Marketing automation and the scope of marketers' heuristics

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Abstract

Purpose – This paper examines the relationship between marketing automation emergence and the marketers' use of heuristics in their decision-making processes. Heuristics play a role for the integration of human decision-making models and automation in augmentation processes, particularly in marketing where automation is widespread.

Design/methodology/approach – This study analyzes qualitative data about the impact of marketing automation on the scope of heuristics in decision-making models, and it is based on evidence collected from interviews with twenty-two experienced marketers.

Findings – Marketers make extensive use of heuristics to manage their tasks. While the adoption of new automatic marketing tools modify the task environment and field of use of traditional decision-making models, the adoption of heuristics rules with a different scope is essential to defining inputs, interpreting/evaluating outputs and control the marketing automation system.

Originality/value – The paper makes a contribution to research on the relationship between marketing automation and decision-making models. In particular, it proposes the results of in-depth interviews with senior decision makers to assess the impact of marketing automation on the scope of heuristics as decision-making models adopted by marketers.

Keywords Marketing automation, Scope of heuristics, In depth interviews, Marketers' decision-making models, AI in marketing

Paper type Original article

1. Introduction

Automation is one of the most important marketing trends today, as evidenced by the widespread adoption of software to replace human activity in accomplishing specific marketing tasks (Bagshaw, 2015; Heimbach *et al.*, 2015; Hoffman *et al.*, 2022; Mero *et al.*, 2022). The marketing tasks that can be replaced involve not only operational aspects such as email management, but also strategic aspects such as segmentation and targeting (Hoffman *et al.*, 2022). Automation often proposes conditions for greater efficiency and replacement of managerial tasks, providing support to the activities of marketing managers in terms of augmentation of their judgment and choice-making abilities in decision-making processes (Raisch and Krakowski, 2021). Automation of individual tasks is presented in the terms of replacing human activity (Mari, 2019), but a more comprehensive level of marketing automation proposes not only a replacement theme, but primarily one of increasing managers' possibilities, affecting marketers' decision-making models and the scope in which they find application (Guercini, 2019, 2023). In particular, while on the one hand automation is presented as a natural evolution given the capability of new artificial intelligence systems, however, there is widespread difficulty among management in accepting the automation of critical decision-making processes (Haesevoets *et al.*, 2021; Leyer and Schneider, 2021).

Management Decision
Vol. 61 No. 13, 2023
pp. 295-320
Emerald Publishing Limited
0025-1747
DOI 10.1108/MD-07-2022-0909

A research gap exists about how marketing task automation impacts marketers' decision-making activities. This paper aims to help address this research gap by examining the scope of application of heuristics by marketers. Heuristics are defined here as robust and transparent decision-making models that are simple and easily adopted by human actors. Assuming that integration of the human component with machine is superior to automation (Brynjolfsson and McAfee, 2014; Jarrahi et al., 2023), one key concern is the integration of elements of machine strength with those proper to the behavior and cognition of the human actor (Teodorescu et al., 2021). The strengths of the latter could be explained in the literature that highlights the effectiveness of heuristic processes in decision-making pathways (Gigerenzer et al., 1999; Gigerenzer and Brighton, 2009; Gigerenzer and Gaissmaier, 2011; Todd et al., 2012). Heuristics are seen as tools for bounded rationality (Gigerenzer, 2004), have the character of rules (March, 1994), and can be associated with characters of "simplicity" and "robustness" (Martignon and Schmitt, 1999). Simplicity pertains both to the small number of data (cues) needed, and to the way these data are combined to make the decision (Katsikopoulos et al., 2020, p. 32). Robustness, on the other hand, is the ability of a model to extract relevant information from the data while avoiding noise (Martignon and Schmitt, 1999, p. 565), and consequently to be less sensitive to the error component by variance. In addition, heuristics are associated with the character of "transparency" as a key value of the decision model. Transparency is achieved when the decision model is readable within a group, where the model can be understood, stored, executed and taught (Katsikopoulos et al., 2020, p. 26).

In this study, we focus on the effects of marketing automation on the use of heuristics as marketers' decision making models, and in particular in term of their "scope." Scope is the (extension of the) field in which a heuristic rule can be applied (with success) (Guercini, 2019). The structure of the heuristics adopted (building blocks) integrates cues from the automatic system, as well as rules aimed at integrating the automatic marketing processes as a control to reduce the flaws/errors/incidents, which might be rare but can be detrimental. It is important to clarify the relationship between the concept of "scope" and existing concepts such as "ecological rationality" (Todd and Gigerenzer, 2012) and "in the wild" decision-making (Katsikopoulos et al., 2020). The meaning of the term "scope" in this paper is consistent with that of ecological rationality, but it takes on a more specific meaning of managerial significance, a meaning that is not satisfied by the concept of ecological rationality in itself, which stands on a more general level of comparison with other forms of rationality. In fact, "scope" does not represent a type of rationality, but a field of decision-making in which a specific decision model, or even a single and specific decision rule, can find application and be effective. The relationship with ecological rationality is such that the existence of such rationality is a prerequisite for seeking scope, but the mere statement of the principle of ecological rationality does not define scope. The emphasis is not on whether heuristics are the most effective model of decision-making, but on delineating the domain in which that effectiveness is expressed. There are specific heuristics that might have a scope (effective scope) for a certain period, and then lose it given the evolution of the task environment, but without losing the principle of ecological rationality.

In this paper we investigate the impact of marketing automation on the adoption of heuristics in decision-making and how the scope has evolved. More precisely, the research question is the following:

RQ1. Does the adoption of marketing automation solution result in overcoming or changing the scope of heuristics adopted by marketers?

We build on evidence collected from in-depth interviews (Van Maanen, 2011) with twenty-two marketers (entrepreneurs, managers, marketing consultants). Our research approach is descriptive and non-prescriptive, considering how decision-making changes "for the wild",

understood as "large worlds" (Katsikopoulos *et al.*, 2020, p. 2), and gathering useful elements for the subsequent formalization of the models that decision-makers, in our case marketers, adopt (Katsikopoulos, 2019). We explore the assessments of managers, consultants and entrepreneurs to gather cues on how automation of marketing systems has impacted the decision-making models to which the marketers refer.

2. The emergence of marketing automation
2.1 Marketing automation definition and relevance
The choice of the study of the impact of automation in marketing is relevant because the inclusion of new software systems and technology solutions that now occupy a larger portion of the marketing area's budget than personnel (Gartner, 2022). Marketing automation is a part of information systems dedicated to marketing and sales management, the goal of which is to make these activities primarily more efficient and assessable through automatic measurement of both actions and their effects. Marketing automation refers to automatic support for marketing decisions based on a kind of software and used to execute, manage and automate marketing in an increasingly digital task environment (Heimbach *et al.*, 2015; Little, 2001; Mero *et al.*, 2022).

The heart of marketing automation is the automatic customization of marketing-decision support that "promises enhanced productivity, better decision-making, higher returns on marketing investments, and increased customer satisfaction and loyalty" (Heimbach *et al.*, 2015, p. 129). Today, a large amount of data are automatically produced by the business environment, enabling the marketers to adopt marketing automation software systems to react adaptively to customer, competitor, and influencer behavior, producing effective proposals, and identifying preferences (Bucklin *et al.*, 2002; Hoffman *et al.*, 2022). The abundance of data available allows making decisions for marketing activities in an automatic form, starting from parameters set with specific software and algorithms. These algorithms use the data inputs to produce predictions and behaviors, sometimes almost in real time with respect to the production of data (for example, analytical data from social media or search engines to activate promotions to specific online customers). This support is important to respond to the speed with which market data is produced and used by marketers in the digital task environment (Crawford Camiciottoli *et al.*, 2014; Hirt and Willmott, 2014).

The use of dynamic machine-driven models cope with the large amount of data produced automatically to react adaptively to customer, competitor, and influencer behavior, produce automation relevance in delivering effective proposals and identify preferences (Bucklin *et al.*, 2002). Marketing automation systems are a natural response to the real needs of contemporary marketing. Their most important capability is to relate an individual customer to a set of activities he or she has performed and their effectiveness. Automation in itself is the replacement of the human actor by a machine in the assumption of specific tasks and recently assumes particular relevance in marketing activities (Mari, 2019). After it affected the production of goods and services, automation increasingly affects first individual marketing tasks (as e-mailing) and then the entire marketing (segmentation, advertising, content production etc.), in a context in which it is conceptually distinct but in fact intertwined in its development with that of digitalization and more recently artificial intelligence (Huang and Rust, 2021; Mehta *et al.*, 2022).

2.2 Historical background and machine-human interface
The term marketing automation was previously used with other meanings, but the current topic of marketing automation has been used in the literature for just over two decades (Little, 2001). There is a distinction between automation, optimization and augmentation (Raisch and

Krakowski, 2021). Optimization corresponds to overcoming inefficiencies through superior processing capabilities and algorithms. In augmentation the human capabilities are supported by the integration with the machine. In principle, after a set of rules or parameters is identified by the marketing actor, marketing automation requires no further managerial decision (e.g. automated promotions). In that sense, we might ask why to study changes in marketer's decision-making models if decisions are entirely delegated to the machine. If automation is the replacement of the human actor by the machine, new tasks for the human actor emerge as a result of the introduction of automation itself (e.g. the tasks of exploring, selecting, introducing and controlling new software systems) and because of the integration between machine and human actor particularly in augmentation processes (Skiera and Abou Nabout, 2013). Automation does not just replace humans in repetitive tasks to reduce costs but becomes central to knowledge management (Jarrahi *et al.*, 2023) and potentially also to research in management science (Johnson *et al.*, 2021). This has an organizational impact, as integrating automation systems managed through AI-powered machines into decision-making processes requires different profiles of managers who are better suited to interact with such systems (Man Tang *et al.*, 2022).

Automating marketing activities including decisions does not mean that marketers no longer have decisions to make (Stone *et al.*, 2020). This paper start from the view of machine-human actor integration as a solution with superior performance (Brynjolfsson and McAfee, 2014; Huang and Rust, 2022). Heuristics is a decision-making model that characterizes the human actor and can be its distinguishing feature in integration with the machine in automation processes. The ability to form judgments for marketers can apply to interaction with automated processes, so heuristics may have application in generating and controlling human-machine interface. In that respect, in this paper we focus on marketing "task" automation, i.e. the automation of specific marketing activities (e.g. segmentation, advertising campaign) that require further managerial decisions (e.g. to run a campaign on that segment or not).

The integration of the machine with the human component in decision-making processes seems to add more value than the simple automation of such processes (Daugherty and Wilson, 2018). The same literature also points out that it is difficult to distinguish between the two components (automation and augmentation) in management, since automation assumes the replacement of humans with machines in the accomplishment of specific tasks, while augmentation assumes that humans interact closely and interdependently with machines to accomplish a certain task (Raisch and Krakowski, 2021). The existence of a knowledge gap on how augmentation should be conducted has recently been highlighted as one of the key problems in the adoption of artificial intelligence in decision-making processes (Teodorescu *et al.*, 2021). As much as they may seemingly go in the opposite direction with respect to the role of the human component's contribution to the organization, in reality automation and augmentation are closely related to each other. In fact even in automation the substitution of humans in certain tasks may be accompanied by the emergence of new tasks for the human actor (Guercini, 2022, 2023). This makes it on the one hand important to work on the view of automation in relation to marketing tasks, in relation to which both forms of automation and augmentation can be developed (Raisch and Krakowski, 2021).

2.3 The new forms of automation AI-based

Automation in marketing is functional distinct but more and more integrated with artificial intelligence (AI). Automated marketing can improve the integration between AI in the overall marketing processes (Cui and Curry, 2005; Smith, 2020). Automated marketing decision support can improve the productivity of strategic players (Bucklin *et al.*, 1998), freeing them from the constraints between the emerging data and required actions. With the rise of AI, the

decision-maker is also free from the need to formulate decision-making models by identifying the solution based on pre-established needs, even in the most stratified and complex forms. This includes the topics of machine learning and deep learning, and more recently the generative forms attributable to large language modelling. By machine learning (ML) we mean a learning program that recognize patterns from data (Alpaydin, 2016) and a machine learning algorithm is "a search process designed to choose the best function, from a set of possible functions, to explain the relationships between features in a dataset" (Kelleher, 2019, p. 11). In ML, we have a two-stage process: training and inference. In training, the algorithm processes the data and chooses the function that has the best match with the patterns in the data. That function constitutes the encoded pattern as a result of the training process. By deep learning (DL) we mean specific type of ML in which "the function extracted from a dataset during training is represented as a neural network model" (Kelleher, 2019, p. 13), enabling higher levels of abstraction (for more details see Alpaydin, 2016, p. 106). Marketing automation is not just smart database marketing, as it can use AI to independently manage processes such as monitoring contact behavior on the Internet; generating contact segmentation; managing e-mail marketing, customer relationships, and contact management; elaborating analytics, reports, and advanced functionalities.

Marketing process automation is therefore an essential component of integrating AI into business processes, even for traditional companies that do not have algorithm-based business models (Ritter and Pedersen, 2020). In marketing, as in other disciplines, "the boundaries between humans and computers in decision-making is shifting" (Stone *et al.*, 2020, 183). Potentially AI (and ML) can influence all functional areas of marketing, from online advertising (programmatic ads) to e-commerce (recommendation engines) to service management (chat-bots). In this paper, the extracts from the interviews focus on different applications of the "automation systems" (Mari, 2019).

The spread of AI is a major phenomenon that affects not only the tools that are made available to businesses and consumers, but more generally the impact on the development of individuals, society and culture (Brock and Von Wangenheim, 2019; Rust *et al.*, 2021). AI in strategic marketing is embodied in what some authors have recently called "predictive machines" (Agrawal *et al.*, 2018). In fact, automated data-driven marketing uses input data to directly produce predictions that underlie actions, sometimes in near real-time. The prediction model is directly related to the decision model. Armstrong *et al.* (2015) define "being conservative" as the golden rule of forecasting, which is to "reduce the amount of change that is expected in the presence of uncertainty" (Armstrong *et al.*, 2015, p. 1718). Green and Armstrong (2015) suggest employing evidence-based methods to make predictions, adopting the most effective model when tested against the facts (Armstrong *et al.*, 2015, p. 1729). Experience may suggest adopting "sophisticatedly simple" models (Zellner, 2001, p. 242).

AI applied to marketing processes uses algorithms to interact with customers, improve understanding of the market and the processes that influence market players (customers, opinion leaders, influencers, competitors). This support has become an opportunity, but also a necessity in the new digital environment, also due to its increasing adoption by competitors, so if they enable effective decision making the latter may prevail (Paschen *et al.*, 2020).

Studies testing formal heuristic models in specific cases show they can perform better than complex and information-intensive decision models (Gigerenzer *et al.*, 1999). Heuristics and algorithms are similar in nature (Simon, 1995) but the former are here defined as simple rules of to make them easily adoptable by human actors. In fact, the study of heuristics in early research focused on AI (Newell, 1981; Simon, 1995), and more recently on different perspectives in organization behavior, strategic management, business and entrepreneurial decision-making (Artinger *et al.*, 2015; Bingham *et al.*, 2019; Guercini, 2012; Guercini *et al.*, 2015, 2022; Guercini and Milanesi, 2020; Loock and Hinnen, 2015; Luan *et al.*, 2019; Picone *et al.*, 2021; Shepherd *et al.*, 2015; Sinyard *et al.*, 2020; Sull and Eisenhardt, 2015).

3. Research methodology
This study focuses on the impact of automation on the scope of marketers' heuristics. Focusing on the concept of ecological rationality, (Gigerenzer, 2021, p. 2) states that "a heuristic is ecologically rational to the degree that it is adapted to the structure of an environment." Considering the scope of a heuristic rule implies shifting attention from the accuracy of the decision-making model to the boundaries of the context in which it is effective (task environment). A change in the task environment can have an impact on the scope of heuristics in decision-making processes (Guercini, 2022).

The purpose of this research in a nascent field is exploration and theory building (Eisenhardt *et al.*, 2016). In the field of qualitative research, Langley and Abdallah (2011) describe the epistemological differences between two classic methods of data analysis: the Gioia method of analysis (Gioia, 2004; Gioia *et al.*, 2013) and the multiple case study method (Eisenhardt, 1989). After considering the advantages and limitations of both approaches, an attempt is made in this paper to enhance the integration of the study of reference concepts and emergent elements from the empirical material, applying a systematic combining approach between theoretical discussion and collected empirical evidence (Dubois and Gadde, 2002, 2014). Systematic combining is a process involving empirical fieldwork and a theoretical framework that we refer to and that evolves simultaneously. It consists of two processes: (1) the process of matching theory with the elements gathered through empirical work; (2) the process of orientation and reorientation, which consists of analysis and interpretation and may involve an evolution of the theory itself (Dubois and Gadde, 2002, p. 556). This seems a particularly useful process for developing a theoretical approach from the existing literature.

3.1 Data collection
In the paper we present an empirical study based on in-depth interviews with 22 senior decision makers. The interviewees are managers, entrepreneurs, and consultants that have in common to be part of organizations in which marketing automation technologies have already been adopted or in which adoption is being considered. The managers were selected from a larger sample of managers identified through social media as being interested in the topic of marketing automation, primarily through LinkedIn, and as subscribing to channels and authoring comments related to that topic. These were semi-structured interviews with a qualitative nature and greater breadth. In particular, we referred to the traditional type of unstructured interviews, that of in-depth open-ended interviews (Lincoln and Guba, 1985; Merton *et al.*, 1956).

The profiles of interviewees are shown in Table 1. Each interview lasted between 25 and 64 min, realized between April 2019 and June 2021. The interviews were recorded and transcribed. The text was analyzed passage by passage extracting those passages that could offer more informative content with reference to the subject of the research. Each interview was assigned a code to ensure anonymity. However, it was considered important to provide contextual data regarding the interviewee, her or his organization and the target market in which (s) he comes to operate. The text was collected and transcribed with the help of interviewers who read and analyzed the text and with whom the author discussed the contents to verify understanding.

While not all respondents worked in the marketing function/department, all were involved in decision-making processes relevant to the marketing activity and came into contact with the automation processes. The interviews began with the presentation of the following standard operational definition of marketing automation, AI, and ML based on the literature cited in the previous section, as indicated in the notes in Table 2. Next we began to discuss, beyond that definition, the various points indicated in an interview protocol summarized in Table 2.

Name **	Profile	Position	Company's industry	Organization size***	Interview length	Client	Code
Albert	male, 42 yo	country manager	food wine digital contents	$ 69.4 million in 2020	47 min	consumer	I01
Alessio	male, 32 yo	head of users acquisition	conglomerate services	€ 595 million in 2018	37 min	mixed	I02
Alex	male, 40 yo	market analysis director	conglomerate services	>€ 10 million in 2020	34 min	business	I03
Alexandra	female, 37 yo	engagement manager	Internet services	€ 595 million in 2018	31 min	mixed	I04
Andrea	male, 37 yo	corporate digital manager	pharmaceutical	€ 350 million in 2021	41 min	mixed	I05
Anna	male, 32 yo	digital marketing manager	online fashion retailer	€ 206 million in 2021	29 min	consumer	I06
Carl	male, 38 yo	head of marketing	Internet services	€ 4.3 million in 2019	31 min	consumer	I07
Danilo	male, 35 yo	chief marketing officer	Internet services	€ 92.1 million in 2021	44 min	mixed	I08
Francis	male, 46 yo	marketing manager	financial services	>€ 10 million in 2020	25 min	mixed	I09
Gianandrea	male, 34 yo	head demand planning	tyres manufacturer	¥ 3,650 billion in 2018	39 min	mixed	I10
Lawrence	male, 52 yo	chief financial officer	food chocolate	€ 10,903 mln 2017/18	45 min	consumer	I11
Leonardo	male, 59 yo	entrepreneur founder	marketing research	<€ 1 million in 2019	34 min	business	I12
Marc	male, 38 yo	chief digital marketing	publisher	€ 214 million in 2018	45 min	consumer	I13
Paula	female, 35 yo	IT sales senior manager	luxury fashion brand	€ 1,494 mln in 2018/19	54 min	consumer	I14
Peter	male, 45 yo	digital sales director	eyeswear	€ 1,012 million in 2019	56 min	consumer	I15
Philip	male, 45 yo	regional sales director	luxury fashion brand	$ 1,344 mln in 2018/19	40 min	consumer	I16
Simon	male, 45 yo	marketing director	electromedical	€ 43,1 million in 2021	49 min	business	I17
Stefano	male, 39 yo	chief digital innovation	luxury fashion brand	€ 1,349 million in 2018	60 min	consumer	I18
Stephen	male, 32 yo	IT and service manager	luxury fashion brand	€ 730 million in 2017	54 min	consumer	I19
Thomas	male, 37 yo	chief marketing officer	digital platform	>€ 10 million in 2021	30 min	mixed	I20
Vincent	male, 40 yo	chief technology officer	luxury fashion brand	$ 1,360 million in 2018	64 min	consumer	I21
Walter	male, 41 yo	retail real estate director	specialty fashion brand	$ 1,429 mln Q1 19/20	34 min	consumer	I22

Note(s): * Each contact was interviewed between April 2019 and June 2021
** Real names have been replaced with fictitious names to ensure anonymity for respondents
*** Source: database Bureau Van Dick
Source(s): Author's elaboration

All the interview sessions use the same protocol. In total we produced about 20 h of interviews with extensive descriptions, notes, and interpretations of the rules used to manage the decision-making process. In the following sections these results are presented providing data

No	Questions
1	Profile of the respondent and the company
2	Concept of marketing automation*
3	The contribution of the respondent to the organization's marketing tasks
4	The tasks object of marketing automation
5	The marketing automation tools (software) applied by the company
6	Methods traditional used to address marketing activities and automation
7	Impact of artificial intelligence for marketing automation
8	Perspective of artificial intelligence for marketing automation
9	Problems and ways to overcome them, advantages
10	Implications for individual and organizational decision-making processes

Note(s): * The interview began with the presentation of the following standard operational definition of marketing automation, artificial intelligence and machine learning, based on the literature cited in the previous section. The standard definitions are the followings

Source(s): Author's elaboration

- "The term *marketing automation* is used to define the process of using a platform to monitor key performance indicators, thereby substituting humans in repetitive marketing activities and producing reports at the end of a cycle"

- "By the term *artificial intelligence* we mean that set of studies and techniques that tend to the realization of a machine, capable of solving problems and carrying out activities peculiar to human intelligence"

- "By the term *machine learning* we mean that strand of artificial intelligence that deals with instructing a machine by equipping it with algorithms capable of learning to carry out activities in initially unprogrammed ways."

Table 2.
Interview protocol *

about a phenomenon: how marketing automation changes the heuristic decision-making environment, especially when heuristics are successfully used. The interview excerpts are insightful and describe the status quo in the chosen field. A summary of the most emblematic passages emerging from the interviews is offered in Appendix.
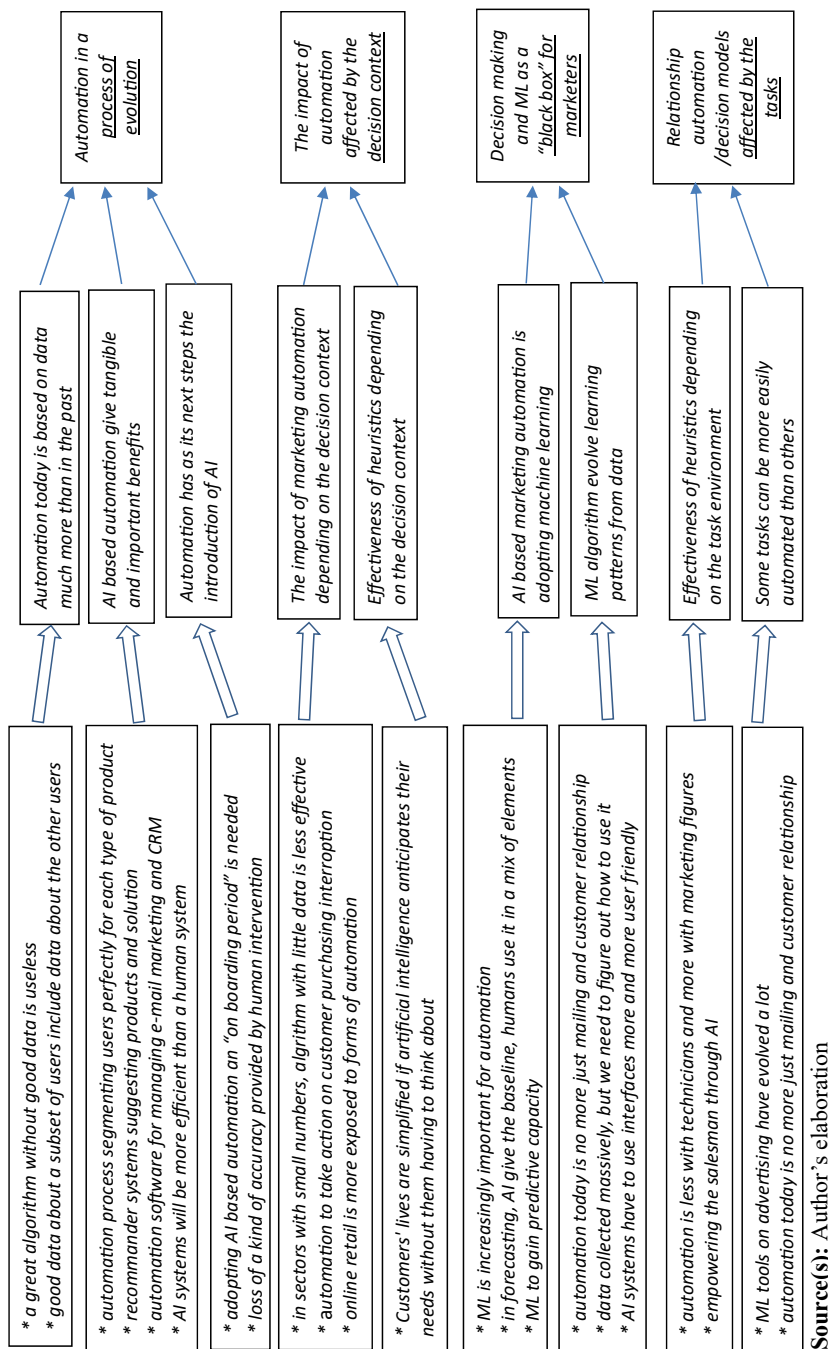
3.2 Data analysis
The interviews provided a broad base of data contained in the hours of taped interviews. These interviews were conducted with the support of surveyors and were all listened to by the author of the paper who identified the most relevant emerging patterns. The resulting data were subjected to a structured analysis through several steps represented in Figure 1. First, this material was listened to carefully in order to identify the most significant contents, represented by the passages contained in Appendix. From this material it was possible to derive a first order of concepts, contained in the first column of Figure 1, from which the themes reported in the second column can be derived, and from this the aggregate dimensions of the third column, according to a practice legitimized by the literature (Gioia *et al.*, 2013, p. 21). As anticipated, we also sought to develop the analysis further, using a comparative approach between theoretical starting point and data analysis (Dubois and Gadde, 2002), used to progress from one step to the other of Figure 1 (Gioia *et al.*, 2013).

4. Findings
This section offers the main findings emerging from the interviews with respect to the topic of evolving decision-making models. Quotes taken from the interviews highlight the relationship between automation and decision models or may be useful elements in assessing the change in context relevant to the effectiveness of the decision model.

First order codes (left column):

* a great algorithm without good data is useless
* good data about a subset of users include data about the other users

* automation process segmenting users perfectly for each type of product
* recommander systems suggesting products and solution
* automation software for managing e-mail marketing and CRM
* AI systems will be more efficient than a human system

* adopting AI based automation an "on boarding period" is needed
* loss of a kind of accuracy provided by human intervention

* in sectors with small numbers, algrithm with little data is less effective
* automation to take action on customer purchasing interroption
* online retail is more exposed to forms of automation

* Customers' lives are simplified if artificial intelligence anticipates their needs without them having to think about

* ML is increasingly important for automation
* in forecasting, AI give the baseline, humans use it in a mix of elements
* ML to gain predictive capacity

* automation today is no more just mailing and customer relationship
* data collected massively, but we need to figure out how to use it
* AI systems have to use interfaces more and more user friendly

* automation is less with technicians and more with marketing figures
* empowering the salesman through AI

* ML tools on advertising have evolved a lot
* automation today is no more just mailing and customer relationship

Second order themes (middle column):

Automation today is based on data much more than in the past

AI based automation give tangible and important benefits

Automation has as its next steps the introduction of AI

The impact of marketing automation depending on the decision context

Effectiveness of heuristics depending on the decision context

AI based marketing automation is adopting machine learning

ML algorithm evolve learning patterns from data

Effectiveness of heuristics depending on the task environment

Some tasks can be more easily automated than others

Aggregated dimensions (right column):

Automation in a process of evolution

The impact of automation affected by the decision context

Decision making and ML as a "black box" for marketers

Relationship automation /decision models affected by the tasks

Source(s): Author's elaboration

Figure 1.
Data structure: first order codes, second order themes and aggregated dimensions

4.1 Marketing automation evolution
Automation appears to be evolving toward a new phase based on the introduction of AI. On this aspect, some interviews (see Table 1) propose many useful elements:

> Today marketing automation is done as it is, but in the future I can't imagine marketing automation without machine learning ... Our company uses recommender systems, they are not yet based on machine learning systems ... (interview I03)

> Machine learning tools on advertising have evolved a lot ... Those who use marketing automation by natural evolution will also have to use machine learning systems. It's not that this is good regardless of the type of business, though ... (interview I07)

> We can acquire from online sales a lot of consumer data ... Then in the next few years, maybe after five years, we will be able to make product strategies, define offerings based on this data ... (interview I11)

At the interviewed managers, the difference between now-traditional solutions and new solutions based on adopting ML forms seems to be clear. Organizations are in different positions with respect to the topic of the introduction of AI, even the most advanced ones however grasp the novelty of these steps and testify to a still ongoing development whose actual possibilities are yet to be defined. Marketing automation is now perceived as a widespread standard and its future is seen in the adoption of ML solutions, perceived as its natural evolution for the near future (interviews I03 and I07). Even where marketing automation takes forms focused particularly on CRM (interview I14), there is a perceived need for a digital agenda as a necessity for the organization to prepare for the use of more advanced tools (interview I11).

Marketing automation is increasingly developing its potential today through the inclusion of AI. From the interviews, AI emerges as a technology that requires time to be embedded in the company. What are these insertion times due to? Sensibly, they are due to the need for managers to learn rules for its use. More specifically, for the effective insertion of AI into companies' automated marketing, what seems necessary is the development of heuristics that solve problems, for example, about the nature of the data that must be considered in the data set.

> A major pharmaceutical company had given an artificial intelligence system a dataset of sick people to figure out what was the best treatment, well the algorithm only proposed solutions that made the disease worse, but the problem was that the dataset was only sick people, and that was a mistake, while it was realized that the dataset should include both healthy and sick people ... today this is trivial, but when you start we don't have that confidence ... (interview I03)

> Companies need to be aware that these systems need some time to become effective in using the data. They use tools for the unification of browsing data, for example ... To embed marketing automation requires the courage to make mistakes and to learn (interview I02)

From these comments emerges a widespread perception among the marketers that decision models need to evolve to respond to this natural evolution of marketing automation systems toward AI and ML. Emblematic is the case of databases used by a pharmaceutical company referred to by one of the interviewees (see interview I03). But other interviewees also emphasize the importance of phasing in AI in order to have positive effects in the company's automated marketing (see interview I02).

4.2 Decision-making and context
The impact of marketing automation on heuristic decision-making models is significantly affected by the context of the decision, such as the moment in time, the experiences of business decision makers, or the characteristics of the industry. There are specific fields, both

as functional areas and even more so as industrial sectors, in which marketing automation has limitations, others in which it can make a leap through the inclusion of AI:

> Sectors with small numbers (SMEs B2B, for example) have less need for automation, an algorithm with little data is less correct . . . (interview I08)

> Digital technologies are of interest to luxury companies particularly for online retail . . . There are technologies that are potentially still developable, such as even more advanced CRM management . . . (interview I14)

> There are sectors, particularly in business to business, in which the numbers of operations, machines and customers are very low, and as a result the data base does not assume such large proportions as to create a suitable terrain for the application of big data analysis techniques . . . (interview I17)

> In luxury companies where retail is fundamental an important role in the development of automation mechanisms has been played by the endowment of tools, first tablets and then mobile phones, as an endowment of salespeople, capable of replacing the old paper catalogs of product . . . (interview I19)

The extent of marketing automation and the way it impacts the use of decision-making models such as heuristics is conditioned by the definable context in terms of industry, previous experiences of the decision maker and organization, and the moment of the decision. Sometimes, the conditions of the industrial sector are strongly conditioning the potential of marketing automation tools and even more so their evolution toward forms of AI. In some industries, the low number of customers and operations may reduce the margins of efficiency from automation, and even more so the chances of effectively applying the evolution toward adoption of ML (see interviews I08 and I17 in particular). Significant weight is then assumed by the time at which the decision is to be made, an element that can take on a strong bearing on the type of decision model adopted (see interview I17). For some industries, such as the luxury industry, automation processes may be affected by the particular ways in which data collection and customer service are integrated into sales processes in physical stores as well as digital stores (interview I19).

4.3 Machine learning and human component
In the transition to automatic marketing systems, the internal logic of the adoption of ML is clearly a "black box" for many marketers. The data sources (search rules) indicated as the most important for decision-making differ from company to company, and are influenced by contextual elements (sector, company size, customer type, role of the interviewed manager, amongst others). They include more traditional reports and personal interactions (meetings), more recent forms of big data (analytics), and data shared with other managers and players (vendors, suppliers, customers etc.). The kind of data required for decision-making (stopping rules) is often specific to the situation (see before about the role of the decision context). For instance, when linked to personal interactions, they are accompanied by an assessment of the degree of trust of the source. Marketing automation tools are widespread in the businesses, some are very general, others more specific:

> The company has been adopting marketing automation tools for at least two and a half years, doing e-mail marketing, push notifications, sending sms, online advertising, social . . . some of these software require skills not only in marketing but also in data engineering and in some cases in information technology. There are advantages . . . these are still tools that have positive effects, with really good effects on ROI . . . (interview I04)

> My company has been using marketing automation software for at least four years, more specifically we use Emarsys, specifically for e-mail marketing and CRM. It is e-mail marketing software that has evolved by providing additional marketing automation elements . . . (interview I06)

Several specific types of marketing automation software emerge from the interview to sustain processes about forecasts in business contexts (for example, see interviews I04 and I06). This is an area in which new products are always coming and require continued monitoring so that they are not anachronistic (see interview I03).

Marketing automation and the inclusion of AI and ML does not eliminate the importance of the human component in marketing processes. This is especially true for the role that the human component continues to play in the decision-making models adopted:

> Human input is always important, the machine cannot learn on its own, it is the human who has to tell the machine what to learn . . . (interview I01)

> Artificial intelligence will be able to do many things but it does not go to replace the human part, because the more empathetic part is quite difficult to be replaced by the machine. The chatbot tool for example is only used internally. Artificial intelligence has simplified but mostly made some processes faster . . . (interview I05)

> . . . the voice experience of contacting a human is irreplaceable (interview I06)

The point of view in these interviews seems to be quite clear. The human component is considered fundamental to the relationship between AI and decision-making models, since at one time or another "it is the human who has to tell the machine what to learn" (interview I01). The importance of the human component may stem from the empathic component that is rather difficult to replace with machines (interviews I05 and I06). Particularly telling is the example of the use of, automated sentiment detection systems, where despite past announcements (interview I12). After all, the effectiveness of adopting automated marketing systems is not immediate, but there is a certain "on boarding period" that is needed (interview I02).

> In our forecasting, the baseline is formed for me by the artificial intelligence . . . the human element is at a great advantage because it gets the mix already made by the artificial intelligence . . . I, however, wouldn't know how I would behave if the artificial intelligence told me that in a week's time a snow cyclone is coming and so now you have to tell production to make an extra production of snow tires, I wouldn't go about it exposing myself. If the prediction is then wrong I risk my career . . . (interview I10)

> sentiment continues to be an extraordinarily minefield for technology, especially when the text are short, especially when the language is not English . . . (interview I12)

> Listening to customers is always key, the customer is ahead of the company, I don't think there will be, at least in our industry, a total dematerialization as has been believed at times . . . (interview I16)

> The online system we have cannot replace from our point of view the seller . . . Our goal is to empower our salesman, through artificial intelligence, which is a system that can help him and make him much more efficient . . . (interview I18)

Essentially, time is needed to learn how to perform data selection and to adapt decision-making models (interviews I12 and I17), particularly for the integration of different skills (interview I04), to manage risk (interview I10), and to learn or redefine the scope of data selection rules, partly because "a good algorithm without good data is useless" (interview I03). Such rules include heuristic rules as in the case of the pharmaceutical company that had adopted a big data system on sick people and then learned that such a system must also include healthy patients in order to work properly (interview I03).

4.4 Automation, decision models and tasks
The relationship between marketing automation and decision models is then affected by the tasks on which automation proceeds and decisions must be made. This is a very close issue to

that of the "scope" of the decision-making model, particularly heuristics. Within the application of these tools, there are typical decision areas that the automatic marketing tools impacted the most include at least the following: sales forecasting; segmenting and targeting customers; customer assistance and the use of chatbot; listening customers and influencers; promotional campaigns, direct marketing, and communications:

> The automation process is underway regarding mailing with customers. The company has internally developed software that suggests wines to users based on learning about their tastes . . . (interview I01)

> My company has been using marketing automation software for at least four years . . . We use from the classic shopping cart abandonment e-mail to some more advanced e-mails that are based on the user's categories of interest, from products visited, to the proposal of personalized products for the user, then there are other automations based on the phase of the customer's life cycle . . . Artificial intelligence software has then been included that allows personalization of the experience for the customer based on their specific characteristics . . . (interview I06)

> We make use of marketing automation software not only for data collection and processing but also for use in workflow from a predictive and prescriptive perspective, for example in managing the "abandoned cart" in the purchasing process. Technology no longer passive tool but purposeful tool . . . (interview I09)

> One risk of the automated system, for example, is that if a customer enters the online system in a marketing automation flow to search for a product, even if he then re-enters to search for a different one he might still be read for the old search, and so he is offered something that maybe he is not looking for now. (interview I13)

Marketing automation is accompanied by customer clustering that leads to specific forms of segmentation and targeting (see interview I01). The topic of automation presents a more operational aspect when it takes on the contours of managing abandoned shopping carts, trying to recover any failed online sales (interviews I06, I09, I13). The use of AI can encompass very operational but still important issues for companies such as the problem of "cart abandonment": a customer has started an online purchase but does not take it to the end, for example, does not make the payment. Having identified these cases, specific initiatives can be proposed on them:

> we need to work on machine learning to gain predictive capacity of machines relative to customer behaviors. For this, we would like to put appropriate systems on all digital eyewear purchasing platforms soon. This is to be able to suggest to the consumer the eyewear that we think may be of interest from the journey that the consumer has made . . . (interview I15)

> Starting with the historical is key to making forecasts and setting business plans, just as it is important to keep open because completely unexpected changes happen . . . (interview I20)

> . . . there is still a dominant role there for personal contact with the salesperson and traditional selling . . . That's not to say, however, that there is no adoption of technology, but it is less visible technology. There are challenges in place for analyzing preferences or making recommendations . . . (interview I21)

> The benefits of digitization are that of greater knowledge of the customer and the implementation of a targeted offer . . . (interview I22)

Combined with this is the implementation of recommendation systems (Alpaydin, 2016), which can have considerable impact on the sales of the companies involved (see interviews I15, I21). Another area of application of these tools is realization of forecasting and risk assessment (interviews I20 and I22). Sometimes, as a result of learning processes, the machine processes data about customers that management no longer detects directly. As such, is

automatic segmentation and targeting still strategic? In the words of two interviewees, targeting remains a management task despite the introduction of new automated marketing tools (see interview I01).

5. Discussion: the emerging decision-making model

5.1 General discussion

The interviews confirm the growing relevance of marketing automation and the technologies that are driving its evolution. Marketers are grappling with the topic in their organizations and in the business environment in which they operate, letting a number of themes emerge that can be aggregated into the dimensions shown in Figure 1.

In the introduction, we proposed this research question: Does the adoption of a marketing automation solution result in overcoming or changing the scope of heuristics adopted by marketers? To answer, we examine the implications of the aggregate dimensions that emerged from the in-depth interviews and are depicted in Figure 1. The evolution of automation processes is characterized by the adoption of new technology-based tools. This is the first aggregate dimension that emerged from the in-depth interviews and it has an impact on decision-making models, because it determines a different articulation of the decision-making process, according to the shift from model (a), of traditional decision-making, to model (b) adopted with the arrival of the first forms of marketing automation, to model (c) in the presence of ML-driven marketing automation. This evolution over time occurs at different speeds in different contexts depending on their characteristics. In other words, the impact of automation is influenced by the decision context, based on the elements underlying the second emerging aggregate dimension depicted in Figure 1.

An additional feature that impacts the decision model is the fact that by its nature ML processes may not be known to decision makers, the machine being the one to explore big data. The ML process, especially in the more advanced forms of AI, is such that the models used are not knowable by decision makers. For marketers in other words, the ML comes across as a "black box," whereby insights that come from AI systems may be considered without knowledge of the processes that generated them (third aggregate dimension in Figure 1). This adds further articulation to the decision-making process, because there is a need not to put the data analysis in direct hold with the marketing actions, if control is to be maintained by the human actor, who must be able to verify whether or not to follow up on the decision suggestion that emerged from the ML (as a black box) or whether to follow a different path.

An interesting aspect that can be discussed is the contrast between a widespread recognition of the potential of AI and a certain fear that the automated system based on complex algorithms can produce errors with potentially dramatic effects. Therefore, incorporating simple rules into the decision-making model can be seen as a controlling factor on the effects of using automated marketing systems. This integration can also be sought at the organizational level, generating moments of confrontation between computer scientists and experienced marketers. Managers' lack of trust in automated systems, to the extent that it is present, is a complex phenomenon in that it stems from a multiplicity of factors, including: lack of preparation and control; the presence of instinctive elements; knowledge of flaws or shortcomings in automated systems; and AI flaws/errors/accidents emerged as an interesting field of study for interviewees, as they occur with low probability but high impact. Tesla accidents are given as examples, which can have several origins including: (a) the failure to observe an element that was obvious to the human actor but escaped the data employed by the algorithm (an unfinished bridge that was instead terminated in the maps); (b) other incidents related to limitations in the data collection and processing and learning process, because not all the complexity of reality is captured or processed by an algorithm, as it may

reflect aspects that arose after the data formation that determined it in its current configuration (producing "black swans"). In this sense, our research makes an additional contribution to the study of limits in the willingness to collaborate between managers and AI (see Haesevoets *et al.*, 2021).

The automation of marketing activities accomplished through the use of AI and ML is itself an object on which judgment and choice formation for marketers is exercised. The integration of automation/AI/ML and human judgment and decision-making represents a terrain where the heuristics in marketers' adaptive toolbox can be applied. Heuristics are then used to form judgments on new topics, so the use of heuristics does not disappear but its scope changes, but there are additional elements. First, the use of heuristics to integrate human decision-making with automation processes is an area characterized by uncertainty, as it is new and becoming, given also the evolution of the automation process (Figure 1, first aggregate dimension emerging from the analysis of qualitative data). These conditions of variability make it important to use robust models for forming judgments and choices. Automation also does not have an impact that appears to depend greatly on the context of decisions (Figure 1, second aggregate dimension), and the relationship between automation process and model for decisions appears to be influenced by the task (Figure 1, third aggregate dimension).

Finally, a need for transparency may emerge from the perception of "black boxes" relative to ML. The relationship between marketing automation and decision-making is then influenced not only by the context, but by the nature of the task to which the marketer's decision refers (Figure 1, fourth aggregate dimension emerging from qualitative data analysis). This may be a strength for the adoption of heuristics in the integration of automation and human judgments and decision-making.

5.2 The scope of heuristics in the decision model

The presence of new marketing automation tools is perceived as a way to overcome the limitations (of data, time, computational capacity) that accompany traditional decision-making models (Jarrahi *et al.*, 2023). Specifically, with the new tools, we tend to overcome the typical forms of the model (a) depicted in Figure 2. However, overcoming the limits in data processing does not lead to overcoming the adoption of heuristics, when to shift them to some of the stages of the more articulated decision-making processes that are described in the three types of models represented in Figure 2. In other words, heuristics "move" to different stages of the decision-making model, so heuristics change the scope, which we have defined as the range of actual adoption of heuristics in decision-making processes. The emergence of marketing automation and the inclusion of AI in that field is an important trend at the companies of the actors interviewed. Some aspects emerge particularly strongly in the relation with the decision models, In other words, this adds steps to the decision model, which takes the more articulated form in (c) of Figure 2.

A first aspect of the relationship between marketing automation and decision models concerns the tasks assumed. Indeed, in some areas one can speak of replacement of the human decision maker, in repetitive and operational aspects such as e-mail marketing. In others, however, of prevalent consistency and importance, there is a theme of automation more in terms of integration than replacement of the human decision maker (Gigerenzer, 2022). This integration takes various forms. First, the human decision maker is an important factor in the process of evaluating the data that feed the system, both when he or she selects it directly and when he or she sets up the architecture of the big data production mechanism that then feeds the AI and ML systems that characterize the evolution of marketing automation. In this area one can find heuristic mechanisms used by actors at different levels of the decision-making process (Figure 2). In this case, the impact of marketing automation on
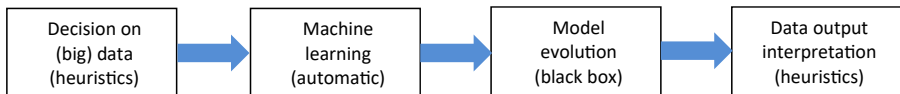
Traditional decision making

(a)
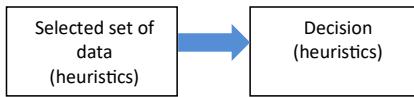
Marketing automation
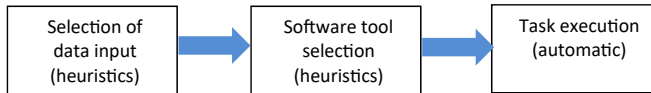
(b)

Marketing automation with machine learning

(c)

Note(s):
* An example of a setting for each of the three decision models:
(a) In the traditional setting the marketer uses experience data to identify a supplier of a component with whom to share information about a problem about a product. He has multiple possible suppliers but chooses to continue working with the one with whom he faced the last similar situation without having problems. Having retrieved the data on the previous situation (by recall) the marketer applies a continuity rule (heuristic of changing only if there is a reason)
(b) An automation setting corresponds to the introduction of social media presence management software in the marketer's company. One of the tasks of the software is to send an e-mail to customers who have a warranty on the expiring product to propose a renewal. To do there is an automated CRM solution. The marketer heuristically decides which data to consider (birthday) and which software to use among those available. Instead the execution of the task is left to the program (automatic).
(c) The marketer wants to employ a marketing automation system based on machine learning to recommend to his customers in a database the service that best suits their needs.to do this, he chooses through heuristics the database to use from those accessible. For example, it could predicate a database that recognizes (heuristic) The machine learning system learns a pattern from the data, and the latter may not be known to the marketer using the system, which is why we call it a "black box." Finally, the data proposed by the system is read as a proposal and the marketer can take action by selecting which messages to send and which not to send
Source(s): Author's elaboration

Figure 2.
Relations between data and decision model in different settings*

managerial decision-making does not imply abandoning the widespread use of heuristics but modifying their scope in terms of adoption and effectiveness. The arrival of automation and then AI and ML, leads from one decision-making model to another, but the new tools do not

exhaust the decision-making process. In fact, heuristics cover some parts of the decision-making model; they do not disappear but change their scope (in the transition between the models in Figure 2).

Figure 2 shows, for example, how possible decision models are present in the context of processes that integrate judgment formation and human decision-making with AI- and ML-based automated processes. The integration of automated marketing systems with the human component is particularly realized in defining the data to feed the automated system and subsequently the AI. In the interaction between systems and the human component, the latter makes use of rule learning that is basically heuristics integrated with the use of the new computer systems. We are still at a preliminary stage of AI adoption because marketers need time to learn the rules for effective management of the automated system. However, these rules include heuristic rules at various points in the marketing automation process, with a redefinition of scope understood as the scope of the rules.

In summary, for marketers, integration with automation processes in their decision-making generates a broad new terrain for forming judgments and choices in which favorable conditions for the use of heuristics seem to be present. The scope and effectiveness of such heuristics, or scope, appears subject to change due to the evolution of automation processes, dependence on context and task characteristics, and the black box character of the algorithm in use at the moment due to ML processes.

In the automation of marketing processes based increasingly on AI and ML, humans assume a controller/manager role, but before that they must work on the acceptance of the new processes both by customers and within the organization. Both for such control/management and to achieve such acceptance, transparency of the heuristics adopted can matter. The term "black box" is one that has traditionally been prevalent in the treatment of technology by economists, where technology has been the subject of an abstract type of treatment, locked in fact in a black box that is not opened and whose contents are not of a systematic type. In this case, the term "black box" identifies a topic, that of technology, which has long not been the subject of sufficient treatment (Rosenberg, 1994), but the term black box is adopted with reference to the lack of visibility, even if desired as transparency, on the stage of progress of the ML process (Katsikopoulos *et al.*, 2020).

The adoption of automatic marketing systems leads marketers to redefine the scope of the heuristic rules to which they previously referred, but without abandoning the use of these rules. For marketers, technological change is perceived as important, but the ability to learn and adapt is even more evident compared to the new environment in which automatic marketing systems emerge. The use of these new systems modifies the quantity and especially the quality of the decision-making tasks in terms of feeding the inputs into the new systems, controlling the functioning, and evaluating the results. In other words, rather than replacing heuristic rules, automation seems to change the field of use (scope) of the heuristic decision-making models.

The interviews highlighted some hypotheses for discussion and future research. One is that the relationship between data and decision-making appears reversed. While traditionally decisions were based on data (Figure 2, Part A), the emergence of marketing automation includes passages driven by heuristics (Figure 2, Part B). Finally, a situation emerges where the marketing automation system requires making decisions on which the data depend and on which subsequent decisions should then be based (Figure 2, Part C). In this decision-data-decision chain, the role of heuristics is still fundamental.

6. Limitations, managerial implications and conclusions
This paper has examined the relationship between marketing automation and marketers' decision-making models through a literature review and qualitative research on a sample of managers, entrepreneurs and expert consultants. The spread of automation systems

represents one of the major trends in contemporary marketing, and they exhibit particular effectiveness when integrated with the capabilities of human actors, which are naturally oriented toward the adoption of heuristic decision models. Accurate profiling of current customers should not preclude the search for new customers. Automation tends prospectively to integrate more advanced forms of AI and is capable of are greatly improved performance in both operational (e-mail marketing, abandoned cart management, recommendation systems) and strategic (segmentation and targeting, market knowledge management) marketing activities.

In terms of the contribution made by this paper, the research presented allows us to highlight the role of heuristics in the evolution of decision-making models in marketing automation, offering a new perspective both for research on the role of heuristics in marketing and management (Bingham *et al.*, 2019; Gigerenzer, 2022; Luan *et al.*, 2019), and in the interface between AI and management in terms of automation and augmentation (Haesevoets *et al.*, 2021; Leyer and Schneider, 2021; Raisch and Krakowski, 2021).

Acknowledging the limitations of this paper, we briefly indicate those that appear to us to be the most relevant, which at the same time represent future lines of research. A first limitation relates to the very nature of the fast-moving topic, for which it is difficult to capture essential traits that can quickly become obsolete. For example, important innovations, albeit still at the level of experimentation, such as large language modelling as ChatGPT, have arrived in the context of the study's elaboration, which may challenge some of the views expressed by managers and entrepreneurs interviewed earlier about the relationship between processes of adopting new technologies for automating marketing tasks and the human component, with its associated heuristics in decision-making processes.

A second set of limitations concern the characteristics of the empirical investigation conducted. The paper uses the instrument of interviews with managers and entrepreneurs who are confronted with the topic of marketing process automation to see how it impacts decision-making models and the use of heuristics. This is justified by the exploratory slant of this research, which is not intended to characterize itself by a specific industry type/ marketing theme. To capture aspects of general value, the sample is intentionally not focused on a group (only entrepreneurs, for example) or a specific industry. This increased focus of the research could be done in the future to capture insights into specific contexts and defined types of decision-making tasks (e.g. marketing managers in advertising automation processes, with the adoption of programmatic forms of advertising). One limitation is also the fact that the respondents include only two women out of a set of 22, as evidenced by Table 1.

A third limitation concerns the issue of heuristics in the relationship between parts of the decision-making process managed directly by marketers and parts for which automated systems are used if heuristics are technically viewed as a decision-making model, they are in fact useable both by human decision makers and in the automation processes of marketing tasks. Another limitation concerns the distinction between issues that relate to marketing tasks and the role of marketers and aspects that are relevant more generally to the use of automated systems supported by AI tools In this study we focus on the issues of marketing automation, but some of the reflections are hardly confined to that area and take on a more general relevance.

With this in mind, the paper makes a contribution both on the theoretical level and for managers. On the theoretical level, the links between issues emerging from the impact of automation of marketing tasks and the decision-making models adopted by marketers are highlighted. This linkage results in a comparison of decision-making models that can also be proposed as a theoretical model that is the subject of future empirical testing conducted in research that may benefit from our exploration and theoretical approach. This paper offers new content on the relationship between decision making and marketing automation than is currently available in the literature (Hoffman *et al.*, 2022; Man Tang *et al.*, 2022).

The main contribution of this paper is precisely about focusing on the role that marketers' heuristics can play in the evolution of decision-making models consequent to automation and the use of AI. The focus on heuristics suggests attention to the context in which decision-making automation and augmentation is realized for marketers, with reference in the paper to the context of strategic marketing decisions (Raisch and Krakowski, 2021).

On a theoretical level, studies that have pointed to the existence of a knowledge gap on how augmentation should be conducted have focused on the forms of augmentation that can be adopted (Teodorescu et al., 2021). Instead, this study examined the type of decision-making with reference to the specific problems of marketing automation and the adoption of a perspective that examines the use of heuristic decision-making models by human decision makers. This focus on the role of heuristic models adopted by human marketers for decision-making in automation processes represents an element of originality and proposes the importance of taking into account specific contexts and issues as well as general perspectives in the relationship between AI and humans in integration models and from the perspective of augmentation rather than replacement of managers (Leyer and Schneider, 2021).

Managerial implications relate to the availability of a schema with which to compare the problems experienced at the level of the decision-making model in adopting automated marketing systems in one's own business experience. There is a widespread perception of increasing advantage from AI because of its ability to handle large volumes of data: in the company experience of one interviewee (interview I04), a benefit to ROI of 400% is found. At the same time, however, it is noted that at present it is still not surpassing humans in performing some tasks. Humans themselves are seen as developing judgments and choices like an algorithm, but with much less capability than AI. Indeed, the paper can give practitioners a term of comparison and some guidance on how to redesign their decision-making processes following the automation of specific marketing tasks in their own organization (Jarrahi et al., 2023).

Further implications are relevant for managers engaged in taking advantage of new automation systems are often attracted by operational benefits. The use of new technologies that support the automation of marketing decisions enable the management of large information bases and promise to do so more efficiently on repetitive tasks such as selling and interacting with large numbers of customers in mass markets (Hoffman et al., 2022), but also in supplier-customer relationships in industrial markets (Rusthollkarhu et al., 2022). Managers, however, must always be aware that although the operational aspects are more obvious in the immediate term, the strategic aspects are more important in the long term. In particular, the structure of decision-making processes takes on significant strategic implications, and for this a clear vision of the decision-making model is needed. This paper makes a contribution in this regard, highlighting the role that concretely deployed tools such as heuristic models can play. A failure to assess the impact on decision systems can lead to company management may suffer at various levels, both because new automated systems are not free of problems anyway, and because old decision models still have advantages that should not be lost where they can be a strength. It is not enough to recognize augmentation; we need to see how to pursue it. That is why the explication of decision models and the role of heuristics in them we think can help and offer interesting managerial implications.

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Appendix

Code	Tools of marketing automation and artificial intelligence – Marketer's heuristics and their scope
I01	"We have a mechanism for scoring wines from our users; we then have the ability to understand what we can offer them by segmenting them perfectly for each type of wine ... The automation process is underway regarding mailing with Customers. The company has internally developed software that suggests wines to users based on learning about their tastes ... To operate in our field you have to be an expert, who knows the meaning of terms (for example, "acidity" of a wine). It is very important to know the topic to train users and tell them how to use the terms. Human input is always important, the machine cannot learn on its own, it is the human who has to tell the machine what to learn."
I02	"Marketing automation systems based on artificial intelligence give tangible and important benefits. This is the essential element. That said, some weaknesses must be taken into account, for example, the loss of a certain amount of accuracy of a kind provided by human intervention ... It must also be taken into account that an "on boarding period" is needed, in the sense that they are not immediately effective, they require a period of maturation for inclusion in the company. Companies need to be aware that these systems need some time to become effective in using the data. They use tools for the unification of browsing data, for example ... To embed marketing automation requires the courage to make mistakes and to learn. "
I03	"We have different marketing automation software, there has been a layering of systems ... By now marketing automation is a standard, for those who do operational marketing, it is a standard activity of our process, it is not in question. Today marketing automation is done as it is, but in the future I can't imagine marketing automation without machine learning ... Our company uses recommender systems, they are not yet based on machine learning systems ... There are still limitations, however ... A major pharmaceutical company had given an artificial intelligence system a dataset of sick people to figure out what was the best treatment, well the algorithm only proposed solutions that made the disease worse, but the problem was that the dataset was only sick people, and that was a mistake, while it was realized that the dataset should include both healthy and sick people ... Today this is trivial, but when you start we don't have that confidence. A great algorithm without good data is useless. "
I04	"The company has been adopting marketing automation tools for at least two and a half years, doing e-mail marketing, push notifications, sending sms, online advertising, social ... Some of these software require skills not only in marketing but also in data engineering and in some cases in information technology. There are advantages ... These are still tools that have positive effects, with really good effects on Roi (even a 400% positive effect on Roi) ... The company is not yet using artificial intelligence systems ... My experiences suggest that companies are still far behind in adopting artificial intelligence. Addressing it requires holding different business functions together ... Not all companies have this ability for cross-functional collaboration. Artificial intelligence is such that there is always a human behind it, The criteria on which artificial intelligence works are given by humans. "
I05	"Currently the company does not use marketing automation software, but we are thinking of implementing such solutions, for loyalty and engagement purposes. We are thinking in particular of developing the e-mail marketing part, which is not currently done .... Within the pharmaceutical environment these systems have to be very well built to avoid them going against ministerial and regulatory rules ... Artificial intelligence will be able to do many things but it does not go to replace the human part, because the more empathetic part is quite difficult to be replaced by the machine. The chatbot tool for example is only used internally. Artificial intelligence has simplified but mostly made some processes faster. "
I06	"My company has been using marketing automation software for at least four years, more specifically we use Emarsys, specifically for e-mail marketing and CRM. It is e-mail marketing software that has evolved by providing additional marketing automation elements. We use from the classic shopping cart abandonment e-mail to some more advanced e-mails that are based on the user's categories of interest, from products visited, to the proposal of personalized products for the user, then there are other automations based on the phase of the customer's life cycle ... Artificial intelligence software has then been included that allows personalization of the experience for the customer based on their specific characteristics... In our opinion at the moment, the voice experience of contacting a human is irreplaceable ... Machines over time will improve and surpass humans, however, we realized by adopting text-producing software that human-produced ones performed better. However, we think it is a matter of time. I am sure that an Artificial Intelligence System will be more efficient than a Human System. "

Table A1.
Representative quotes
from the interviews*

Code	Tools of marketing automation and artificial intelligence – Marketer's heuristics and their scope

I07 "I am head of marketing in my company, where I have been working for 12 years. We got a marketing automation system six months ago, we are still in a beta phase. We use the System mainly for e-mail marketing, where we employ them to profile the customer and facilitate customer journing. We think that the customer today expects to have a customization service even with respect to the journey in the online shopping experience . . . One disadvantage is that sometimes there is a kind of reluctance on the part of the customer to receive communications, so we have tried to give the customer as much transparency as possible of why they are receiving these communications, communicating the possibility to unsubscribe . . . Machine learning tools on advertising have evolved a lot . . . Those who use marketing automation by natural evolution will also have to use machine learning systems. It's not that this is good regardless of the type of business, though. "

I08 "For us today it is unthinkable to do marketing without marketing automation tools. We develop the tools in-house (from partners' proprietary software solutions and platforms) . . . We apply it to both marketing and product (raccomandation systems). Campaigns using artificial intelligence perform better than others because they are more responsive. One downside, however, is that you lose a little bit of control, you don't put more hands on it and to be precise. You have to treat artificial intelligence as a black box . . . We don't use ROI but we reason about the cost per acquisition. Space for creative is getting tighter and tighter, it remains less important in studio and post campaign . . . Sectors with small numbers (smes B2B, for example) have less need for automation, an algorithm with little data is less correct. "

I09 "We make use of marketing automation software not only for data collection and processing but also for use in workflow from a predictive and prescriptive perspective, for example in managing the "abandoned cart" in the purchasing process. Technology no longer passive tool but purposeful tool . . . The customer's life is simplified if we anticipate his needs. The customer can wish for the not having to think ("don't let me think"). First the data then creativity is developed. Creativity is enhanced by the data base developed by marketing automation. Machine learning is increasingly important for marketing automation. "

I10 "It is very important for us to do cleanup on the input data, considering only the data related to the orders that are sent to us. We have our own order-gathering systems and these create a history of data, basically using databases that are already built, being processed for the supplier relationship . . . There is a mix of using artificial intelligence and other tools. In our forecasting, the baseline is formed for me by the artificial intelligence . . . The human element is at a great advantage because it gets the mix already made by the artificial intelligence . . . I, however, wouldn't know how I would behave if the artificial intelligence told me that in a week's time a snow cyclone is coming and so now you have to tell production to make an extra production of snow tires, I wouldn't go about it exposing myself. If the prediction is then wrong I risk my career. "

I11 "We can acquire from online sales a lot of consumer data . . . It is then a matter of figuring out what to do with it, and that will take one or two years. Then there will be a phase that will be able to use them, so we will create a department that uses them. Then in the next few years, maybe after five years, we will be able to make product strategies, define offerings based on this data . . . To do this we need to attract new skills to the company, we need a digital agenda, the digital world needs to come more and more into the center of the company and our decisions, Data is being collected massively, but we need to figure out how to use it, and then we need empowerment, those who have the skills need to be empowered to influence the organization and make decisions. "

I12 "Network listening is an interesting terrain in which forms of artificial intelligence and machine learning can be employed. Our company has a proprietary platform (Buzztech) for listening. It started from this consideration: regardless of the development of technology, there is always the need for substantial human intervention. As much as one can tell about the magnificent virtues of technology, for example, sentiment continues to be an extraordinarily minefield for technology, especially when the texts are short, especially when the language is not English . . . Then there are problems of overinformation, one has to prioritize data and data sources . . . When we started in 2008, it was said that there were algorithms that would be able to handle sentiment in an automated way. It is now 2020 and there is no sign of those algorithms . . . Today it is hard to say what artificial intelligence will be capable in the future of doing. "

I13 "A first aspect is to make a previously initiated buying process come to tarmine (ed. The theme of the shopping cart abandonment . . . Automation imposes more planning in marketing activities . . . These systems are increasingly user friendly . . . The organization for this has to equip itself less and less with technicians and more and more with marketing figures, the technical aspect is better to buy it from outside than to develop it internally . . . Man-machine interaction is important. The machine on the one hand might make mistakes, but the man if he only draws on his traditional tools fails to have an evolution . . . One risk of the automated system, for example, is that if a customer enters the online system in a marketing automation flow to search for a product, even if he then re-enters to search for a different one he might still be read for the old search, and so he is offered something that maybe he is not looking for now. "

(*continued*)

Code	Tools of marketing automation and artificial intelligence – Marketer's heuristics and their scope
I14	"Digital technologies are of interest to luxury companies particularly for online retail. Behind every real-time response there is always a technological solution that has required an organizational commitment. Technologies that are integrated with those used in the online are now being incorporated into the offline store itself, and they enable the creation of databases and also support automation mechanisms (for example, for collecting purchase data and possibly profiling) . . . These systems integrate with the management of the other aspects, such as warehouse and management in general. There are technologies that are potentially still developable, such as even more advanced CRM management. "
I15	"The machine learning part is particularly important in our company, and it feeds into the data that we can collect about customers and that is collected not only online but through digitizing the data collected in the context of store stores . . . Going forward, we need to work on machine learning to gain predictive capacity of machines relative to customer behaviors. For this, we would like to put appropriate systems on all digital eyewear purchasing platforms soon. This is to be able to suggest to the consumer the eyewear that we think may be of interest from the journey that the consumer has made (reccomandation systems) . . . There is also an important part of developing the theme of augmented reality, which through glasses can access a mass of potential users. "
I16	"The mistake we can make is that we can superimpose a digitization hat on an old-fashioned company, this is not possible and is the reason why companies starting now have an advantage over traditional ones . . . These tools can give us the ability to develop appropriate promotions to our customer audience. Listening to customers is always key, the customer is ahead of the company, I don't think there will be, at least in our industry, a total dematerialization as has been believed at times. "
I17	"The issue of decision-making through the use of artificial intelligence systems using big data is affected by the market context in which decisions will have to be made. There are sectors, particularly in business to business, in which the numbers of operations, machines and customers are very low, and as a result the data base does not assume such large proportions as to create a suitable terrain for the application of big data analysis techniques . . . Another element to consider is the time at which the decision is made, which can have enormous weight. The sales part is one element within the big world of marketing. The marketing man is comparable in theater to the author and the impresario, the salesman is comparable to the actor. "
I18	"The online system we have cannot replace from our point of view the seller. Digital can never replace the human relationship with the seller . . . Artificial intelligence can help the customer by storing the preferred color type, so the color range is much wider and digitally manageable. Our goal is to empower our salesman, through artificial intelligence, which is a system that can help him and make him much more efficient. "
I19	"In luxury companies where retail is fundamental an important role in the development of automation mechanisms has been played by the endowment of tools, first tablets and then mobile phones, as an endowment of salespeople, capable of replacing the old paper catalogs of products, which being very numerous in companies with important luxury brands like ours, benefited from the support of the catalog to be identified . . . Salespeople have been endowed with these tools, The tools, however, which if on the one hand gave support to the sales activity, on the other hand have become doors from which to acquire and upload a large amount of data on sales processes. These applications that I called the "digital lookbook" sis evolved to a model of "clientèling" applications to all the activities you can do in front of a customer, integrating with sales systems. "
I20	"Digital is inescapable, the physical environment such as store management, for example, will increasingly be integrated as a producer of data that feeds into automated marketing processes . . . Starting with the historical is key to making forecasts and setting business plans, just as it is important to keep open because completely unexpected changes happen. "
I21	"Online retail is more exposed to forms of automation, but for our company, physical stores remain fundamental and there is still a dominant role there for personal contact with the salesperson and traditional selling . . . That's not to say, however, that there is no adoption of technology, but it is less visible technology. There are challenges in place for analyzing preferences or making recommendations. But not technology-for-technology proposal, because technology does not always give a real benefit. You have to respect a business value of technology, as well as regulations and compliance, for example on data management . . . You have to strike a balance. "
I22	"The benefits of digitization are that of greater knowledge of the customer and the implementation of a targeted offer . . . The major risks are that the remote use of these technologies risks losing sight of the customer and missing the contact with the customer that is lost sight of. The optimal way would be to combine these tools with qualitative analysis, which risks being lost. Touching the products is always important for the customer and therefore also for us. "

Table A1.