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Understanding the Role of Artificial Intelligence in Personalized Engagement Marketing

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SUMMARY

This article explores the role of artificial intelligence (AI) in aiding personalized engagement marketing—an approach to create, communicate, and deliver personalized offerings to customers. It proposes that consumers are ready for a new journey in which AI is a tool for endless options and information that are narrowed and curated in a personalized way. It also provides predictions for managers regarding the AI-driven environment on branding and customer management practices in both developed and developing countries.

KEYWORDS: artificial intelligence, CRM technology, customer relationship management, customization, marketing, personalization

> The thing that's going to make artificial intelligence so powerful is its ability to learn, and the way AI learns is to look at human culture.
>
> —Dan Brown[1]

Technological advancements produce structural shifts in firm strategies and change business paradigms—for example, personal computers (PCs), the Internet, and smartphones. Such advancements often improve the knowledge potential of organizations in managing customer needs and delivering offerings. In addition, research has shown that firms in a knowledge-based environment create, disseminate, and use knowledge as a key source of competitive advantage.[2] Artificial intelligence (AI) is breaking new ground in delivering value to users. AI refers to the broad idea that computers, through the use of software and algorithms, can

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think and perform tasks like humans. They actively shape human lifestyles in almost every aspect of daily life, and the way they do it is through personalization. For the purpose of this study, we use the following definition of AI: a system's ability to interpret external data correctly, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation.[3]

AI technology operates in the domain of automation and continuous learning, acting as the intelligence that drives data-focused analytics and decision making. AI automates many of the activities involved in the collection, storage, management, and retrieval of information that can aid in the creation and management of firm offerings. By using technologies like deep learning, genetic algorithms, and natural language processing, AI can train machines to recognize patterns in large amounts of data. Popular AI tools for personal uses include personal assistant (e.g., Alexa, Siri, and Cortana), travel planning (Mezi), music (Pandora), financial planning (Olivia), language translation (Liv), and smart-home solutions (Nest). Popular AI tools for business use include plug-and-play solutions for business needs (e.g., Fluid AI), ecommerce and digital marketing (Sentient), process automation (Amazon MTurk), face recognition (Haystack), legal language assistant (Legal Robot), and credit scoring (Lenddo).

Where and How Do Personalization and AI Converge?

In terms of marketing, personalization is often presented and studied alongside customization as they are related in concept but differ in application. Personalization occurs when the firm decides, usually based on previously collected customer data, what marketing mix is suitable for the individual, whereas customization occurs when the customer proactively specifies one or more elements of his or her marketing mix.[4] A fair amount of consensus prevails in understanding personalization as a largely firm-controlled process that is powered using customer-level data and customization as a largely customer-decided process that is focused on the design and delivery of the offering.[5] Personalization has been shown to work in both digital and nondigital environments.[6] Classic examples of digital personalization include "recommended for you" section in websites such as Amazon, Pandora, and Netflix. In terms of nondigital personalization, Sprint uses predictive analytics to personalize retention offers to customers who are at risk of churning.[7] Within the services domain, intelligent call routing services also deliver personalization by matching customers with service representatives with appropriate skills and personality.[8]

Personalization as a process interlinks customers and marketers[9] and solidifies the relationship between them.[10] Customer relationships that also have emotional bonding progress to a state of engagement,[11] and that positive relationships play a role in influencing customer engagement (CE) behaviors.[12] Accordingly, engagement has been defined as the attitude, behavior, the level of connectedness among customers; between customers and employees; and of customers and employees within a firm.[13] Furthermore, the more positive the attitude and

behavior, and the higher the level of connectedness, the higher the level of engagement.

The high degree of personalization in AI is considered to be a major factor behind its popularity. AI has shifted the paradigm from a rules-based expert systems approach to a deep-learning-based, data-driven approach.[14] AI is so unobtrusive that users are mostly unaware that they have interacted with the technology.[15] When technology works on a personal level, it creates an endearing bond with the users. Furthermore, when marketers tap into such a bond, the potential for customer value creation is enormous. However, the success of personalization initiatives is constrained by the volume and quality of customer information; the ability of firms to generate insights from customer data; and the effective implementation of insights.[16] To overcome these three constraints and to go beyond the current level of personalized offerings, companies are now resorting to AI-powered solutions.

Curation in an AI-Driven World

Digital curation is defined as "the management and preservation of digital material to ensure accessibility over the long-term."[17] Curation as a strategy focuses on practices that select, maintain, and manage information in ways that promote future consumption of that information.[18] Curation of product, price, place, and promotion to individual customers assumes more significance for companies in this digital age where customers are exposed to an information explosion.[19] For instance, a recent survey found that 48% of consumers moved their purchase to a different provider (online or in-store) because the first company's website was poorly curated.[20] Research has also found that CE improved with curation.[21]

In an AI-powered environment, the process of curation still involves selecting, maintaining, and managing information. For instance, Intel implemented a solution to identify the Path to Purchase journeys in the purchase of a PC that involved an AI tool for collecting, selecting, synthesizing, and maintaining social media information regarding the PC purchase, as well as the human element for managing the collected information toward identifying business opportunities and insights.[22] In another instance, HealthifyMe, an Indian health and fitness app, held a vast database of over 8 million users' food habits, workout routines, and the interactions with human nutritionists through the app.[23] As a means to utilize the valuable data, the company in 2017 created Ria, an AI bot, that can track and manage daily calorie needs and workout regimens and can offer suggestions on heathy lifestyle habits. In addition to listening and reading user information, Ria 2.0, launched in 2018, can also see and identify healthy and unhealthy foods from photos of food plates and menu card options based on user-uploaded photos. Furthermore, Ria 2.0 can also factor in medical conditions and offer curated food suggestions, diet plans, and general information regarding healthy lifestyle that are particular to every user. This bot has significantly reduced the role of humans

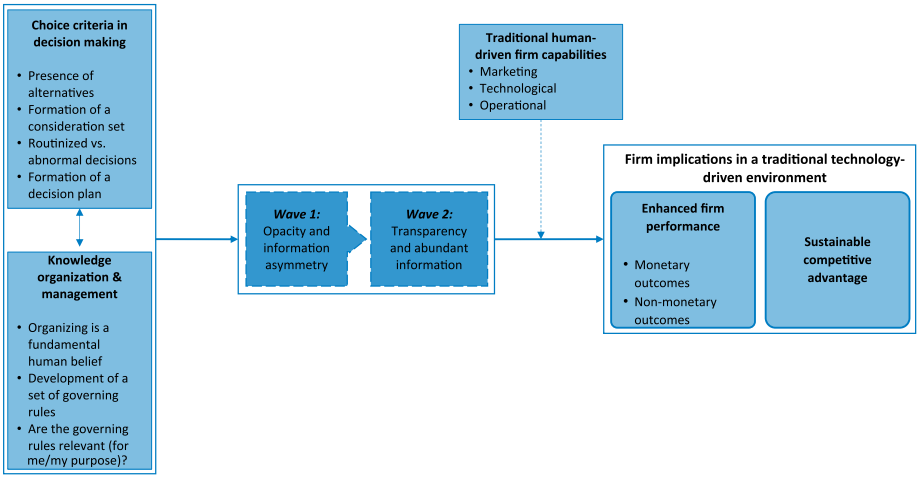
handling messages (to about 20%), with more improvements expected in the future. This example illustrates the potential of AI in handling a large volume of data to generate valuable insights and deliver personalized content to users, with little to no human interaction.

In the context of personalized engagement marketing, curation refers to the automatic machine-driven selection of products, prices, website content, and advertising messages that fit with an individual customer's preferences. The AI in this case uses data—on firm-customer transactions, customers' consumption pattern of offerings, and the communication pattern about firm offerings to customers—to automatically predict the type, timing, and purchase of preferred firm offerings. Furthermore, AI can also customize the firm's website content to match customer preferences (e.g., Wix, The Grid), price offerings to align with customer's willingness to pay (Pace for hotel room pricing; Perfect Price for dynamic pricing), and connect the customer interactions across all channels and devices in a seamless and personalized manner (Adobe Sensei, Samsung SmartThings ecosystem). AI tools also learn from customer interactions to improve the accuracy of the predictions about customer preferences, thereby increasing the value from the firm to the customers over the customers' relationship lifecycle.

Within AI, machine learning algorithms (such as collaborative filtering, deep learning, unsupervised clustering, and k-nearest neighbors) have emerged as a preferred method for developing applications that understand consumer preferences (based on their reviews, prior product purchases, and product usage) to find new products or services the consumers are more likely to prefer.[24] Recommendation engines are a popular application of machine learning, wherein users are matched with offerings that they liked in the past and/or may be interested in the future. Such curation reduces consumer cognitive load and takes the responsibility of finding the best options for a consumer's choice context to the search platform or the brand.

Self-learning neural networks trained on volumes of customer voices have led to the advent of voice as a major interface. In 2016, a tipping point was reached in the ongoing tug-of-war between human capability and that of machines, specifically in the field of image recognition. As recently as 2010, machine algorithms had an error rate of 30% when attempting to identify images from ImageNet, a large database of over 10 million obscure images, compared with a stagnant human error rate of 5%. By 2016, however, machines had made such strides in image recognition that the error rate had dropped to 4% for the best systems, thus edging out the human eye. In 2017, Google announced the achievement of a 4.9% error rate in speech recognition. This implies that Google now makes a mistake in speech recognition every 20th word.[25] These developments along with advances in natural language processing technology will make it increasingly possible for buyers to ask "curation engines" for a narrow set of buying options ("What are the three best monitors for my new computer?"), and even for a buying decision/implementation ("Find me the best monitor for my new computer

FIGURE 1. Traditional technologies and consumer information processing.



that will fit on my office desk and costs less than $300; buy it and have it delivered here tomorrow.").

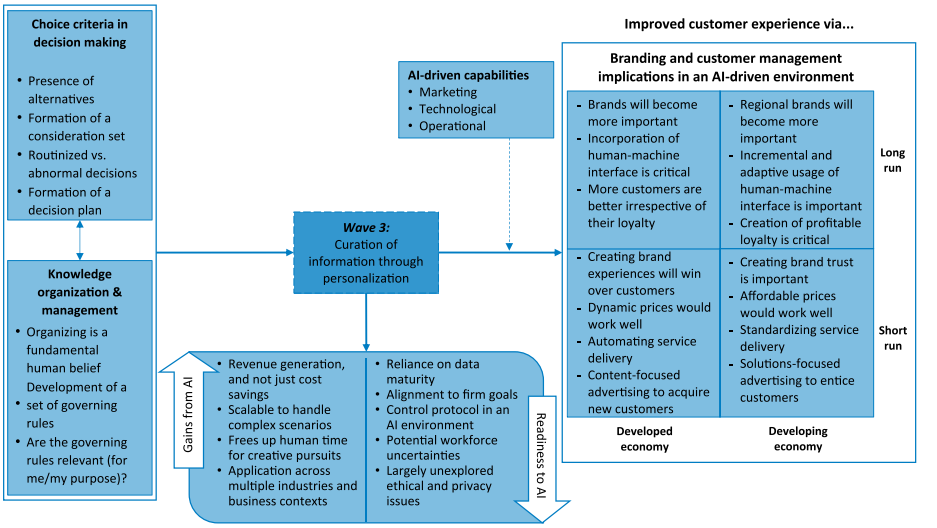
These developments in AI algorithms—and devices that interface with consumers in a more cognitive style—pose challenges, opportunities, and threats for brands. Given all this, how should brand managers approach personalization? Data on consumer interactions with the brand and its competitors are a major requirement for effectively harnessing artificial intelligence technologies for improved CE. Within this premise, we propose an integrative framework to understand the role of AI in personalized engagement marketing and offer predictions on two key strategic firm assets—brands and customers—across developed and developing economies.

An Integrative Framework for Understanding the Role of AI in Personalized Engagement Marketing

Research has shown that consumers' evaluation processes about offerings are based on their prior knowledge of alternatives and how offering-related information matches with their knowledge.[26] Furthermore, consumers with limited knowledge are known to make more comparisons among alternatives than more knowledgeable consumers.[27] Such evidence plays an important role in the personalization of offerings through two progressions—one that involves only traditional technologies (Figure 1) and one that involves AI (Figure 2)—that result from jointly managing consumer choice sets and consumer knowledge.

Figure 1 depicts the information that drives firm outcomes through human capabilities by generating broad recommendations and product configurations. It involves the evolution of two waves in handling information. The firm outcomes typically result in enhanced firm performance and sustainable competitive advantage.

FIGURE 2. An integrative framework for understanding the role of AI in personalized engagement marketing.



Note: AI = artificial intelligence.

Figure 2 presents a world based on wave 3, where voluminous information is supplanted with curated personalized choices that fit consumers' needs. The impact of AI is distinctly different from the existing marketing practices that largely focus on firm-level outcomes such as financial gains and competitive advantage. In an AI-driven environment, personalization is manifest through the curation of marketing content and tactics (i.e., product, price, place, and promotion).

Consumer Choice and Decision Making

Nearly all marketing actions address the choice faced by consumers, which is composed of two or more alternatives, conflict among the alternatives, and a thought-driven approach to alleviate the conflict.[28] When faced with choices, consumers typically look for information to help them address their dilemma. Although information about the alternatives may be acquired through multiple means (e.g., nondigital sources, such as print media and published reports, and/or digital sources, such as owned media, paid media, and earned media), they all serve an important purpose in avoiding decision regret[29] and thereby helping consumers feel confident about their choices.

When consumers face a nonroutine (or less frequent) decision, it is likely that they will seek more information to assuage their concerns. Seeking and processing large amounts of information can lead to "information fatigue" and an unsatisfactory decision-making process. Customers can suffer from information overload[30] and can experience dysfunctional consequences as a result.[31] How

consumers process choices and how they arrive at credible decisions can influence how firms personalize their offerings.

Knowledge Organization and Management

The constant accumulation and (re)organization of knowledge indicates that knowledge is always used. However, it is a challenging activity as it requires prediction of when or how information will be accessed and used. The successful management of knowledge in firms has often involved a careful selection, interpretation, and integration of insights to add overall value, in favor of just adding newer technology tools.

Waves in Customer Information Processing

Information processing on the part of consumers has journeyed through three distinct "Waves." Prior to the Internet, curated recommendations have existed as possible buying routes (see Figure 1) through television, radio, and print media. With these technologies, buyers could rely on the recommendations of a celebrity they like and trust (such as say Martha Stewart), a brand campaign (more common in wave 1), or their friends and family. With the advent of the Internet, product configurators or search engines applied fixed "if-then" rules against a list of preset criteria to narrow the field of product options (the common customer interface in wave 2).

With the proliferation of the Internet and the present growth of AI, consumers are now in wave 3 (see Figure 2). It is a journey in which customers' endless options and information are narrowed and curated in a personalized way by AI tools. The overall journey through the three Waves indicates a new important decision-making "moment of truth" that marketers need to address. Specifically, not just the traditional First Moment of Truth at the store shelf but also the Zero Moment of Truth that exists online in the reviews, ratings, and searches of wave 2.[32]

The reason for the emergence of wave 3 lies in personalizing content and offerings. Wave 1 relies on advertising campaigns and celebrity endorsements. Wave 2 requires buyers to find a configurator and hope that the configurator is knowledgeable and neutral. The abundance of information and frustration among consumers to process all the data from a configurator or search engine is reflected in the academic literature as the paradox of choice and the digital cognitive load.[33] For example, consumers are more likely to click deeper into search results when the keyword is less popular or the consumer is more involved.[34]

What Does AI Offer to Firms?

AI offers firms several benefits that are closely aligned with all aspects of the marketing process that are extremely compelling. First, firms are often caught between aiming for revenue growth or reducing costs. Although AI does provide ways to provide process efficiencies and thereby reduce costs, companies are investing heavily in AI with the expectation to see revenue gains in the future. For instance, Toyota has invested $4 billion in an institute devoted to AI

and robotics to create driverless vehicles;[35] and Baidu has raised $1.9 billion for their new financial services division that will use AI to provide short-term loans and investment services curated to customer preferences.[36]

Second, AI allows product curation on a scale that far exceeds what humans are capable of. For instance, IBM has developed a new AI offering that is based on deep learning that is scalable. By being able to connect to multiple servers at the same time to boost computing speed and power, the new AI offering can significantly scale up without any loss of accuracy in results.[37] This can provide real-time curation that is accurate and does not disrupt the customer experience. AI technologies allow brands to provide buyers with the ideal decision journey they are seeking. Furthermore, AI also enables precise matching of preferences to firm offerings by using data to make predictions. Such abilities make AI highly powerful and contribute to efficient decision making on the part of consumers. For instance, eBay is building descriptive and predictive models to power their AI initiatives that can provide customers an exact or near exact match of the products they are interested in based on price points and other requirements.[38]

Third, with tasks getting automated, AI can improve the creativity of managers. Firms can now allocate their time to identify and develop creative offerings that otherwise may have taken a long time to hit the market. For instance, in the United Kingdom, L'Oréal uses AI for social listening, through which it can recognize images on social media and identify trends across the board. The brand's CMO Stéphane Bérubé says that "By personalizing our interactions with consumers we get to understand them and react accordingly. More than ever before, we will be able to predict and forecast marketwide trends to serve the consumer."[39] McCormick foods is using IBM Watson to help their research and development (R&D) teams develop new spice combinations based on insights about customer consumption and social listening.[40]

Finally, AI applications cover a wide swath of industries and contexts. Across the industries, AI is estimated to make the most impact in supply chain management/manufacturing, and marketing and sales functions.[41] Within the business-to-business domain, firms such as GE and 3M are connecting devices and using the Internet of Things data as the inputs for AI algorithms to automatically predict wear out of spare parts.[42] This helps them improve customer retention because of the preventive maintenance services that are based on predictions from the AI algorithms. McKinsey estimates that AI can create $1.4 trillion-$2.6 trillion in value in marketing and sales across the world's businesses, and $1.2 trillion-$2.0 trillion in supply chain management and manufacturing.[43]

Is AI a Magic Pill?

Firms will have to ensure whether they are ready before bringing AI into their operations. The preparatory steps are largely strategic and have more long-term implications than short-term. Certain measures are necessary to ascertain whether firms are ready for AI. First, AI thrives on data maturity. A well-developed, well-endowed, and well-connected data ecosystem is fundamental to

deriving benefits from deep learning and AI capabilities. This also implies that firms will have to invest in data scientists who can extract meaning from data and can identify ways to develop actionable insights for firms. The ability of firms to leverage AI in developing economies where data are not regimented is low.

Second, for AI initiatives to succeed, it is imperative that AI is aligned with firm goals. Essentially, AI has to be an organization-wide initiative spanning hierarchies, functions, and stakeholders. In this regard, given the interdisciplinary nature of AI capabilities, firms may even want to consider an interdisciplinary format of operation, rather than a traditional hierarchy-based, top-down format. This would likely better prepare firms to counter the business shifts as a result of AI integration. Furthermore, the establishment of clear expectations regarding AI is critical. For instance, a McKinsey survey found that, especially in smaller firms, poor or uncertain commercial returns were cited as the primary reason for not adopting AI.[44] This should serve as a credible call to understand and explore further the strategic requirements and implications of adopting AI.

Third, it is important for firms to establish clear control parameters and guidelines on how and when AI is to be implemented. This point goes back to the Turing test—"Can machines think?" Turing contends that the answer to this question "should begin with definitions of the meaning of the terms 'machine' and 'think'."[45] In the context of AI, it is possible that the user is ignorant of some of the inner-workings of the AI tool (from a conceptualization or debugging standpoint), at times not able to make sense of the output (from an analytics standpoint), and unsure of how to handle randomness (or the lack of it) in the AI tool (from a human fallibility vs. "true" learning standpoint). In such instances, how is the firm going to perform, and who will be calling the shots?

Fourth, AI is set to transform workplaces regarding the nature of existing job tasks, the creation of new job roles that previously did not exist, and the formation of operational and managerial (global) teams. In such situations, how are firms preparing themselves to meet the changing face of workplace?

Finally, AI raises ethical and privacy concerns that need more understanding. What types of data can and cannot be used by firms? Can data be expunged from an AI application in order to accommodate privacy needs? If so, how? Additionally, it is possible that human biases may be fed into AI processes as part of data, resulting in output that could indicate confirmation bias. Such issues can pose serious limitations and test the true readiness of firms.

Branding and Customer Management in an AI-Driven Environment

We offer some predictions for firms by categorizing them across two dimensions—time (i.e., short-run vs. long-run) and place (i.e., developed economy vs. developing economy). We focus more on the long-run impact because the time between the commercial availability of innovative technologies and their eventual maximum level of adoption spans several years.[46]

Predictions for Firms in the Short-Run

The short-run business outcomes that AI promises are likely to be tactical solutions. For firms in developed economies, AI will aid in personalization by creating superior brand experiences for customers (e.g., Spotify's "Discover Weekly," a curated personalized playlist based on their listening history),[47] dynamically pricing their offerings (e.g., online retailer Jet using AI to update pricing in real-time),[48] automating service delivery (e.g., Uber Eats use of AI to optimize delivery times),[49] and creating content-focused advertisements (e.g., McCann's AI creative director that advises the creative team on directing commercials).[50] These tactical solutions are likely to bear fruit immediately and create a positive difference in branding and customer management practices.

For firms in developing economies, AI will aid in personalization by creating brand trust for customers (e.g., mobile financial conversation platform Juntos tailors personalized text messages in fifteen countries to help low-income consumers achieve their financial goals),[51] offering affordable prices (e.g., Amazon India's AI tool can study holiday purchase data and advise on the right pricing),[52] standardizing service delivery (e.g., Keeko robot that teaches kindergarten kids has been in more that six hundred schools in China),[53] and creating solutions-focused advertisements (e.g., Ogilvy created a nutrition assistant for Nestlé in China to help in personalized meal preparation options).[54]

Long-Run Predictions for Firms in Developed Economies

In the long-run, firms will be better prepared to offer AI-driven solutions that are comprehensive solutions impacting the entire customer lifecycle, rather than the focused, tactical solutions in the short-run. There are three critical areas of customer relationship management—acquisition (brand value), retention (human-machine interface), and growth (customer knowledge value)—that have long-term relevance to firms and that can serve as the cornerstones of their marketing strategy.

Customer acquisition. A key distinguishing feature of developed economies is the abundance of technology and digital infrastructure. As consumers increasingly use networks such as Amazon or Google for product recommendations, the power of these networks to control consumers' consideration sets increases. In contrast to a brick-and-mortar store, or even an online website where firms controlled the presentation and managed the availability of their products, firms have much less control on the availability and presentation of their products through voice-enabled devices or on curation platforms. For example, a brand has less control on the incidence of its products as one of the "customers who bought this also bought" recommendations on Amazon.com.

One option for firms to overcome this loss of control is to develop a direct relationship with consumers. This can provide two benefits. First, it increases the incidence of consumers searching directly for their brands. Second, it allows the firm to collect data about consumers to better curate content. In wave 2, brands competed with paid search and display advertisements to convert unbranded search results to branded search and organic website visits. Branding, traditional

TV, YouTube, or display advertising were instrumental for firms to influence consumers at the top of the purchase funnel and induce branded search results. The need for brands to develop consumers who directly search or query for their products is only going to increase as they lose control of the results for unbranded search queries on curated search engines.

A higher level of brand awareness also allows firms to directly observe the behavior of consumers on their websites and mobile platforms instead of an intermediary curation engine such as Amazon. Starbucks is a good example of a brand leveraging its strength to increase consumer adoption and usage of its mobile app and thereby understanding more about its consumers' preferences in order to provide a personalized experience.[55] The Starbucks mobile app also allows customers to reorder drinks in future purchases and suggests new drinks personalized to customer preferences based on their prior purchases. Nestle's Nespresso machines and coffee pods are another example of brands developing a direct relationship with their customers to understand their preferences. This provides Nestle the ability to identify bestselling coffee flavors and also provide variety pack bundles curated to fit customer preferences. Recently, Coca-Cola developed the freestyle vending machines and apps to understand consumer preferences for mixing different flavors directly. This eventually led to the development of Cherry Sprite that was developed from data on customers personalizing drinks for themselves on the freestyle vending machines.[56] Firms are also developing intelligent chatbots that can develop a personal relationship with customers on the Facebook messenger platform. These chatbots (from firms such as H&M, Snaptravel, 1-800-Flowers, Aerie, and Sephora) provide customers with curated recommendations for products based on customers' past transactions and inferred preferences.[57] Such apps and chatbots require consumers to seek out the firm offerings directly. This, in turn, emphasizes the importance of brand value, so that consumers are aware of the brand, trust the brand, and are willing to develop a direct relationship with the brand.

Customer retention. After customer acquisition through superior brand value, the interface of customers with the apps, chatbots, and intelligent devices is important for customer retention. In an AI-driven world, this can be a challenge because as machines become more conversant and interactive; brands need to understand how to project their personality through machines and should understand how to create consumer trust with their algorithms. The static imagery in display advertising needs to be translated to a dynamic and interactive environment of voice-enabled virtual assistants and virtual reality.

In aesthetics, the uncanny valley is a hypothesized relationship between the degree of an object's resemblance to a human being and the emotional response to such an object. The concept of the uncanny valley suggests humanoid objects which appear almost, but not exactly, like real human beings elicit uncanny, or strangely familiar, feelings of eeriness and revulsion in observers.[58] The uncanny valley denotes a dip in the human observer's affinity for the replica, a relationship that otherwise increases with the replica's human likeness.[59] Examples include robotics, 3D computer animations, and lifelike dolls among others.

In developed economies, the uncanny valley of AI possesses an especially difficult challenge for managers to balance between pushing for virtual assistants to completely reflect humans versus maintaining some artificiality. For example, researchers in Singapore found that consumers experienced uneasiness when they first used a driverless car.[60] Furthermore, consumers exhibit algorithm aversion wherein they believe human forecasters more than they believe machines, even when the machines are more accurate.[61] Doctors also exhibited lack of trust with recommendations from IBM Watson about medical diagnostics.[62] Firms such as Poncho (from the Weather company), Slack, and Autodesk are trying to find the right balance for their AI bots between providing a human versus a machine interface.[63] All these examples suggest that firms in the developed economies design sophisticated multisensory AI devices that provide personalized recommendations. Therefore, they also have to understand the human-machine interface in order to design effective AI products that effectively present recommendations and consequently improve customer retention.

Customer growth. AI systems allow firms to understand the consumption of products. This is a breakthrough in contrast to traditional nondigital environments that allowed firms only to know whether a consumer purchased a product. This additional layer of information enables the generation of better brand value (that drives customer acquisition) and a better human-machine interface (that drives customer retention), which subsequently aids in better CE through the development of recommendation algorithms using customer consumption data.

CE has been shown to consist of four dimensions: customer lifetime value (CLV), customer referral value (CRV), customer influence value (CIV), and customer knowledge value (CKV).[64] Traditional customer relationship management was based on the notion of differences in the cost of serving customers. With the increase in automation, the heterogeneity in the cost of serving customers reduces. This implies that the main difference in CLV on digital platforms is driven by retention and the gross margin provided by the consumers.

The machine learning algorithms underlying AI require data on transactions from multiple customers to improve their predictions. The algorithms also benefit from customer heterogeneity regarding customer preference, demographics, transaction frequency, and spending potential. Machine learning through algorithms in curation engines requires product preference inputs across a gamut of customers to better discriminate between products preferred by high CLV and low CLV customers. Furthermore, the lower cost of serving customers implies that firms can make personalized product recommendations and also serve customers across a range of profits.

Firms in developed economies that focus on cultivating only a small group of high lifetime value customers would not be able to collect sufficient data to develop their machine learning algorithms effectively. In an AI-driven environment, such firms would hence need to change their strategy to focus on profitably serving a wide range of customers with varied preferences rather than a focus on

only CLV. The knowledge value of customers increases with the marginal improvement to the firm's machine learning algorithms predictive accuracy provided by the customers' transactions. Such high knowledge value customers need not necessarily be higher CLV or high CRV customers.

Companies such as Google, Netflix, or Amazon that are geared toward building network effects (i.e., providing products for free or a nominal subscription) also focus on broadening their user base. The data collected from the portfolio of offerings (i.e., Google search, Gmail, and Amazon Prime) provides the basis for the development of recommendation algorithms that then provide autocomplete/recommendation results for search terms, emails, movies, music, related articles, and similar product bundles.

Although developing a brand value represents the first step wherein firms can acquire customers directly, and the human-machine interface represents the second step that enables customer retention, the customer knowledge value component relates to firms leveraging the data from the retained customers to develop AI-based recommendations aimed at growing the value of the customer base.

Long-Run Predictions for Firms in Developing Economies

As with developed economies, there are three critical areas of long-run importance to firms in developing economies—acquisition (regional brand value), retention (adaptive and incremental human-machine interface), and growth (profitable customer loyalty).

Regional brand value. Developing economies are characterized by regional differences in local culture, economic conditions, and consumer preferences. Incorporating these differences in tailoring marketing content can help firms enhance customer awareness and induce favorable purchase decisions.[65] Second, the instances of buying convenience products (e.g., food, clothing, groceries, coffee, and magazines) are higher compared with specialty/luxury products (e.g., jewelry, high fashion). This is due to vast variation between income segments, fragmented purchase behavior, and heterogeneity between and within consumer segments.[66] Finally, distribution and transportation have been identified to play a critical role in a brand's success in emerging economies.[67] Especially in developing economies, road congestion and grid-locked transportation systems cause significant hardships to users and firms. Recognizing this, Ford is now changing focus from an auto manufacturer to a "mobility" provider. The company has set up a City Solutions division that will use AI to bring together various transportation options (e.g., public transit, bike sharing) that are connected seamlessly.[68]

Especially in rural areas, many users are likely to be first-time buyers of various product categories such as mobile phones, home electronics, and automobiles. As a result, such users are likely to have a smaller initial brand-consideration set; stay with a brand for a longer time, provided they are satisfied with the brand; be more influenced by in-store environments and salesperson interactions; lower

their search costs by using a "tried-tested-and-trusted" product; rely on word-of-mouth from their immediate social connections; and prefer regional brands over foreign brands to avoid paying premium prices. For instance, rural markets in India contribute 35%-40% of overall sales value in the consumer goods and agribusiness industries. This has immensely benefited Indian companies such as ITC and Hindustan Unilever to realize growth surges.[69]

Realizing the power of regional/local solutions, Google India has launched a social media app called Neighbourly that allows people to exchange information about local services and services providers. This app is based on Google's insight that most of life in India happens within 1 km (0.6 miles) of home or work, and therefore the power and relevance of hyper-local information is of immense help to users. The app is developed for and in India, in English and eight Indian languages, and is scheduled for a nation-wide expansion.[70] Therefore, the opportunity here for foreign firms is to entrench themselves locally and create a powerful brand, as it is regional user preferences that dominate and matter.

Here is where AI can make a difference. Through advanced computing processes, AI applications can tailor offerings and communications that are relevant to the immediate audience. For instance, developing economies like India and South Africa speak several languages, with English being one official language. The commercial implications of the language choice can be found in many sectors (e.g., banking, health care, education, and agriculture) where creating marketing messages and offerings for every local/regional area may become tedious and expensive, thereby creating a large section of unserved and underserved users. Here, AI tools (through chatbots and voice response programs) can engage in local dialects in a jargon-free manner to communicate a brand's message and offering. Furthermore, when the relevant information is provided in a readily consumable format, an enjoyable experience materializes, thereby strengthening the brands. In such a setting, the regional brands gain the most, due to the local rooting preferences of consumers in developing economies.

Incremental and adaptive human–machine interface. Until now, only human intellect had been powering innovation. With AI, computing capabilities will not just assist humans in bringing innovations to light but may even surpass human potential to do so. What does this mean for firms worldwide? Although firms in the developed economies will have to gain an in-depth understanding of AI to flourish, for firms in the developing economies, it will be a challenge of a different kind. We predict that an incremental and adaptive usage of the human-machine interface will better serve firms in the developing economies.

Our prediction can be understood from the overall fear that machines will replace human jobs. For instance, in developing economies such as Greece, South Africa, and Argentina, there is widespread concern that machines will replace humans and that subsequent employment prospects will be harder.[71] Four economies—China, India, Japan, and the United States—account for just over half of the total wages and almost two-thirds the number of employees associated with

activities that are technically automatable by adapting currently demonstrated technologies.[72] Although the concern for jobs is present across developed and developing countries, anxiety is more significant for developing economies. Specifically, challenges regarding socioeconomic parity, sectoral growth imbalances, labor market dynamics, lower education and literacy rates, country infrastructure levels, governmental inefficiencies, social acceptance, and political volatility will play a key role in determining how governments, firms, and consumers collectively manage changes in automation levels. Furthermore, the factors relating to the readiness for AI discussed earlier would critically impact a firm's technological feasibility in implementing AI tools. In light of these challenges, a macrolevel implementation of AI tools in developing economies is going to be slow. Therefore, in developing economies, firms should consider incremental and adaptive uses of AI that, although infusing new technology into existing processes, also judiciously leverage the vast human resource potential.

Profitable customer loyalty. Although knowledge from managing customers is rich in the developed countries, the same cannot be said in the case of developing economies. That is, knowledge regarding a precise estimation of customer value (e.g., CLV) is sparse. The reasons for such a situation can be found in market heterogeneity, paucity of structured customer-level data (attitudinal and behavioral), brand clutter, insufficient technological infrastructure, insufficient storage space in households, and unorganized retail format—all key distinguishing features of developing economies. Furthermore, the dominance of market intermediaries (e.g., wholesalers, retailers) directs emphasis toward moving goods through the channels, and not on collecting data required to make brand and customer management decisions. In light of this, the frequency of purchases is higher, and the number of product returns are very low as compared with developed economies. In addition, with customer purchases distributed across various vendors, encouraging consumers to cross-buy becomes increasingly difficult in such markets.

Therefore, firms in developing economies can establish loyalty programs that are designed to reward customers for spending more, thereby making customers more profitable. Furthermore, studying what people buy, when they buy, how much they buy, how often they buy, and what product combinations they buy can inform firms on specific loyalty program initiatives for individuals or groups of customers. In doing so, it is beneficial for firms to focus on identifying the right combination of type and timing of rewards that can lead to improving sales.

Here, AI has been established as a powerful tool for personalizing product recommendations that can subtly nudge consumer purchase decisions. Furthermore, by analyzing aggregated user data to understand individual customer preferences, the AI tool can learn over time the changing trends and match it with targeted offerings. For instance, retail stores can implement AI tools that can optimize shelf space, product variety, and competing brands based on their user preferences. Furthermore, by integrating these results with store inventory, firms can better manage their supply chain activities.

Moderator

The wave 3 journey identified in Figure 2 is moderated by AI-driven capabilities that can potentially enhance or diminish the predicted AI outcomes.

The AI-driven capabilities consist of marketing, technology, and operational elements. First, marketing capabilities (such as customer-level data) can influence a firm's AI outcomes. New technologies such as AI enable firms to collect, integrate, and analyze large amounts of data at the individual level, giving firms access to granular insights—but the volume, variety, and velocity of data available to firms can lead to information overload.[73] This provides firms with avenues for generating and executing insights that can improve their marketing outcomes.

Regarding technological capabilities, firms need to assess their existing software, applications, legacy systems, and technologies and determine their compatibility with the new technologies. Furthermore, the effort and time required to learn how to use and apply new technologies are related to the existing knowledge base and skills of the firm and its employees.[74]

Operational capabilities can be thought of as those firm actions, processes, and resources that are geared towards enabling the firm to perform better (than their competitors), and to achieve more. In this regard, a continuous sensing mechanism (such as AI) would enable the creation of a learning environment that can constantly inform and prepare the firm about the evolving business and customer needs.

Conclusion

The interconnectedness between human society and the business enterprise has a long history. In this interfacing relationship, periodic upheavals regarding business outlook and evaluating firm success have emerged. For instance, during the times of the production economy, businesses approached their performance from the increasing returns to scale standpoint. Factories strived to enhance their outputs by more than the proportional change in inputs. This brought in focus to production efficiency and overall management of the factors of production. With subsequent marketplace changes, especially with increased market access, we moved to an exchange economy wherein, firm-customer interactions were the focus. This meant firms were concerned about, over other factors, increasing returns to investment. The goal here is, of course, to maximize the return on the initial investment of resources (financial and nonfinancial). Here, the impetus of firms was in bottom-line growth (not just top-line growth), and return on investment became the most important performance indicator.

We are now in a new realm, again. This time, the focus has moved toward how we manage information. We are in a knowledge economy, its currency is information, and the performance indicator is increasing returns to knowledge. This shift has risen, in particular, due to the role of technology. We are now able to

collect, store, process, and (re)use information through technology. This has given us further thrust in exploring new frontiers, and AI is part of that new frontier.

This article is one way to understand the impact of AI on businesses. Specifically, we have explored the role of AI in creating a personalized engagement marketing approach. Firms are able to leverage individual customer information and AI technology to provide curated products and services. The AI technology can facilitate real-time learning and help managers improve customer value proposition over time. Such a strategy of curated products that provide increasing value to customers will form the basis of customer retention and sustainable competitive advantage. As a start, we have presented here a few predictions on how AI can affect customer management strategies. In doing so, we have also presented the experience and likely varied futures of developed and developing economies. Of course, this is only an early attempt to understand the larger implications of AI in marketing. We expect more such efforts in the future to prepare us better.

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