

Artificial Intelligence (AI) in Strategic Marketing Decision-Making: A research agenda

Professor Merlin Stone

St Mary's University, London, UK; University of Portsmouth UK; Merlin Stone Consulting

Dr Eleni Aravopoulou

St Mary's University, London, UK

Professor Yuksel Ekinci

University of Portsmouth, UK

Geraint Evans

St Mary's University, London, UK

Matt Hobbs

Accenture

Professor Ashraf Labib

University of Portsmouth, UK

Paul Laughlin

Laughlin Consultancy

Dr Jon Machtynger

Microsoft; Surrey University, UK

Liz Machtynger

Customer Essential Ltd; Kingston University, UK; University of Portsmouth, UK

Purpose

The purpose of this article is to review literature and thinking about the application of AI in strategic situations and to identify the research that is needed in the area of applying AI to strategic marketing decisions.

Design/methodology/approach

Review of literature and consultation with marketing experts who were invited to contribute to the article.

Findings

There is little research into applying AI to strategic marketing decision-making. This is needed as the frontier of AI application to decision-making is moving in many management areas from operational to strategic. Given the competitive nature of such decisions and the insights from applying AI to defence and similar areas, it is time to focus on applying AI to strategic marketing decisions.

Research limitations/implications

Applying AI to strategic marketing decision-making is known to be taking place, but the it is commercially sensitive, so data is not available to the authors.

Practical implications

There are strong implications for all businesses, particularly large businesses in competitive industries, where failure to deploy AI in the face of competition from firms who have deployed AI to improve their decision-making could be dangerous.

Social implications

The public sector is a very important marketing decision-maker. Although in most cases it does not operate competitively, it must still make decisions about making different services available to different citizens and identify the risks of not providing services to certain citizens, so this article is relevant to the public sector.

Originality/value

This is one of the first articles to probe deployment of AI in strategic marketing decision-making.

Keywords

Artificial intelligence, marketing, decision-making, strategy, planning, operations.

Paper type

Conceptual.

Introduction

This paper focuses on the evolution of marketing practice and in particular on the possible application of artificial intelligence (AI) to strategic marketing decision-making. We use Accenture's definition of AI as the use of multiple technologies that enable computers to sense, comprehend, act, and learn, including techniques such as machine learning, natural language processing, knowledge representation, computational intelligence (Awalegaonkar *et al.*, 2019). This report is discussed later.

In marketing – and in other disciplines – there boundary between humans and computers in decision-making is shifting. Today, AI is increasingly deployed in operational marketing e.g. identification of risks, contact centre response management, as well as in marketing including analysis and targeting of customers, design and selection of advertising copy to match target customers, pricing to maximise yield from individual customers (Marinchak *et al.*, 2018). Tomorrow, we expect that AI will be employed in strategic decision-making (e.g. which business models to use, which strategies to follow, which markets to target, which products to market, which channels of communication and distribution to use, what pricing and competitive positioning strategies to follow, etc.). However, the use of AI in marketing strategy has not been much discussed in the public domain. Our contacts with industry indicate that some companies have made great progress in this area, but these projects are kept secret and treated as a source of competitive advantage.

It should be emphasised at this point that the focus is not primarily on the replacement of human decision-making in strategic decisions, but on the creation of a higher quality decision-making mechanism, using AI, in which marketers are provided with quicker, more complete and more fully-worked out options from which to choose, and the creation of the associated theoretical framework.

Much of the writing about AI and strategy currently focuses on strategies which are based on extending the use of AI in organisations, often in operational areas, as Kiron and Schrage (2019) point out. However, as researchers start to focus on how AI can be used to develop new business models – a possible outcome of business and/or marketing planning (e.g. Lee *et al.*, 2019; Valter *et al.*, 2019), this may lead to the extension that Kiron and Schrage (2019) focus on, the use of AI in determining strategy. A related area is the literature on using AI to achieve digital transformation (e.g. Brock and Wagenheim, 2019), although this too focuses on AI in strategy. However, the focus of this article is firmly on the use of AI in marketing strategy.

AI in management decision-making

The frontier between humans and computers in management is moving from operational to strategic. A good synthesis is provided by Jarrahi (2018). This forms part of a wider discussion on the encroachment of AI on professions such as law, where the focus is partly on the ability of AI to help humans make sense of high volumes of information, which themselves are growing (so-called “big-data”). A particularly relevant article, based on empirical research, is that of Kolbjørnsrud *et al.* (2016), which focuses on the use of AI in redefining management. In management decision-making, there is usually a trade-off between efficiency and fairness (equity). For example, see the work of Perris and Labib (2004) on prioritisation of patients for organ transplant waiting list using fuzzy logic. Another application of AI in management decision-making is classification and incorporation of various stakeholders' views using AI technique of fuzzy logic (Poplawska *et al.*, 2015), and group decision-making using a machine learning method (Chakhar *et al.*, 2016).

Claudé and Comb (2018) identify that today, AI is seen primarily as a support to major business decisions rather than a decision-maker, but attribute this to the fact that AI as currently constituted is relatively weak, compared to what will be the strong AI of the future. As computational capacity and speed increase, and as data sets available to support decisions grow, the frontier of substitutability of AI for human decision-making shifts. Shrestha *et al.* (2019) suggest several possibilities, as follows:

- Full human to AI delegation e.g. recommender systems, digital advertising, online fraud detection, dynamic pricing.
- Hybrid 1: AI to human sequential decision-making e.g. idea evaluation, hiring.
- Hybrid 2: Human to AI sequential decision-making e.g. sports analytics, health monitoring.
- Aggregated human-AI decision-making e.g. top management teams, boards.

It is this latter alternative which reflects most closely the topic of this paper.

Shrestha *et al.* (2019) also suggest that the appropriateness of these alternatives, and in particular the likelihood of appropriateness of full delegation to AI, depends upon:

- Decision search space specificity – the more specific the required decisions, the more suitable AI is.
- Interpretability – how easy it is to understand the reasons for decisions/recommendations (this relates to whether the AI approach used is “black box” or can “explain” its decisions).
- Size of the alternative set – the larger the size, the greater the problems humans have in dealing with
- Decision-making speed required – the faster it is, the more suitable AI is.
- Replicability – the higher the commonality of data/decisions etc., the more suitable AI is, given that AI depends partly from learning from other cases.

In strategic decisions, the time it can take to see if a particular approach works; the lack of specificity; possible diversity of interpretations; the fact that speed is less of the essence and relative lack of replicability; means that aggregated human-AI decision-making may be more appropriate, although Hybrid 1 may be used too.

In terms of evidence on implementation of AI in strategy, this seems to be secret, though there is evidence of a battle between the two main relevant digital players, Amazon and Google, to extend AI use, using the enormous data sets available to both companies (Condon, 2019; Kiron and Schrage, 2019).

Industrial background

Marketing has changed much in the past and will continue to change in the future, so the scope for the application of AI will change as a result, including:

- The evolution of marketing analytics towards AI and changes in market research.
- Ethical and data protection issues.
- Patterns of expenditure and distribution in consumer markets.
- Business to business marketing (including to the public sector).
- Public sector marketing (i.e. from the public sector).

We need to review these areas for two reasons:

- Our interest is in the future of marketing strategic decision-making and related areas, not just AI.
- Where we focus on the use of AI, we need to consider how it might apply in all these five areas.

This paper is written mainly from the perspective of business-to-consumer (B2C), and also businesses selling to consumers via other businesses (known as B2B2C). We have covered some aspects of these developments in Wright *et al.* (2019), Parnell *et al.* (2018), Stone and Aravopoulou (2018), Stone *et al.* (2017, 2018).

The evolution of marketing analytics towards AI

There is a fashion element to discussions about AI, particularly in marketing, where the boundary between advanced analytics and AI is definitely fuzzy. Analytics has evolved to where it can handle problems which are relatively unstructured and come up with suggestions in a way that would once have been considered “expert” and even defined as AI. One essential characteristic of AI that distinguishes it from classic “advanced analytics” is automation of feedback loops and improvement i.e. learning by the system (machine learning) about how to do things better, and this in turn implies that conclusions are being tested and assessed against certain criteria, as opposed to being reviewed by humans who then make decisions about what to do next. Where the action being “managed” by AI is precise and contained, implemented quickly and with the results also being measurable and assessable quickly, AI is generally very productive. But where decisions are more wide-ranging, take time to implement and time elapses before the results of the decisions are apparent, let alone measurable and assessable, deployment of AI can be more complicated. It may be hybrid, with parts of the cycle being undertaken by AI, part by human decision-makers. The latter applies to marketing strategy. However, one technique which may be usable to improve applicability is back-casting, in which decisions taken earlier and of which the results are now known are used along with data from the period of analysis to train the system. This approach can also be used to capture the “historic expertise” of strategic marketers, by rule elicitation or case-based reasoning.

The rise of AI in marketing is not taking place in isolation from the rapid, wider advance of marketing technology, whether in front-line marketing operations such as contact centres, or the management of marketing resources. This advance helps in the deployment of AI in marketing, in the sense that it computerises other aspects of marketing and generates data which can be used to support AI. However, this also means that AI use should be integrated with these applications, taking data feeds automatically and making recommendations back to these other areas.

Ethical and data protection issues

Marketing involves doing things to customers and using their data. Both involve important ethical considerations. Asking computers to decide which customers shall be offered which products or which customers seem to have committed fraud is already normal in industries such as financial services, but has already raised problems of equity and trust. Where customers' data is concerned, legislation makes it paramount that AI-based processing does not lead to infringement of increasingly stringent data protection legislation, or of basic ethical rules which marketers should observe.

Patterns of expenditure and distribution in consumer markets

In most developed markets, much consumer expenditure is now on services, while government services are an important element of government expenditure (e.g. health services, education, security). Services generally yield richer data flows about consumer behaviour, because (depending on the extent of digitalisation), usage, not just purchase, can be or is tracked. The data richness is growing (for example, in motor insurance some policies require use of devices which track amount and style of usage). Data is an important theme of this paper, because one of the barriers to the use of AI is absence of data.

Another important development is the emergence of giant web retailers e.g. Amazon, eBay and of platforms for advertising e.g. Google, which yield rich data about product and service purchasing. This data may or may not make its way back to product or service providers (this is increasingly the focus of a commercial transaction), but it is certainly available to these "platform players" to plan their marketing (Wright *et al.*, 2019; Stone *et al.*, 2017).

Finally, within the strict category of pure consumer expenditure, patterns are changing. Instead of going to the cinema, consumers use streaming video. Use of mobile apps has in many ways replaced other forms of entertainment. Channels are changing too, with digitalisation (particularly of content) supporting the switch from physical to virtual retail, perhaps seen in its most dramatic form in areas such as holiday booking, fashion and furniture. In some countries, a rapidly ageing demography is causing an even faster shift away from physical products to services which can be easily consumed by the older adult.

Business to business (B2B) marketing

Much early thinking on customer relationship management arose from the experience of B2B companies, who kept contact with customers through sales forces and then contact centres (e.g. Stone and Shaw, 1987, 1988; Stone *et al.*, 1990). However, the data-richness of consumer marketing has led to much of the discussion on marketing automation being focused on consumer markets. Despite this, much of B2B marketing is completely analogous to consumer marketing, especially where it involves marketing to many small businesses. At the other extreme is the world of major account and key account marketing, involving the sale of large contracts and the personal management of customers by sales forces (Hughes *et al.*, 2004). However, even this is becoming extensively digitalised. For example, in this world advanced content management systems are used to target content to appropriate prospects and customers, and downloading and engagement of this content is tracked, enabling suppliers to prioritise customers according to their interest in a product or service. However, as we shall see later, factors such as the big differences among customers (and so the lack of simple replicability of decisions about them) can limit the applicability of AI.

Public sector marketing (i.e. from the public sector)

In some countries, where the public sector retains a large share of expenditure on (if not always by) consumers, much of what is written about consumer marketing applies. In some situations, close partnerships between public and private sector organisations can also produce the same effect (e.g. partnerships between public owners of airports and privately-owned airlines and retailers). The boundary

between public and private expenditure and the data that arises from it is shifting as government becomes more involved in enabling service provision, as in the case of smart cities (Stone *et al.*, 2018), where information platforms used to manage services may be partly or wholly government owned. Indeed, the idea that public sector information platforms may be arenas in which private as well as public sector organisations compete to provide public services has been aired extensively – the so-called “government as a platform” (Brown *et al.*, 2017). So, public expenditure is certainly not excluded from this paper, though some aspects of use of AI might be more constrained by political decisions, data protection and regulation.

Applying AI to strategic management

In this section of the article, we review some of the research in areas which are closely related to the topic of this article and need to be tied in more closely.

The strategic decision-making process (SDMP)

There is an extensive literature on this topic, summarised well by Shepherd and Rudd (2014). It arises from the need to understand how strategic decisions are made rather than their outcomes. However, there is little literature on SDMP on marketing, as most SDMP literature covers general management, particularly financial decisions relating to acquisitions and mergers, as well as psychology (the cognitive aspect).

The SDMP literature identifies the importance of these factors.

- External environmental characteristics
- Internal organisational characteristics
- Top management team characteristics and behaviour
- Other team characteristics e.g. how it works together
- Decision-specific characteristics
- Decision maker’s individual characteristics
- Data and technology
- Cognitive issues

However, the SDMP literature has not been linked with the literature on the use of AI in decision-making, and thus the two literatures need to be connected.

The military experience

The use of AI in strategic decision-making is becoming an area of focus in military strategy (Ayoub and Payne, 2016; Payne, 2018). This is relevant because marketing is essentially a competitive activity, involving improving performance relative to a competitor (i.e. enemy), and in some industries in a complex world of alliances, where allies may have relationships with enemies and share forces.

Cognitive bias

One of the main advantages of the deployment of AI in strategy is the extent to which it could be used in removing the cognitive bias that results from individual and group decision-making (often but not always strategic). The individual and social biases in making decisions have been the subject of intense research in many disciplines. Reviews include those in the following areas – finance (Kumar and Goyal, 2015), entrepreneurship (Kerr *et al.*, 2018; Zhang and Cueto, 2017), pricing (Iyer *et al.*, 2015). A related area is the application of cognitive neuroscience disciplines, a general summary of which is provided by Butler *et al.* (2016). A good review of cognitive and motivational biases and debiasing in decisions and risk analysis, is the work of Montibeller and Von Winterfeldt (2015). The broad conclusion relates to the ubiquity of bias, identifying the opportunity for AI to remove bias.

Planning processes

Research into this topic goes back to the 1960s, when the first marketing planning texts were produced, first by management consultants, then by academics, becoming integrated into university teaching a decade or so later. The leading author here is McDonald (2016a, 2016b), who has researched marketing planning for 40 years and focuses on logical (e.g. from objectives, through strategies, to tactics), analytical and functional or cross-functional (especially finance) and other processes deemed necessary to produce a marketing plan appropriate for a firm’s context. It includes ideas about appropriate market research, customer information management and competitive intelligence. The data content of planning has been changed by the advent of

customer relationship management and digital marketing, with data about individual customers, their behaviour and needs, becoming more widely used compared to “classic” market research (Stone, 1996; Stone and Woodcock, 2014). Digitally supported marketing allows an initiative to move from an idea or concept to execution in weeks or even days, compared to the months or years suggested in classic marketing (Chaffey and Ellis-Chadwick, 2019). More generally, the impact of big data on board decisions has been researched by Merendino *et al.* (2018). The impact of the digitisation of data on board decisions has been explored by Dibb *et al.* (2015). The impact of digitisation on the role of strategists is discussed by Åberg *et al.* (2017), while the problem posed by data overload and the impossibility of articulating all data is covered by Quinn *et al.* (2018). One of the most relevant points emphasised by Lee *et al.* (2019) is the dependence of AI on data quality and quantity and the issue of shortage of AI skills, pointing out that even in relatively straightforward operational implementation on AI, shortage of AI skills may hinder progress. Blending the relatively high-level skills of business/marketing planning with AI skills may prove an even greater challenge.

Strategic tools

Academic writing in this area focuses on the tools of strategic analysis and decision-making and case studies of “successful” strategies. Many of the tools (e.g. SWOT – Strengths, Weaknesses, Opportunities, Threats analysis, TOWS – Threats, Opportunities, Weaknesses, Strengths - analysis, Ansoff Matrix, BCG – Boston Consulting Group - matrix) have been integrated into marketing planning processes, but new tools/versions of tools have emerged to meet the needs of marketing and business planning in the digital world. For example, instead of segmentation based upon static categories of need, it might be based up what is revealed real-time by what a customer does on a website. One of the best books on strategy which covers all the relevant tools is that of Johnson *et al.* (2017). It is noteworthy that the SDMP literature does not focus on the use of different tools but focuses on decisions in general, so an additional aspect which should be explored is whether and how the SDMP varies according to the data and tools being used and the types of strategy being considered.

AI in marketing decision-making – benefits and examples

The benefits

The benefits of applying AI to strategic marketing decision-making are expected to include these:

- Increased speed of decision-making, especially in response to new data being available or competitive threats emerging, allowing companies to capture the benefits of stronger market positions earlier.
- Identification of missing data.
- Increased rationality, particularly via removal or reduction of cognitive bias by decision-makers.
- Creation of a common basis for decision-making.
- Incorporation of learning from experience.
- Higher quality management of marketing projects.

Examples of application

In this section, we consider some of the ways in which AI might be used in different areas of marketing decision-making and planning. It is based on the analysis framework proposed by Stone and Woodcock (2014) for analysing the impact of digitalization but applied to AI. A similar matrix needs could be developed for corporate strategy. There is not always a clear separation between marketing strategy and business strategy. Nor is there a clear separation between overall marketing strategy and strategy for different elements of the marketing mix. For example, decisions about marketing channels have strategic aspects (Stone *et al.*, 2002) as well as tactical aspects, particularly as digital approaches change the balance between channels and the roles that different channels play. These decisions can affect every aspect of marketing. However, Tables I-III present an attempt to show the main changes that digital marketing has made to different marketing activities, as digitalisation of marketing is a precondition for the data to be made available for AI to be deployed, and examples of possible AI deployment. The tables cover in turn marketing strategy, marketing mix and marketing management.

Table I. Deployment of AI in marketing strategy

Marketing area	Changes made by digital marketing	Examples of how AI can be used in each area
Overall strategy – target markets, marketing mix for each, objectives, KPIs, goals etc.	This allows information for decision-making to be assembled quickly and be automated, and results of different strategies to be analysed more quickly so strategy can be revised in a ‘test and learn’ approach.	Quickly assessing different outcomes based on alternative strategies. Assisting in rapid decision-making to choose those most likely to produce best results.
Business model of customer management	This relates to which customers the company wants to acquire, retain, develop (up-sell and cross-sell) and divest, with what resulting revenues and costs, to achieve its strategic objectives rather than to meet the goals of certain elements of the marketing mix in isolation.	Using technology such as machine learning to assist in ‘reaching’ look alike audiences. Quantifying and exploring consequences of different business models.
Overall branding and proposition	Depending on whether the company is involved in many different types of product and market, this may apply to the whole company or to parts of it, but at a higher level than individual products and services – with different branding approaches taken on different channels.	Identifying results of brand investments, recommending future investments and channel strategy.
Developing new revenue streams	This refers to developing revenue using a way or introducing a new product or service that is in some sense different from existing ways – it may involve any or all elements of the marketing mix, and different markets.	Identifying revenue streams for existing customer base and for new markets in order to accelerate launch.
Ecosystem management, partnering, outsourcing and value chain redefinition	This relates to how companies and partners (i.e. suppliers and manufacturers!) that are not owned by the client but work very closely with it are organised to ensure that the company’s overall marketing (and business) strategy is developed and delivered, and how the gains from working together are shared.	Identifying most productive parts of ecosystem and gaps in ecosystem development.
Competitive strategy – who are main competitors, targeting for winning and defence	This relates to how direct and indirect competitors are identified, their strategies discovered and understood, and how the company strategizes so as to avoid where possible the negative effects of competition.	Identifying weak signals of impending competition. Identifying weaknesses in own and competitor’s strategy.
Resource management	This allows overall costs and benefits of different strategies to be measured and analysed more quickly in order to adjust resourcing (i.e. for periods of peak demand).	Analysis of the data to identify risks, rewards and outcomes/ possible planning scenarios.

Table II. Deployment of AI in the marketing mix

Marketing area	Changes made by digital marketing	Examples of how AI can be used in each area
Branding	The locus of many companies' brands has shifted from the real to the virtual world, with many brands of many others are strongly affected by what is said about them in the virtual world.	Tracking shifting brand image using evidence from the web, particularly social media. Finding evidence of the causes of brand shift and loss of market share.
Product	Customer input into product design (collaborative design) can be obtained much more quickly. Customers can design their own products more easily. Designs can be tested and revised more quickly, while problems can be identified and rectified more quickly and easily using a variety of digital channels and collaboration tools.	Synthesising input from customers. Simulating results of new product designs of formulations.
Proposition	The proposition can be more closely attuned to target markets, and the engagement of customers with different propositions can be understood more quickly, with iterative changes made and tested for further feedback.	Identifying which propositions work best though customer feedback and testing.
Price	Prices can be tailored more easily to different customers. Yield management can be applied in many new areas.	Resetting pricing strategies based on results of different yield management approaches.
Advertising	Website/mobile/digital advertising is gradually usurping advertising in conventional physical media, allowing greater trackability and better assessment of return on investment. This is leading to a blurring of the distinction between advertising, digital and other marketing communications methods. The automation applied to advertising via programmatic and similar approaches is greatly increasing the opportunity for applying AI approaches.	Choosing/designing text, images and videos to suit market segments and individuals in different channels and platforms.
Direct marketing	Direct marketing has expanded out of the conventional media of mail and telephone to include virtually all marketing communications, especially digital and CRM (Customer Relationship Management), so that in some ways it appears in all marketing, whether initiated by the company or its customers. Referrals, always valuable, have been transformed into recommendations for many companies.	Choosing which form / combinations of contact types / channels / content that is appropriate for different target markets and individuals.
Personal selling	Personal selling now has much stronger information support, while improved sales management systems, sometimes integrated with response management systems, allow much more effective targeting, prospecting and management of customers and prospects.	Providing personalised response to individuals. Analysing the results. Recommending different ways to personalise.

Public relations	Electronic word of mouth, or "word of mouse", is replacing conventional media exposure, not solely through social networks, but through all aspects of web and mobile dialogue – and often developing rapidly and in real time ('trending'). In some sectors, online reviews have become critical in determining whether a product will sell, while social influencers have become a very important part of marketing in some sectors, such as travel, clothing, cosmetics and automotive.	Identifying patterns of word of mouth, reasons for them, suggested actions and underlying sentiment.
Sales promotion	The effectiveness of sales promotions can be gauged much more quickly than ever before, while online channels facilitate distribution of buying incentives (such as coupons, discounts and other incentives).	Identifying which promotions work best and quickest with which customers/market segments. Identifying which offers should be used and when.
Content	The increase in the number of channels and the importance of content (text, audio, image, video) in persuading and influencing customers has come to the fore, particularly given the possibility of customising all kinds of content to market segments and now individual customers, supported by the ability to search for, classify and analyse all kinds of content. The rapid rise in video content, facilitated by significant improvements in mobile bandwidth (with more to come with the advent of 5G), is both a challenge and an opportunity, multiplied by using messaging to communicate content. Extended (virtual and augmented) reality are changing the approach to content, allowing the blending of real and digital experiences. Brand and product storytelling are being used much more, partly because they support the development of much richer content that can be used across all communication channels. However, an issue which remains controversial is the extent to which the use of AI can support and encourage creativity and increase the returns from it.	Serving content to the right customers and prospects at the right time and analysing results of serving it. Customising content to target segments and customers.
Customer management (acquisition, retention, development, customer service, customer experience)	This relates to how the customer inventory is built for particular products or groups of them, from the targets set to the techniques used to achieve desired results and track fulfilment of commitment and customer promises following transaction.	Optimising inventory levels real-time, and helping the customer react to different segments demand. Automating interaction with the customer (bots)
Distribution	The web has become a very important channel of distribution for many information-based products and services, as well as some physical products, and in many markets the dominant channel for marketing communication, so that distribution and the communication decisions become closely tied to each other, with customers seeking immediate response to their requests, or a simple method in which to purchase when they are ready.	Optimising channels. Identifying missing channels. Improve transaction times and streamline fulfilment.

Table III. Deployment of AI in marketing management

Marketing area	Changes made by digital marketing	Examples of how AI can be used in each area
People	Marketing, sales and service people can be much better informed about what they need to know to sell and market better, and results of their work can be obtained and distributed more easily. They can also benefit professionally from having more training on new digital marketing tools and how to apply the technology personally.	Identifying what information should be used to support different types of decision. Identifying where managers are not using the right information, have not got access to the right information or are misinterpreting the information they have. Providing tools and frameworks to better use the opportunities created by new AI technology.
Marketing analysis	Using the huge volumes of data now available to some companies, and customers growing increasingly impatient for rapid responses targeting of outbound messaging and rapid response to inbound messaging can be much more accurate and timely. Timing has become critically important to capture buying intent, as customers may be in the market for a very short time, as they make their comparisons and reach their conclusions using the mountains of content available from firms and their competitors.	Accelerating analysis and its application – both from a ‘reactive’ internal perspective and also from the point of view of customers accessing information relevant to a purchase.
Market research	Market research is increasingly online, while gaining insight from both customer-initiated feedback and sentiment analysis (with the appropriate permissions) are providing a new source of information to marketers on how their current and prospective customers think, feel and act.	Gaining and analysing larger data sets. Analysis of results of research, especially when combined across different studies,
Market targeting	Due to its growing complexity, market targeting is becoming increasingly automated. The results of recent changes in targets and deployment of different elements of marketing mix to produce appropriate response rates and sales.	AI can assist with more accurate targeting, including allowing for real-time changes to strategy.
Data and systems	Marketing processes can be migrated onto systems, increasingly running on the "cloud" and allowing the marketing and wider team to collaborate and enhance their effectiveness and speed of processes such as workflow/ project management. Systems allow much better access to data required for decision-making on everything from individual customers to strategic decisions, and then for measurement, review and calculation of return on investment. Personalisation and location-based marketing have moved on from becoming watchwords, to being ‘business as usual’ for the most effective marketing teams. They however pose significant privacy risks, as data protection requirements have become a central focus for marketing management. Meanwhile, the requirements for integrating data from different sources so as to maximise marketing effectiveness, particularly the integration of their Data Management Platforms (centralized systems for collecting and analysing large data sets from disparate sources) with their Demand-Side Platforms (systems that allow buyers of digital advertising to coordinate their activity, including bidding) are essential to keep up with competitors.	Identifying opportunities for improving returns to systems deployment. Identifying new ways to accelerate workflow and a collaboration to assist in developing speed to market and increased compliance.

Marketing resource management	Marketing automation allows marketing processes to be managed more effectively as the return on investment for different marketing expenditures to be calculated and forecast with more accuracy than traditional channels.	Optimising resource management is key with business being more stretched than ever by a hyper competitive market.
Content management	Managing the increasing volume and variety of content requires maintaining various systems, and constantly customising content to the needs and use-cases of specific situations is particularly important, given the rising possibility of exposing the wrong customer to the wrong content. Matching content to the right end customer (at the right time) uses significantly more marketing resources, so the return on the additional cost improving content management must be measured and acted upon.	Detailed optimisation for individual customers. Provision of tool that speeds up delivery of content and improves its optimisation.
Managing marketing people	This relates to how marketing people are recruited, trained, developed, targeted and assessed as marketing professionals. This is particularly important in a rapidly changing landscape of digital technology, which is necessitating an entirely new skill set from traditional marketing channels and disciplines.	Identifying the most productive marketers and assisting the resolution of problems associated with the decision-making of others.
Marketing operating model	With digitalisation, the marketing operating model is changing. One of the best examples of this is the rise of programmatic advertising, which is helping companies use technology to move beyond the manual management of advertising to use technology to reach the nirvana of attributing the correct value to different advertising interventions, given the possession and use of the right analytics tools to reach the right target audience automatically.	Optimising the efficient working of model, including using machine learning to make real time decisions on appropriate audiences and investment levels.
Marketing finance	Identifying where revenue and crucially profit come from in while operating in a complex multi-channel, multi-product/service business is essential. Given the reduction in barriers to entry online, the increasing speed of change in the market, ensuring that a business is acting in a sustainable manner needs to be ascertained much more quickly. New measures are being used, not just the classic financial ones, that take into account, portfolio approaches, and digital traction.	Identifying returns accurately, more rapidly and with greater impartiality than human analysis.

Progress to date

The use of AI in marketing operations has been extensively publicised by suppliers of systems which are either ones where AI can be deployed or which provide the AI component, for example, from the leading supplier of Customer Relationship Management software, Salesforce.com (Garvin, 2019). However, the use of AI in making strategic marketing decisions has been researched very little, with the most recent comprehensive report being from Accenture (Awalegaonkar *et al.*, 2019). This report, based on interviews with 1,500 C-suite executives from companies with a minimum revenue of US\$1 billion in 12 countries in 16 industries, focused on the factors require to scale artificial intelligence. The report used the concepts of piloting and scaling to segment users of AI. It defined “Pilot” as rolling out a capability with real data, users and processes in a production environment (using a subset of the relevant scope). The purpose of piloting to test how the capability performs with a limited scope and to then make any needed modifications before expanding to the full applicable scope. It defined “Scale” as extension of the piloted capability across the full applicable scope with all relevant data, end users, customers, and processes.

The main findings of the report were as follows:

- 84% of C-suite executives believe they need to use Artificial Intelligence (AI) to achieve their growth objectives. Nearly all C-suite executives view AI as an enabler of their strategic priorities and that achieving a positive return on AI investments requires scaling across the organization.
- 76% acknowledge that they struggle in scaling AI across the business and that if they do not scale AI in the next five years, they risk going out of business.
- Companies that successfully scale AI achieve much better financial returns from their investment in it.

The report suggested that users of AI fell into three groups:

- Those at proof of concept stage (80-85% of companies), with a low scaling success rate, a low return on their AI investments, their efforts usually siloed within a department or team, often IT-led, with no connection to a business imperative and difficult to scale.
- Those engaged in strategic scaling (15-20% of companies), having moved beyond proof of concept, with a higher success rate for AI, with a clear AI strategy and operating model linked to the company’s business objectives, with an experimental mindset, with their efforts supported by a larger, multi-dimensional team championed by the Chief AI, Data or Analytics Officer, but with the scaled AI generally applied to individual applications such as personalization, intelligent automation and predictive reporting.
- Those (at most 5%) who have industrialised their use of AI, creating a culture of AI, a clear enterprise vision based on strategy and competitive advantage that resists siloed applications, with strong accountability, metrics and governance, with thousands of models in use within an AI framework, using it to promote product and service innovation, using ‘What if’ analysis enabling improved acquisition, service and satisfaction, and re-using digital assets. They recognise the importance of business-critical data— identifying financial, marketing, consumer, and master data as a priority, investing in structuring and managing data, data quality, data management, and data governance frameworks on the cloud, with clear operating models for generation versus consumption of data, integrating internal and external data sets as a standard practice, and understand the importance of using more diverse datasets to support initiatives.

The report cites two case studies, as follows:

- A brewing firm which uses AI to develop more accurate forecasting models, improved consumer and customer segmentations, and enhanced sales, deploying advanced analytics capabilities on more than one hundred global datasets, including sales and forecast data, social media, trade spend, customer and product master data, and weather data.
- A convenience store chain which uses AI in pricing to match customer demand across the world, using virtual agents to interact with global category management teams to drive adoption of the new pricing approach, supported by multi-disciplinary teams with skills in areas like data engineering, visualization, data quality, and human-centered design.

The future research agenda

Where does the above leave us? Our conclusion is that there is an urgent need for deeper research, both to guide how marketing academics teach their students and prepare them for work in marketing, and to guide marketing, IT and strategy decision-makers in their decisions on investments in AI, on its deployment and in its exploitation, in their reconstruction of their strategic decision-making processes, their forecasting and scenario planning, and their strategic cultures. Other areas that need more research include:

- Impact of culture on attitudes to possible changes in decision-making.
- Applicability of AI-supported decision-making to transformational decisions e.g. switching to a new business model or dealing with “wicked” problems (Foss and Saebi, 2018) or in turbulent environments (Vecchiato, 2015).
- How to maintain innovativeness in strategic marketing decision-making and planning in an AI-driven world.
- How to implement any new approach i.e. change management requirements, including how to ensure that policy/strategy recommendations are implemented at the right speed, and that any required testing and learning is undertaken (should test and learn be built into the approach), the skills required for leaders/others, implications for governance e.g. board behaviour, location of decisions, risk accountability.
- Strategic partnerships that companies will need in order to achieve the best results, including the role of consultants and suppliers and marketing and similar agencies.

References

- Åberg, C., Kazemargi, N. and Bankewitz, M. (2017), “Strategists on the Board in a Digital Era”, *Business and Management Research*, Vol. 6 No. 2, pp. 40-51.
- Awalegaonkar, K., Berkey, R., Douglass, G. and Reilly, A. (2019), “AI: Built to Scale”, Accenture, available at: <https://www.accenture.com/gb-en/insights/artificial-intelligence/ai-investments> (accessed 5 December 2019).
- Ayoub, K. and Payne, K. (2016), “Strategy in the age of artificial intelligence”, *Journal of Strategic Studies*, Vol. 39 Nos. 5/6, pp. 793-819.
- Brock, J.K.U. and Von Wangenheim, F. (2019), “Demystifying AI: what digital transformation leaders can teach you about realistic artificial intelligence”, *California Management Review*, Vol. 61 No. 4, pp. 110-134.
- Brown, A., Fishenden, J., Thompson, M. and Venters, W. (2017), “Appraising the impact and role of platform models and Government as a Platform (GaaP) in UK Government public service reform: Towards a Platform Assessment Framework (PAF)”, *Government Information Quarterly*, Vol. 34 No. 2, pp. 167-182.
- Butler, M.J., O’Broin, H.L., Lee, N. and Senior, C. (2016), “How organizational cognitive neuroscience can deepen understanding of managerial decision-making: A review of the recent literature and future directions”, *International Journal of Management Reviews*, Vol. 18 No. 4, pp. 542-559.
- Chaffey, D. and Ellis-Chadwick, F. (2019), *Digital marketing*, Pearson, London.
- Chakhar, S., Ishizaka, A., Labib, A., Saad, I. (2016), “Dominance-based Rough Set Approach for Group Decisions”, *European Journal of Operational Research*, Vol. 251 No. 1, pp. 206-224.
- Claudé, M. and Combe, D. (2018), “The roles of artificial intelligence and humans in decision-making: Towards augmented humans”, Master’s Thesis, Umeå University School of Business, Economics and Statistics, Sweden
- Condon, S. (2019), “Amazon shares how it leverages AI throughout the business”, available at: <https://www.zdnet.com/article/amazon-shares-how-it-leverages-ai-throughout-the-business/> (accessed 24 October 2019).
- Dibb, S., Meadows, M. and Wilson, D. (2015), “Digitisation and Decision Making in the Boardroom”, available at: http://www.nemode.ac.uk/?page_id=1524 (accessed 18 October 2019).
- Foss, N.J. and Saebi, T. (2018), “Business models and business model innovation: Between wicked and paradigmatic problems”, *Long Range Planning*, Vol. 51 No. 1, pp. 9-21.
- Garvin, K. (2019), “Artificial Intelligence in Marketing Is What Customers Want”, available at: <https://www.salesforce.com/products/marketing-cloud/best-practices/artificial-intelligence-for-marketing/> (accessed 27 December 2019).

Hughes, T., Foss, B., Stone, M. and Cheverton, P. (2004), "Key account management in financial services: An outline research agenda", *Journal of Financial Services Marketing*, Vol. 9 No. 2, pp. 184-193.

Iyer, G.R., Xiao, S.H., Sharma, A. and Nicholson, M. (2015), "Behavioral issues in price setting in business-to-business marketing: A framework for analysis", *Industrial Marketing Management*, Vol. 47, pp. 6-16.

Jarrahi, M. (2018), "Artificial intelligence and the future of work: human-AI symbiosis in organizational decision making", *Business Horizons*, Vol. 61 No. 4, pp. 577-586.

Johnson, G., Whittington, R., Scholes, K., Angwin, D. and Regnér, P. (2017), *Exploring strategy*, Pearson, London.

Kerr, S.P., Kerr, W.R. and Xu, T. (2018), "Personality traits of entrepreneurs: a review of recent literature. *Foundations and Trends in Entrepreneurship*", Vol. 14 No. 3, pp. 279-356.

Kiron D. and Schrage, M. (2019), "Strategy for and with AI", MIT Sloan Management Review Magazine, available at: <https://sloanreview.mit.edu/article/strategy-for-and-with-ai/> (accessed 24 October 2019).

Kolbjørnsrud, V., Amico, R. and Thomas, R.J. (2016), "How artificial intelligence will redefine management", *Harvard Business Review*, available at: <https://hbr.org/2016/11/how-artificial-intelligence-will-redefine-management> (accessed 1 Nov 2019).

Kumar, S. and Goyal, N. (2015), "Behavioural biases in investment-a systematic literature review", *Qualitative Research in financial markets*, Vol. 7 No. 1, pp. 88-108.

Lahmann, M., Keiser, P. and Stierli, A. (2018), "AI will transform project management, are you ready?", available at: <https://www.pwc.ch/en/publications/2019/ai-will-transform-project-management-en2019-web.pdf> (accessed 13 October 2019).

Lee, J., Suh, T., Roy, D. and Baucus, M. (2019), "Emerging Technology and Business Model Innovation: The Case of Artificial Intelligence", *Journal of Open Innovation: Technology, Market, and Complexity*, Vol. 5 No. 3, p.44.

Marinchak, C.M., Forrest, E. and Hoanca, B. (2018), "Artificial Intelligence: Redefining Marketing Management and the Customer Experience", *International Journal of E-Entrepreneurship and Innovation*, Vol. 8 No. 2, pp. 14-24.

McDonald, M. (2016a), *Marketing Plans: How to prepare them, how to profit from them*, Wiley, Chichester.

McDonald, M. (2016b), "Strategic marketing planning: theory and practice", in Baker, M.J., Hart, S. (Eds.), *The Marketing Book*, Routledge, pp. 108-142.

Merendino, A., Dibb, S., Meadows, M., Quinn, L., Wilson, D., Simkin, L. and Canhoto, A. (2018), "Big data, big decisions: The impact of big data on board level decision-making", *Journal of Business Research*, Vol. 93, pp. 67-78.

Montibeller, G., Von Winterfeldt, D. (2015), "Cognitive and motivational biases in decision and risk analysis", *Risk Analysis*, Vol. 35 No. 7, pp. 1230-1251.

Parnell, B., Stone, M. and Aravopoulou, E. (2018), "How leaders manage their business models using information", *The Bottom Line*, Vol. 31 No. 2, pp. 150-167.

Payne, K. (2018), "Artificial Intelligence: A Revolution in Strategic Affairs?", *Survival*, Vol. 60 No. 5, pp. 7-32.

Perris, T. and Labib, A. W. (2004), "An Intelligent System for Prioritisation of Organ Transplant Waiting List", *Journal of Operational Research Society*, Vol. 55 No. 2, pp. 103-115.

Poplawska, J., Labib, A., Reed, D., Ishizaka, A. (2015), "A dynamic framework for stakeholder identification and salience measurement using fuzzy logic methodology applied to a corporate social responsibility case study", *Journal of Cleaner Production*, Vol. 105, pp. 103-115.

Quinn, L., Ardley, B. and Dibb, S. (2018), "Unravelling the Tacit in a Digital Age: The Inescapable Role of Inarticulable Insight", paper presented at the Data, organisations and society conference, Coventry University.

Shepherd, N.G. and Rudd, J.M. (2014), "The influence of context on the strategic decision-making process: A review of the literature", *International Journal of Management Reviews*, Vol. 16 No. 3, pp. 340-364.

Shrestha, Y., Ben-Menahem, S. and von Krogh, G. (2019), "Organizational Decision-Making Structures in the Age of Artificial Intelligence", *California Management Review*, Vol. 61 No. 4, pp. 66-83.

Stone, M. and Shaw, R. (1987), "Database marketing for competitive advantage", *Long Range Planning*, Vol. 20 No. 2, pp. 24-39.

Stone, M. and Shaw, R. (1988), "Competitive superiority through database marketing", *Long Range Planning*, Vol. 21 No. 5, pp. 24-40.

Stone, M. and Aravopoulou, E. (2018), "Improving journeys by opening data: the case of Transport for London (TfL)", *The Bottom Line*, Vol. 31 No. 1, pp. 2-15.

Stone, M. Hobbs, M. and Khaleeli, M. (2002). "Multichannel customer management: The benefits and challenges", *Journal of Database Marketing*, Vol. 10 No. 1, pp. 39-52.

Stone, M., Knapper, J., Evans, G. and Aravopoulou, E. (2018), "Information management in the smart city", *The Bottom Line*, Vol. 31 Nos. 3/4, pp. 234-249.

Stone, M., Laughlin, P., Aravopoulou, E., Gerardi, G., Todeva, E. and Weinzierl L., (2017), "How platforms are transforming customer information management", *The Bottom Line*, Vol. 30 No. 3, pp. 216-235.

Stone, M., Thomson, A. and Wheeler C. (1990), *Telemanage Your Customers*, Gower, Aldershot.

Stone, M., Woodcock, N. and Wilson, M. (1996), "Managing the change from marketing planning to customer relationship management", *Long Range Planning*, Vol. 29 No. 5, pp. 675-683.

Stone, M. and Woodcock, N. (2014), "Interactive, direct and digital marketing: A future that depends on better use of business intelligence", *Journal of Research in Interactive Marketing*, Vol. 8 No. 1, pp. 4-17.

Valter, P., Lindgren, P. and Prasad, R. (2018), "Advanced business model innovation supported by artificial intelligence and deep learning", *Wireless personal communications*, Vol. 100 No. 1, pp. 97-111.

Vecchiato, R. (2015), "Strategic planning and organizational flexibility in turbulent environments". *Foresight*, Vol. 17 No. 3, pp. 257-273.

Wright, L.T., Robin, R., Stone, M. and Aravopoulou, E. (2019), "Adoption of big data technology for innovation in B2B marketing", *Journal of Business-to-Business Marketing*, Vol. 26 Nos. 3/4, pp. 281-293.

Zhang, S.X. and Cueto, J. (2017), "The study of bias in entrepreneurship", *Entrepreneurship theory and Practice*, Vol. 41 No. 3, pp. 419-454.