Future research could lead to broader theories, expand the application of marketing theories or take an interdisciplinary approach, and try to develop specialized theories to better explain how collaborative AI shapes place branding. In future research, we should investigate the complexity of local contexts, the characteristics of other stakeholders such as visitors, residents, and communities, and explore how theories such as service-dominant logics can be used to explain consumer-related antecedents and the influence of other actors. AI-driven algorithms help to shape brands in the minds of consumers, and wider digital transformation of local brands is to be studied (Ebrahimi, Hajmohammadi, & Khajeheian, 2020). While continuously improving multiple intelligence, anthropomorphism, consumer culture and technology acceptance theory as the theoretical basis of CAIEPB formation mechanism, researchers can also continue to expand and integrate other discipline-related theories, such as assemblage theory (DeLanda, 2019), local attachment theory and actor-network theory (Latour, 2007), etc.

Future work should analyze the characteristics and coupling of antecedents to differentiate complicated formation mechanisms of CAIEPB. Using the S-O-R theoretical framework and constructing module O in the previous section, it is known that under module S, module O can generate the corresponding cognitive state, contextual state and activating state based on its cognitive, contextual, and activating attributes. The cognitive state and activating state are mutually influenced, and the contextual state affects both the activating state and cognitive state. Based on the above analysis, the formation mechanism of CAIEPB is divided into three types: cognitive stimulating mechanism, contextual stimulating mechanism and activation stimulating, which is displayed in the S → O path of S-O-R-M integration theory model.

### 6.4. Exploring the Impact Mechanism and O → R Module

The impact mechanism is an indispensable component of CAIEPB integrated framework. Researchers can continue to construct corresponding models embodying diverse outcomes based on the analytical frameworks of use and satisfaction theory and value co-creation theory to address shortcomings of theory restriction. And research should also stretch out to include constructs such as region type and policy system as moderating variables in models. Using satisfaction theory and value co-creation theory can be integrated, so that they can take the cognitive, contextual, and activating attributes of CAIEPB into account. Fu-

ture research can actively consider and integrate theories from other disciplines, such as spillover theory and relationship quality theory, to lay a solid theoretical foundation for the mechanism of CAIEPB outcomes.

Moreover, the literature examining CAIEPB based on value co-creation theory is still lacking in understanding how AI re-configures the process of value co-creation (Payne et al., 2021). The complexity of embedding AI into service exchange encourages traditional industries to collaborate with AI. The evaluation of how consumers define the value of AI service, and the impact of changing service experiences is on demand. Future research in service ecosystems should identify unique value-creating AI activities geared toward customers or in back-office operations. Collaborative AI, undoubtedly affecting all place brand dimensions, exerts influence in three most evident areas: brand promise fulfilment, customer service, and personalization (West et al., 2018). Existing literature suggests that AI can improve the consistency of brand promise, which facilitates differentiation. Brand promise consists of three elements—"clarity, consistency and organizational coherence". The extant study only explored the impact of AI on its delivery consistency, and the impact analysis of AI on the other elements of brand promise (clarity, consistency) is needed. Customer brand experience is the foundation of branding. We find that many AI technologies, such as Natural Language Programming, could be utilized to examine the path to enhancing an organization's customer service and overall brand experience, and to assess the impact of collaborative AI on elements such as brand loyalty and brand pricing.

In addition, researchers can also categorize and analyze the mechanism of CAIEPB outcomes based on different theories and further explore the connections between different categories of mechanisms, so further detailed portrayal of the O → R path in the analytical framework of S-O-R-M is needed. With the cognitive, contextual, and activation attributes, CAIEPB's impact mechanism is also classified into 3 types: the cognitive impact mechanism, the context impact mechanism and the activation impact mechanism. As cognitive and activation mechanism interrelated, context impact mechanism exerts influence on the previous two mechanisms.

### 6.5. Rationalizing the Interrelationships of Consequences and "R" Module

The outcomes of CAIEPB are of fundamental significance for place sustainable development. Future study should take a broad perspective. Besides customer-oriented brand experience, topics like place branding building, place transformation, and organizational performance are emerging and evolving. CAIEPB can affect individual experience, as well as relationships between place, brand, and actors. Many scholars have reiterated the divergence between place brand and other types of branded entities in that branding process should account for the differing and possibly increased social sensitivities resulting from various collision (Swaminathan et al., 2020). Hence, we propose that further research could elucidate the diverse outcomes of CAIEPB from 4 dimensions. For indi-

vidual experience, it's essential to explore AI communication and customer sensory brand experience alteration, brand gamification immersive experience (Yung & Khoo-Lattimore, 2019), algorithm recommended e-brand perceived value and quality of brand etc., which reveal distinctive potentials regarding consumer experience and behavior. In sustainable brand building, place brand value evaluation, rebranding, brand identity change and brand intelligence analytic etc. remain to be comprehensively probed. For place transformation, further study is needed in place regeneration, AI innovation index, place technology readiness (Ramírez-Correa, Grandón, & Rondán-Cataluña, 2020), place changes assessment. For organization performance, even though AI does improve operational efficiency and decision-making process of organizations, whether private or public, there is limited research in this area. Recently, AI governance competence of local and regional organizations has begun to monitor this trend (Dafoe, 2018). We construct the R (Response) module in S-O-R-M framework. The R module consists of customer experience, brand building, place transformation and organization performance, and the 4 outcomes interacting accordingly.

### 6.6. Clarifying Moderating Effect and "M" Module

Various individual characteristics, cultures, institutions, and policies may have corresponding boundaries for the formation process, changing pattern, and outcome mechanism of CAIEPB. This highlights the need to strengthen moderator study to improve the scientificity and accuracy of the results. Future research should comprehensively consider the moderating variables and explore the formation mechanism, varying pattern and outcome mechanism of CAIEPB with moderating process. We construct the M (Moderator) module in S-O-R-M theoretical model, which extends the S-O-R theoretical analysis framework.

### 6.7. Enriching Research Methodology

Most studies utilize self-reported data through survey, but it may be inclined to data bias and require procedures counting information triangulation, mixed methods, and objective estimations for validity (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Future research should enrich the research methodology, and it should compare the status of CAIEPB research in different regions horizontally, and fundamentally break through the research limitations of cross-sectional data, and adopt various research methods including grounded theory, experimental research, visual and textual approaches to explicate technology in terms of specific research contents and topics. Real-time affordances for psycho-physiological and behavioral information collection will provide a deeper understanding of actors, counting their level of attention, engagement, delight, and even passions (Parsons & Duffield, 2020). At the same time, the research object for CAIEPB should be further expanded, for example, it is suggested to adopt an experimental design approach to verify the value contribution of residents to CAIEPB, etc.

In summary, this paper draws on and extends the S-O-R theoretical analysis

framework to construct the S module with the antecedents of CAIEPB; the S → O path process with the formation mechanism of CAIEPB; the O module with the core foundation and characteristics; the O → R path process with the result-generating mechanism; the R module with the outcomes generated by CAIEPB; and the M module by integrating the formation mechanism, changing pattern and regulation process of the result-generating mechanism of CAIEPB. Considering the logical connections between each module and path, the S-O-R-M integrated theoretical model of CAIEPB is constructed. We aim to clarify the CAIEPB research context, provide a panoramic scope and overall analysis framework for future study, and gradually establish a theoretical system to guide the digital transformation of place brands and contribute to place branding development with collaborative AI intervention.

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## Conflicts of Interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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