



Scope of heuristics and digitalization: the case of marketing automation

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Abstract

This paper focuses on the impact of digitalization and marketing automation on the “scope” of the heuristics adopted in the marketers’ decision-making processes. The “scope” refers to the decision-making contexts in which the use of the heuristic rules is diffuse and is effective. More precisely, “scope” is (the extension of) the field in which a heuristic can be applied (successfully). The article is based on evidence collected through ethnographic interviews with twenty-three experienced marketers to discuss the impact of marketing automation on the scope of heuristic rules in decision-making. The marketers interviewed make extensive use of heuristics to manage their tasks as emerged from previous exploratory research. The paper discusses how the field of application of marketing experts’ heuristics evolves as result of the digitalization and in particular of the use of automatic marketing systems. The adoption of the new automatic marketing tools modifies the task environment and the field of use of the traditional heuristic rules, but heuristics remain fundamental in the definition phase of the inputs for the automatic marketing systems, or for the interpretation of the output and therefore for the control of the marketing automation. The paper clarifies the concept of scope of heuristics and offers a rich description of the impact of marketing automation on scope.

Keywords Scope of heuristics · Marketing automation · Digitalization · Ethnographic interviews · Marketers’ heuristics · Adaptive toolbox

1 Introduction

“Marketing automation” means automatic support for marketing decisions in the digital task environment (Little 2001; Heimbach et al. 2015). The central idea of marketing automation is to use models to cope with the large amount of data

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produced automatically because of digitalization of process in the business environment to react adaptively to customers, competitors and influencers behavior, to produce effective proposals, and getting preferences (Bucklin et al. 2002). To date, the heart of marketing automation has been recognized in an automatic customization of the marketing activities, an element that allows strengthening areas such as direct marketing and interaction (Heimbach et al. 2015: 130). The great availability of data allows the taking of decisions for marketing actions in an automatic form starting from parameters set using specific software and through the adoption of algorithms. These algorithms use the data inputs to produce predictions and behavior, sometimes almost in real time with respect to the production of the data (for example, analytical data from social media or search engines to activate promotions to specific online customers). The adoption of this support is important to face the speed with which market data is formed and used by marketers in the digital task environment (Hirt and Willmott 2014).

Heuristics define solutions to decision problems starting from one or a few “cues”. Research tested formal models of heuristics in specific cases showing they can perform better than complex and “information-intensive” decision models (Gigerenzer et al. 1999). Heuristics have been studied in the early research on artificial intelligence (Newell 1981; Simon 1995), and more recently they have been object of attention on different perspectives in organization behavior, strategic management, business and entrepreneurial decision-making (Artinger et al. 2015; Bingham et al. 2019; Guercini and Milanese 2020; Guercini et al. 2015, 2022; Loock and Hinnen 2015; Luan et al. 2019; Picone et al. 2021; Shepherd et al. 2015; Sinyard et al. 2020; Sull and Eisenhardt 2015).

In the literature, decision making processes include two, mutually exclusive types: rational decision making versus rule-based decision making (March 1994).

The “scope” of heuristic rules refers to the fit of the decision making rules with the context in a rule-based decision making. “Scope” is (the extension of) the field in which a heuristic can be applied (with success). Looking at the scope means shifting the attention from the accuracy of the decision making model (Gigerenzer and Gaissmaier 2011) to the borders of the context where it is effective (task environment). Emphasizing this aspect is crucial for at least two reasons that are particularly relevant to highlight in introducing the contribution this article intends to make (Grant and Pollock 2011). First, having in mind that there is a scope for heuristic rules offers an important key to the literature and the debate about whether their use is biased or smart. Second, having in mind that there is such a scope immediately highlights the existence of a gap on a topic that is fundamental to the study of heuristics in decision making processes. If “scope” can be translated as “rule environment,” then one can visualize and map the area of effectiveness as the intersection between task environment and rule environment, which is a terrain on which our study has the ambition to advance scholars’ understanding (Grant and Pollock 2011).

This paper intends to address this gap the context of marketing automation, focusing on the impact of digitalization and marketing automation on marketers’ heuristics scope. With reference to this subject, this paper is based on evidence collected with in-depth ethnographic interviews (Van Maanen 2011) with twenty-three

marketers (entrepreneurs, managers, marketing consultants). We consider a set of heuristics emerged from previous explorative research (multipliers, thresholds, calends), to discuss the impact of marketing automation on the scope of heuristic rules in decision-making. The marketers interviewed make extensive use of heuristics to deal with their tasks. The paper discusses how the scope of marketers' heuristics evolves. Questions for a research agenda are proposed: *How digitalization and the adoption of marketing automation systems impact on the models of decision adopted by marketers and specifically the scope of marketers' heuristics?*

The approach adopted in this paper is descriptive and non-prescriptive, taking into consideration how the decision changes "in the wild", understood as "large world", but in any case gathering useful elements for the subsequent formalization of the decision models adopted by decision makers (Katsikopoulos 2019), which are marketers in this case. The paper offers an exploration of the assessments made by managers, consultants and entrepreneurs, gathering clues on how digitalization, in the form of the adoption of automatic marketing systems impacts the decision models to which they can refer.

2 Concept of "scope", digitalization and the emergence of "marketing automation"

"Scope" is (the extension of) the field in which a heuristic rule can be applied (with success). In this sense, the scope of a heuristic decision making rule is a product of its fit to the context (Guercini 2019). Looking at the scope of a heuristic rule means shifting the attention from the accuracy of the decision-making model to the borders of the context where it is effective (task environment). In rule based decision making the logic of appropriateness and identity contrasts the logic of consequences and preferences of rational decision making (March 1994).

Focusing on the concept of ecological rationality, Gigerenzer (2019: 2) states that "a heuristic is ecologically rational to the degree that it is adapted to the structure of an environment". The change in the environment of the task, can have an impact on the scope of heuristic decision making process in different ways, for example by modifying:

- The perimeter of the rule's effectiveness;
- The perimeter of its possible adoption;
- The structure of the decision rules adopted;
- The structure of the toolbox adopted by the actor to get effectiveness (few heuristics with a large scope or many with a narrow scope).

These four ways that the scope can be modified are very promising and prompt several paths of investigation. For instance, the first two (the perimeter of the rule's effectiveness and the perimeter of its possible adoption) make the perfect research ground for exploring the "is versus ought" tension described by Gigerenzer (2019), as the perimeter of the rule's effectiveness measures the area where the heuristic ought to be used and the perimeter of its possible adoption measures the area where

the heuristic is/will be used. The exploratory research performed in this paper does not aim for detailing these aspects, but they suggest as an additional path for future research.

Let us now turn to consider the emergence of marketing automation as a disruptive phenomenon on marketing decision-making processes.

“*Marketing automation*” means automatic support for marketing decision in the digital task environment (Little 2001; Heimbach et al. 2015). Today the great availability of data allows the taking of decisions for marketing actions in an automatic form starting from parameters set using specific software and through the adoption of algorithms. These algorithms use the data inputs to produce decisions and behavior, sometimes almost in real time with respect to the production of the data (for example, analytical data from social media or search engines to activate promotions to specific online customers). The adoption of this support is important to face the speed with which market data is formed and used in the digital task environment (Hirt and Willmott 2014).

The central idea of marketing automation is to use models to cope with the large amount of data produced automatically to react adaptively to customers, competitors and influencers behavior, to produce more effective proposals, and to obtain preferences (Bucklin et al. 2002).

To date, the heart of marketing automation has been recognized in an automatic customization of the marketing mix activities, an element that allows strengthening areas such as direct marketing and marketing interaction (Heimbach et al. 2015: 130). Marketing automation has been related to IT, as “a segment of information systems dedicated to management of marketing and sales”. Its intent is to make more efficient the process and to measure all marketing and sales activities, at the same time, combining them with an individual customer, and their effect (Benhauer 2018).

In consultancy, for example, “marketing automation class systems are a natural response to real needs of contemporary marketing. Their most important capability is an ability to connect an individual customer with a series of activities which she or he underwent, and their effect” (Benhauer 2018, 6).

Automated marketing is positioned at a distinct level but integrated with artificial intelligence. The latter is defined as automatic support for Internet marketing decisions, and adopting automated marketing can improve the integration between artificial intelligence in the more comprehensive marketing processes (Cui and Curry 2005; Smith 2020). “Automated marketing decision support” can improve the productivity of strategic marketing players (Bucklin et al. 1998), freeing them from the constraints between emerging data and required actions. In artificial intelligence, the decision maker is also free from the need to formulate decision models (machine learning) by identifying the solution based on pre-established requirements, even in the most stratified and complex forms (deep learning).

The marketing environment is particularly exposed to the effects of digitalization (Brock and Von Wangenheim 2019). The change is vast and profound not only in regard to the tools that technology makes available to businesses and customers, but also as a result of a substantial and growing familiarity with the new environment that matures in society, becoming almost obvious for the new generations,

sometimes less fascinated but naturally close as “native” in the new digital context. Artificial intelligence in strategic marketing is embodied by what some authors have recently called “predictive machines” (Agrawal et al. 2018). These are means of carrying out forecasting and programming activities, a particularly complex area around which a debate has begun on the rules of reference (Armstrong et al. 2015). Artificial intelligence applied to marketing processes uses algorithms to interact with customers and improve understanding of the market and the processes that influence market players (customers, opinion leaders, other influencers, competitors). In the marketers’ experience, the availability of big data has long been the basis for automatic marketing decisions based on parameters set using appropriate software and adopting algorithms. The algorithms use the input data to produce predictions and actions directly, sometimes almost in real time compared to the phenomena that generate the data in input (for example, analytical data from social media or search engines to activate promotions for specific online customers). The adoption of this support has become an opportunity, but also a necessity in the new digital environment, because of the increasing adoption by competitors. In fact, this is also important from a competition perspective, since if data is available and timely decisions based on its use are not made, competitors could do so (Paschen et al. 2020).

Marketing automation is not just a “smart database marketing”, because it can use artificial intelligence to manage processes such as:

- Monitoring contact behavior on the internet;
- Generating contact segmentation;
- Managing e-mail marketing, customer relationship and contact management;
- Elaborating analytics, reports and playing advanced functionalities.

The automation of marketing processes is therefore an essential component of the integration of artificial intelligence into business processes, even for companies that do not originally have algorithm based business models (Ritter and Pedersen 2020).

3 Methodology

This paper focuses on the impact of digitalization on marketers’ heuristics scope. The impact of automation on marketing decision processes can take on the characteristics of the great challenge for which an important role has been recognized in exploratory methodologies which include those of an ethnographic matrix (Eisenhardt et al. 2016). In this paper the data source are *ethnographic interviews* (Van Maanen 2011) of 23 interviewees, that are business actors including managers of medium level, consultants and some top managers and entrepreneurs, in businesses of different sizes (mainly medium and large organization) and different industries (in luxury fashion and textiles, pharma, automotive-tyre, services, food etc.). An ethnographic interview is “an informal interview that takes place in a naturalistic setting and is often the result of participant observation. Researchers who are engaging in ethnography or acting as both participants and observers within a given community or context may utilize ethnographic interviews to find out more about the lives

and behaviors of community members” (Munz 2017, 460). Our interviews are ethnographic in nature because the interviewees are managers and entrepreneurs with whom there are relationships with the researcher, as former students at the university of participants in previous projects or with an established relationship with the researcher. Therefore there was an opportunity for interviewers to supplement the interview with observations of the naturalistic context in which the interviewees come to operate.

A profile of the interviewees is included in Table 1. Each interview were about 45–60 min. Every contact was interviewed once or more than once on the subject, between April and November 2019. This means that the phenomena induced by the pandemic, with their implications also for the role of digital technologies, did not have an impact on the contents of the interviews with the same university research group and have been interviewed even before the survey period. Nine of the interviewees have been involved in previous projects with the same university research group and have been interviewed for other researches before the survey period. The author interviewed them directly or was supported by collaborators who made recordings starting from an agreed protocol.

The interview protocol dealt with the following steps:

- (1) Most important *decision-making tasks* faced by managers with respect to marketing issues;
- (2) *Methods traditionally used to address the decision problem*;
- (3) Contribution to the *organization’s marketing decision processes*;
- (4) *Automation tools applied* in the company;
- (5) *Impact of marketing automation tools* (perceived) on their work as managers and on the individual and organizational decision processes.

The interview protocol included a short introduction and discussion of “building blocks” of decision rules adopted (Gigerenzer and Brighton 2009), this to give a base for future test of formal model of heuristics (Gigerenzer 2019). In particular, it was required:

- (a) The main source of data input for decision-making (*search rule*);
- (b) When data was sufficient to make decisions (*stopping rule*);
- (c) The type of applied decision rule (*decision rule*).

Not all respondents worked in the marketing department of their business, but all were *involved in decision-making processes relevant to the marketing activity* and came into contact with the discussed automation processes.

In total data were collected in 26 interview sessions (in three cases the interview was divided in two sessions) and more than 20 h of interviews. Some results are provided, both as tales (using quotes) and interpretation. The extensive textual material produced was selected to report descriptions of the rules used to manage the decision-making process. The interviews represent extensive material that is being further expanded as part of a research project of which this article is an initial result.

Table 1 List of interviewees on decision making rules and digitalization impact

Code	Profile	Position	Company	Turnover	Client	Top data source*
R01	Male, 45 yo	Web marketing director	Online fashion retailer	€ 121 million in 2018	Consumer	Web analytics and customer care
R02	Male, 54 yo	Commercial director	Textile manufacturer	€ 53 million in 2018	Business	Trade show and meetings with agents
R03	Male, 43 yo	Sourcing director	Luxury fashion brand	£ 2720 million in 2018/19	Business	Report & meeting with vendors and suppliers
R04	Female, 35 yo	IT sales senior manager	Luxury fashion brand	€ 1494 million in 2018/19	Consumer	Web analytics and physical stores
R05	Male, 48 yo	Marketing director	Bio-pharma	€ 688 million in 2018	Mixed	Meeting with vendors and suppliers
R06	Male, 45 yo	Digital sales director	Eyes-wear product & retail	€ 8929 million in 2018	Consumer	Web analytics and physical stores
R07	Male, 50 yo	Chief executive officer	Textile manufacturer	€ 21 million in 2018	Business	Meeting with clients and suppliers
R08	Male, 40 yo	Chief technology officer	Luxury fashion brand	\$ 1360 million in 2018	Consumer	Web analytics and physical stores
R09	Male, 45 yo	Regional sales director	Luxury fashion brand	\$ 1344 million in 2018/19	Consumer	Web analytics and physical stores
R10	Male, 43 yo	Entrepreneur founder	Online advertising	> \$ 20 million in 2018	Business	Contextual advertising publisher portfolio
R11	Male, 39 yo	Chief digital innovation	Luxury fashion brand	€ 1349 million in 2018	Consumer	Web analytics and physical stores
R12	Male, 38 yo	Chief digital marketing	Publisher	€ 214 million in 2018	Consumer	Web analytics and physical stores
R13	Male, 32 yo	IT and service manager	Luxury fashion brand	€ 730 million in 2017	Consumer	Web analytics and physical stores
R14	Male, 34 yo	Head demand planning	Tire manufacturer	¥ 3650 billion in 2018	Mixed	Machine learning and human experience
R15	Male, 52 yo	Chief financial officer region	Food chocolate	€ 10,903 million in 2017/18	Consumer	Financial data on sales—sell in & sell out
R16	Male, 55 yo	Retail real estate director	Specialty fashion brand	\$ 1429 million in 2019/20	Consumer	Meeting with clients and suppliers
R17	Male, 48 yo	Innovation manager	Specialty fashion brand	€ 622 million in 2017	Consumer	Web analytics and physical stores
R18	Male, 51 yo	Head of retail training	Luxury fashion brand	€ 2114 million in 2018	Consumer	Meeting with store managers and vendors
R19	Male, 38 yo	Senior manager	Real estate agency	€ 06 million in 2018	Mixed	Meeting with clients and suppliers
R20	Female, 51 yo	Owner ex sales director	Textile manufacturer	€ 21 million in 2018	Business	Meeting with clients and suppliers
R21	Female, 55 yo	Head of IT retail & CRM	Luxury fashion brand	€ 530 million in 2018	Consumer	Web analytics and store managers
R22	Male, 47 yo	Head digital marketing	Luxury fashion brand	€ 61 million in 2017	Consumer	Web analytics and sales managers
R23	Male, 53 yo	Marketing consultant	Eyes-wear trade retail	<€ 1 million in 2018	Mixed	Meeting with vendors and suppliers

Each contact was interviewed from one to three times on the subject, between April and November 2019;

*Indicated by the interviewee in the interview

The results of the interviews were analyzed through a process of content selection to identify elements that can help answer the research question. In the following sections these results are presented providing a rich picture of an interesting phenomenon: how a disruption (marketing automation) changes the heuristic decision-making environment, especially in a domain (marketing) where experience-based heuristics are used to create competitive advantage. The interview excerpts are insightful and describe the status quo in the chosen field. The purpose of this type of exploratory research in a nascent field is to build theory (Eisenhardt et al. 2016).

4 The impact for marketers' decision making

With reference to the interviewees and with respect to their organizations, the *decision areas* on which the impact of the insertion of automatic marketing tools seems to be greater include at least the following three areas:

- (1) *Sale forecast and demand planning*;
- (2) *Segmenting and targeting* the clients;
- (3) *Promotion campaigns*, direct marketing and communication.

Marketing automation tools are diffused in the businesses, some are very general (as applications of IBM's Watson) others more specific (for example, for demand planning in business contexts, SAP APO, OMP Partners, JDI) (Skiera and About Nabou 2013).

The organizations adopting new marketing automation tools are experiencing a transition phase, but it is clear that the internal logic of the new systems represent "black boxes" for many of those who make the most important decisions. The data sources (search rules) indicated as the most important for decisions differ from company to company, and they are influenced by contextual elements (sectors, company size, type of customer, role of the interviewed manager ...).

Sources indicated include from more traditional report and personal interaction (meetings), to more recent forms of big data (analytics), through data shared with other managers and players (vendors, suppliers, clients etc.). The kind of data required for decision making (stopping rules) seems to be often specific to the situation; when it is linked to personal interaction it is accompanied by an assessment of the degree of trust of the source. An example of this is provided in the following passage of one of the interviews (here and after, the respondents are identified with the codes shown in Fig. 1):

... today our sector [luxury fashion] is still little exposed to the use of marketing automation and more in general to artificial intelligence in the relationship with suppliers, but things are changing quickly ... there are store data, which with the new in-store technologies are captured on individual customers ... there are the data of the e-commerce that becomes increasingly important and that is already a dominant channel in some countries and for some customer

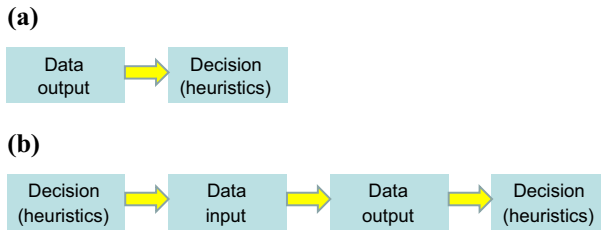


Fig. 1 Key relations between data and decision model in traditional (a) and automated (b) marketing

segments ... systems can be implemented, but at the moment their weight in my work is limited ... (R03)

An example of automation in sales forecast and demand planning is given by the following excerpts from interviews (two) to the interviewee R14:

My work is based on big data, I am responsible for product planning, for all that is the tire forecast for the whole EMEA, so 90% of it is based on historical data, there are statistical systems, real and own statistical engines, also including some machine learning capabilities, which analyze the data and then give what is called a baseline, a proposal. We are really spotted on the subject ...
 ... we always have to deal with traditional methods ... in particular multipliers, so we have to sell 10% or 5% more than last year ... then everything that big data gets to process is then transformed to see if it goes or not in the direction where we want ... The plan is managed so that the result goes in the direction in which the company wants to go ... (R14)

An example of automation in promotion and database marketing is given by the following excerpts from interviews (two) to the interviewee R15:

In our experience, we are using automatic marketing trying to maintain a stable relationship with the flow of users that is generated, automatically with SEO or that we bring to us through direct marketing campaigns, bringing the users into a journey, a guided journey with different times and also in different touch points where the users go to tell something or react to cause a conversion, which can generate either the enrichment of an existing data or the creation of a new profile, of a new user, as a pure lead generation activity and for categorizing ... or creating real conversions directly ... for example, there are users who insert something in the e-commerce "cart" that can be automatically identified to be recipients of promotional initiatives ... (R12)

At times, because of learning processes, the machine can "know" something about customers that human management no longer detects directly. Are segmentation and targeting realized automatically still "strategic"? In the words of one of the interviewees, emerge as targeting remain a task for management despite the introduction of new automated marketing tools:

... this is a very difficult aspect where you come up against any company level ... a company manager thinks that they know what is the best for the users ... a publisher in a particular way ... in the company we have not activated machine learning processes and we have not activated them because we find a very strong ... it can be very difficult to understand why a user bought a book from a tennis champion ... if he is a fan of biographies, I do a mistake if I offer him another book on sport ... if I offer him other books with biographies I could be wrong because he is interested only in the one for his emotional charge ... being able to find predictive systems of suggestion on purchases, in publishing, is quite complicated ... (R12)

“Machine learning tools are in a path where traditional decision-making methods (heuristics) remain ... above all the fact that, speaking at a high level, management always needs traditional approaches...”, as heuristic rules “... does not understand the power of machine learning or big data, or at least does not fully understand its capabilities, so there is always an almost primordial need to rely on the summary as a multiplier, for this to be transformed into information, data are not taken as they are with faith on their capacity” (R19). The alternative would be to rely on an advanced learning machine that manages the decision.

In some cases, the statistical performances may be better or better than those of the human evaluation, but not always ... we have tools that compare the action proposed by the big data and then can be integrated with a “manual” action, to see what benefits or evil spells the latter might have proposed ... (R14)

Our task is to formulate sales forecasts ... there is a system that we use, which specifically is OMP Partners, which works as a data collector that offers to physical, human planners the ability to enter their own numbers ... (R21)

... However, these systems also produce, through a statistical engine ... for which I can't tell you the details of the algorithm ... but that is managed during the roll-out of the system together with the supplier, which is adapted because the inputs are different from sector to sector, taking into account seasonality factors, industry and product typicality with many parameters ... there are also other systems, machine learning, that do nothing but compare so many different inputs, and then choose the most common one, the one that we have it work like this. For example, ask 250 planning tools or different tools, and then choose the most common one ... (R14).

5 Discussion and some conclusions

This paper explores the scope of heuristics, defined as the extension of the field in which a heuristic can be successfully applied. This concept clarifies and enriches the concept of ecological rationality/ecological fitness (Gigerenzer 2008, 2016; Gigerenzer and Brighton 2009; Gigerenzer and Gaissmaier 2011; Hafenbrädl et al. 2016; Mousavi et al. 2017) and offers a necessary boundary condition for studies on

competitive testing of heuristics (Gigerenzer 2016). The research question is "How digitalization and the adoption of marketing automation systems impact the models of decision adopted by marketers and specifically the scope of marketers' heuristics?" and we use ethnographic interviews to propose three propositions.

The digitization and adoption of automatic marketing systems leads marketers to redefine the scope of adoption of the heuristic rules to which they previously referred, but do not lead to an abandonment of the use of these rules. For marketers, technological change is perceived to be important, but the ability to learn and adapt is even more evident compared to the new environment in which digitalization and automatic marketing systems are used. The use of these new systems modifies the quantity and even more the quality of the decision-making tasks, both to feed the inputs of the new systems and to control their functioning and evaluate their results. In other words, rather than replacing the adoption of heuristic rules, digitalization seems to change the field of use (scope) of heuristic decision-making models. In this context, marketers perceive the need to integrate their skills with those of other specialists (data scientists), but also to maintain a comparison with the methods learned in previous experiences.

Some tales of the interviewees put in evidence hypotheses and possible objects of discussion and future research. One is about the relationship between data and decision appears reversed. While traditionally we have data on which decisions are based (Fig. 1, part a), here a situation would seem to emerge in which the use of systems requires the taking of decisions on which data depend, on which subsequent decisions should then be based (Fig. 1, part b). In this chain of decision-data-decisions the role of heuristics can change but remain fundamental.

A second point is the *lack of confidence on the part of managers* is linked to the fear that the automatic system based on complex algorithms will produce errors, sometimes can be sensational and with high impact. This is balanced by the fact that *there is always a need to confront wit simple rules*—even in the most massive forms of automated marketing systems. The *lack of confidence of managers in automated systems*, however, to the extent that it is present, is connected to various factors:

- (1) *Lack of preparation and control*;
- (2) *The presence of instinctive elements*;
- (3) *Knowledge of situations of flaw* in which automatic systems have revealed gaps.

The *study of AI flaws/errors/accidents* became an interesting field for the interviewees. They can have low probability but high impact. An example is given of the accidents carried out by Tesla, including:

- (a) Incidents related to the *failure to see an element* that was obvious to the human actor, but escaped basic data and algorithm (a bridge not terminated, which in the maps was terminated);
- (b) Other incidents related to *a way of elaborating on data* in which there are flaws, because not all the complexity of reality is captured by an algorithm, even if this includes many parameters.

The shift of heuristics' purpose from making the marketing decision to deciding how to use digital data (the search and stopping rules) and to double-check automated algorithms (the decision rule) is a perfect example of the resilience of heuristic decision-making in front of automated algorithms (as described in the three propositions). This resilience can be detailed in a model that includes "scope", which can further and enrich our understanding of the relationship between heuristics and more complex methods (Gigerenzer and Gaissmaier 2011).

In conclusion, as a contribution to the definition of such a model, we propose a series of propositions that can be considered as hypotheses to be verified/tested in future research:

P1—the impact of marketing automation on managerial decision making does not see the widespread use of heuristics being overcome but a modification of their scope, in terms of the scope of adoption and effectiveness;

P2—the structure of the heuristics adopted (building block) integrates with cues that can derive from the automatic system, as well as rules aimed at integrating the processes of automatic marketing as a control element to reduce the flaws/errors/incidents, which can be rare but abnormal and harmful;

P3—the marketing automation based on big data sees low cost output data, while the input data becomes object of particular attention as this object of decision (heuristics), for which the relationship between data and decision can reconfigure itself, seeing increasingly the first object of decision even before being the basis for decisions.

Further research may include testing these three propositions.

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Declarations

Conflict of interest The author declares that he has no conflict of interest.

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