

Simulation Business Games in the Research of Marketing Managers' Decision Making Process

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Abstract

Simulation business games might be suitable research tool to develop knowledge of how marketing managers make their decisions, the area of research still underdeveloped in marketing. The quality of these decisions is single most important factor determining how successful marketing management of a company would be. Marketing decision making process and its results are determined by vast number of factors, with complex interrelationships between them, which implies high levels of risk associated with these decisions. Little is still known what leads to good or bad decisions, and our understanding of the underlying processes is very limited. Better understanding of how marketing managers make their decisions is crucial to develop appropriate support tools and systems. Complex cognitive processes are very difficult to be researched with traditional empirical methods, such as surveys or interviews. Simulation business games allow observation and measurement of decision makers in "known environment", which is controllable and complex enough to emulate real life. Dickinson et al. (2004) argue that simulation business games not only allow investigation of complex phenomena, but also their observation in different timeframes. The aim of this paper is to provide a critical analysis of potential and limitations of simulation business games as research tool to investigate decision making process of marketing managers, based on the analysis of the existing literature. The concept, limitations and potential of simulation business games are identified in this article. Selected proprietary simulation business games are compared to identify what types of marketing decisions can be investigated with them. Simulation business games, although criticized for limited mundane realism and validity, are useful research instruments, allowing investigation of complex decision making processes, and their potential has not yet been exploited sufficiently.

Keywords: simulation business games, marketing decisions, decision making process.

JEL classification: M31.

1. Introduction

One of the most important problems that management and organization researchers face is the choice of the most appropriate research method for the observed phenomenon. Harrison et al. (2007, p. 1229) argue that one can choose between theoretical analysis and deduction, or empirical analysis and induction. The first alternative implies questionable validity of the conclusions, which might require further empirical inquiry. When the second alternative is concerned, the problem is accessibility of data from companies. Even if reliable data is available, the most appropriate method of data gathering and analysis must be carefully chosen. Three groups of factors determine such choice (McGrath, 1982): possibility to generalize the conclusions based on the sample; the extent of control and precision of the analysis of a phenomenon, and the realism of the setting in which sample was subject to inquiry. All these methodological problems are magnified when the researched phenomena are as complex as decision making processes, with all their complexity and often longitudinal character. An ideal approach to research decisions would be direct investigation of the responsible people in their immediate organizational contexts. However, such opportunity is hardly offered to researchers: the access to informants is difficult, some crucial data can be confidential, and time for study limited. When secondary data is available, its reliability and completeness could be questioned (Harrison et al., 2007). Company records do not provide insight into decision making process itself, rather they reveal consequences of selected inputs in the outputs measured. Surveys on the other hand do not allow in-depth inquiry of more complex phenomena, as a researcher must optimize the content and number of questions. Another problem with this classic research method is location of right respondents. Saunders and Thompson (1980) proposed laboratory experiment as an

alternative method. Keys and Wolfe (1990) identify, however, certain limitations of experimental research, resulting from replication of the real world in the artificial setting.

A laboratory experiment can be defined as experiment in which conditions of external environment are artificially replicated (Diagues- Barreiro et al., 2011). This allows observation, analysis and replication of the researched phenomena. Hence, through laboratory experiments, an observation of simplified replicas of conditions or phenomena occurring in organizations is possible. These conditions or phenomena can be replicated either through case studies, games designed purposely for researching behaviors of individuals or teams (not necessarily computerized), or simulation business games (Diagues- Barreiro et al., 2011). The objective of this paper is to critically evaluate how the latter ones as research tool in laboratory experiments in marketing research.

2. The notion of a simulation business game

The notions of “decision games” or “simulation games” are not precisely defined in the literature. As noted by Wardaszko (2013a, p. 33) “in the literature (...) one finds silent assumption that the reader knows what a simulation game is”. Therefore, terms such as “management simulations”, “business simulations”, “game simulations”, “managerial games”, “games” or “simulations” are used synonymously and interchangeably. In this paper the term “simulation business game” is used, which reflects the nature of this tool best, as it includes the key components: simulated context of business decisions (usually in the form of market or markets), and framework of a game.

Simulation should be understood as a simplified replica of the observable business reality, reflecting the conditions of real environment in simplified way. One must note that there is a difference between simulation business games and computer modelling. Both are based on mathematical simulation. Computer modelling relies on simulation to generate a model explaining relationships between variables without participation of research subjects (players). Games, on the other hand, use simulation to replicate an environment in which subjects (players) are placed, and their behaviors observed. The essence of a decision game is active participation of subjects (players) in simulation moderated by an arbiter. Keys and Wolf (1990) argue that this type of games aim to create experimental environment, in which behavioral changes take place, participants learn, and researcher has opportunity to observe their behaviors. Therefore, simulation business games constitute a specific exercise, in which individuals or teams of individuals compete against each other to achieve predetermined goals, pursued with their skills and experiences, with specific behaviors manifesting themselves. As such, a game of this type is a sequence of decisions, organized in specified number of decision rounds and played according to a scenario. The decisions made by players affect decisions of other players and influence results achieved by other players. There are many taxonomies of games proposed in the literature (Greco et al., 2013), which can be classified according to the scope, the role played by an arbiter (game’s administrator), the amount of information available to players, time of feedback’s availability, the level of interdependencies between players or teams, decision sequence patterns, time horizon of a game, and possibilities to make decisions generating immediate effects or effects delayed in time. Currently, game pedagogy and research are dominated by computerized games, in which players take roles of decision makers in organizations, and this type of games is locus of this paper.

Simulation business games are integral part of management education nowadays. As pedagogical tool they enjoy growing popularity. Almost every MBA program offers at least one module in which students play business simulation (Greco et al., 2013). Simulation business games are highly regarded as instructional tool, and one should expect the growth of their importance in pedagogy. Two factors seem to have contributed to this. First, integrating simulation business games into curricula accommodates the current trends in education, such as digital – based- learning, which, in turn, reflects the growing importance of experiential learning in general. These developments are in line with the demands and expectations of the new generation of students, who are considered to be digital- natives, with computer technologies and virtual environment being fully integrated into their lives (Girard et al., 2012). The second factor is accelerating developments in the game technology itself, in result of which games became more

sophisticated, with algorithms more capable of reflecting complex decision contexts, and thus simulating market conditions much more realistically. Less popular application of simulation business games, identified as early as in the sixties of the previous century, is using them as research tool (Cohen and Rhenman, 1961).

As research method, simulation business games position themselves between life case study and more universalistic research methods, such as surveys or in- depth- interviews (Wardaszko, 2013a). Although simulation business games have been available for more than three decades, they have not been widely used as research tool. The literature is rather limited and it is far from precision. The majority of authors seem not to differentiate between research related to games themselves and simulation business games as research method per se, that is simulation business games as an integrated research system. The research stream focusing on games is rich and concentrates on such problems like learning process and its outcomes, or participants' attitudes. Recently, a comprehensive review of research on game- based learning was presented by Qian and Clark (2016). Their review illustrates very well the richness and maturity of this research stream, which cannot be said about research using simulation business games as research method. In the literature it is difficult to locate full descriptions of such research approach, with the notable exceptions of Gatignon (1987) or Meijer (2009). In the most of publications reporting empirical findings gathered simulation business games, methodological aspects did not, unfortunately, receive detailed attention. Moreover, the majority of these studies used Markstrat simulation business game, which, judging just by the number of publications, constitutes standard not only in pedagogy, but also in basic research. Gatignon (1987) provided synthetic analysis of Markstrat's research potential and identified possible areas for inquiry. This game was also subject to analysis by Dickinson et al. (2004). Diagues-Barrerio et al. (2011) provided in- depth analysis of games' potential and limitations in both types of research, presenting different perspectives and key methodological problems. This is however rather limited body of knowledge, and problems related to application of games as research tools have not yet been sufficiently addressed.

3. Specificity of marketing decisions

Marketing decisions are "conscious process of introducing changes into the area of marketing, in order to achieve the desired outcomes in result of rational analysis of situation, based on decision maker's experience, intuition and/ or purposely acquired information" (Garbarski et al., 2011, p. 90). These decisions concern all aspects and areas of marketing activity in an organization (Leeflang and Wittink, 2000). In particular, marketing decision making process focuses on defining goals and directions for marketing activities. An important question is what makes marketing decision making different to decision making in other areas of company's management, such as finance or human resources, that is why it deserves special research attention. According to Wierenga (2011) marketing management involves a unique combination of "hard data and soft judgment" (p. 91). When hard data is concerned, marketing managers can rely on sophisticated quantitative techniques, such as marketing research, big data analysis, just to name a few. In the last decades technological developments enhanced accessibility and richness of hard data available to marketing managers. However, to be actionable, this data requires managerial reasoning, based on judgment and intuition, building on experience and expertise. For each single decision, marketing decision maker must consider considerable number of factors, many of which, like customer reactions or competitive actions, are highly unpredictable. The hard data available from growing number of sources cannot inform the manager what is the best alternative (Wierenga, 2011). This is a specific feature of marketing as such- numerous alternative courses of action emerge within the constraints of the same set of internal and external factors. Marketing managers decisions result at the end from a combination of factual information and subjective judgment. Furthermore, marketing managers usually have extensive experience and knowledge about their particular field. As Wierenga (2011) points, this expertise is domain-specific and difficult to transfer to another field (Glaser and Strauss, 1967). Another important distinction of marketing management is its context. Marketing decision making usually is structured by the marketing mix variables, and is led by the notions of effectiveness and efficiency (Wierenga, 2011). The context for marketing decisions is particularly rich one, including relationships with consumers, competitors, suppliers

of marketing services, influences of market trends, and many more. Although there are general principles and rules of marketing, as well as general principles of human cognition, it should be investigated how these principles direct behaviors in the context of marketing decisions.

Wierenga (2011) provided a comprehensive review of research methods for managerial decision making in marketing, including traditional methods such as interviews, surveys and cases studies, and less commonly applied such as monitoring and observation, experiments in behavioral laboratories, field experiments, and physiological observations (such as brain scanning). The first four methods mentioned generate mainly descriptive data that might not provide meaningful insight into causality. Such possibilities are allowed by more experimental approaches, though.

4. Advantages of using simulation business games in research

One of the most important advantages offered by simulation business games is possibility to observe behaviors of decision makers in “known environment”, that a researcher is able to control. Simulations allow much more precise measurement of behaviors than field research, because the observed subjects make their decisions in a closed environment, and decisions with similar patterns are repeated in time (Keys and Wolfe, 1990). Simulation business games replicate environments sufficiently complex, realistic and repeatable, thus constituting a specific kind of a “micro - world”, which a researcher can manipulate, depending on his or her needs, generating controllable and replicating experiments (Wardaszko, 2013a). The characteristics of the emulated environment are fully known to a researcher, which allows to identify causal relationships between an organization and its environment, to extent impossible to be achieved in field research (Lant and Montgomery, 1989). A researcher can not only control the selection of experiment's participants, choosing specified group of players, but also secure the desired diversity of the researched group through specific composition of positions, responsibilities, business functions and industries represented in a simulation business game. Typically, sampling for research with simulation business games is purposive, for the achieved effect to be a controllable factor.

With high level of control over simulation business game and its course, a researcher can manipulate variables in a game and its course. This properties make a simulation business game de facto a laboratory experiment, although some researchers classify it between field research and laboratory experiment (Gentry et al., 1984). Moreover, because of the high level of control, simulation business games allow generating stable results (internal validity), at the same time securing sufficient level of realism (external validity). Although games do not allow to research individual cognitive process, they provide an opportunity to research problems related to decision making process in an organization (Bass, 1964). Wierenga (2011) points that through games we can gather information regarding what decision makers do, but not so about individual mental process. This is true when simple decision making is considered, which is treated as a black box. However, research in the areas such as dynamic decision science, complex problem solving (Funke, 1995; Gonzalez et al., 2004), systems thinking (Booth- Sweeney and Sterman, 2000; Senge, 1990), and naturalistic decision making (Lipshitz et al., 2001) suggests that simulation and experiments are suitable to investigate complex and joint decision making processes.

In the majority of empirical studies that used simulation business games, subject to research were students (predominantly MBA). According to specialists in this field, players do not perceive participation in simulation business games as participation in a laboratory experiment, but rather in a life case – study (Wardaszko, 2013b). Games allow generating more natural results, and selecting diversified group of players has positive effect on generalizability of the achieved results. As noted earlier, the most often used simulation business game as research method is Markstrat, which is regarded as a suitable research tool. The most interesting empirical studies reported so far include research on influence of information availability and timing on decision makers' behaviors by Glazer et al. (1992). Markstrat was used also by Van Bruggen et al. (1996) to analyze the effectiveness of the decision support systems in marketing. A very interesting research with simulation business games was conducted by Keil et al. (2001) who investigated how goals and frequency of evaluation of managers affected their price decisions. Lim and Pathak (2013) have recently used simulation business game to investigate the phenomenon of “competitive paranoia”

among managers, that is the bias in patterns of evaluation of competitors' behaviors in the market. Probably the most extensive body of knowledge exists in the area of managerial learning, for investigation of which simulation business games seem to be particularly suited. A comprehensive reviews of the studies published in this area were recently presented by Qian and Clark (2016). According to Dickinson et al. (2004) simulation business games allow investigation of longitudinal phenomena, for example strategies on different stages of organization's development; in general, many proprietary games replicate long- term conditions, allowing optimal experiences of players.

Simulation business games can be used both for exploratory and explanatory research studies. When exploratory studies are concerned, simulation business games are suitable for generating research hypotheses for further stages of research. This seems to be a popular approach, as indicated by relatively rich literature, dominated by qualitative studies (Mayer, 2009). One of such methodologies was proposed by Duke and Geurts (2004), who based their operationalization of the research process on Grounded Theory. Simulation business games are sporadically used in explanatory research for testing hypotheses. This is evident in the disciplines with the well-established research methodologies, such as economics or sociology. This is because of questionable replicability of the results of experimental research with simulation games, and identification of causal relationships. To sum up, the advantages of using simulation business games as research method include: high level of control, possibility to investigate phenomena too complex and too time- consuming to study with surveys and other more conventional research methods (such as strategy of decision making), high level of participants' involvement, time compression of longitudinal phenomena and easy replication of experiments. Table 1 presents selected proprietary simulation business games and the scope of marketing decisions that can be researched with them.

Name of a game	Game's mechanism	Marketing decisions and analyses (areas) made by participants
Marketplace	6-8 decision rounds 4 marketing variants, depending of the level of advancement (Introduction, Strategic, Advanced Strategic, Business Management); 6-8 decision rounds.	<ul style="list-style-type: none"> • Market opportunity analysis • Brand development • Advertising • Pricing • Sales force management • Profitability forecasting and analysis
CESIM SimBrand Marketing management, simulation game	5-12 decision rounds	<ul style="list-style-type: none"> • Segmentation • Positioning • Distribution channel investments • Advertising budget allocation • After sales services • Pricing, • Sales forecasting • Marketing research • Competitor analysis • R&D • Profitability forecasting and analysis
Markstrat	6-10 decision rounds	<ul style="list-style-type: none"> • Market segmentation • Product strategies • Marketing mix • R&D • Distribution • Market research
Topsim General Management Game	No purely marketing decisions present, but marketing decisions incorporated into broader managerial decisions; 4-8 decision rounds.	<ul style="list-style-type: none"> • Advertising budget, • Pricing • Sales forecasting • R&D • Profitability projections and analysis

Table 1. The scope of marketing decisions in the selected proprietary simulation business games

The first three games are strictly marketing games, with Cesim being the most advanced one. Topsim is a generalist managerial game, with selected modules of marketing decisions. All these games are flexible enough to incorporate, depending on the scenario, both short- term and long term marketing decisions. In all the cases, they allow testing the long term consequences of decisions made. The typical decision making interval is a year, which is equal to one round. However, a researcher can manipulate temporal factors with deciding on time for decisions, intervals between rounds just to name a few.

5. Limitations of simulation business games as research methods

One of the most important problems with simulation business games as a research method, is whether their results can be generalized. This can be brought to the two following issues: the realism of such experiments, and their validity. In the literature there is common agreement that simulation business games replicate realistically the context of joint decision making, but not necessarily organizational context (Keys and Wolfe, 1990). Even the most sophisticated or advanced games cannot replicate conditions of a specific company, nor of a market in consistent way. Some authors argue that as specific form of laboratory experiment, games do not adequately represent the real world. But this can be applied to laboratory experiments in general. So as method of primary research, they might not suffice to identify or define the key variables (Schwenk, 1982). Furthermore, there are two types of realism: mundane and experimental (Gentry et al., 1984). Mundane realism concerns the likelihood with which a situation replicated through an experiment might occur in the real world. Experimental realism concerns the extent to which the subject of research (players) consider the experiment to be serious or realistic. Mundane realism is always limited in simulation games. The algorithm of a game cannot account for all possible problems and complexities of the real business environment, in which actual decisions are made by marketing managers. This applies not only to strictly business problems, but also to underlying personal, “political”, organizational and psychological issues that constitute important canvas of any decision. One can accuse in- game decisions as free of risk and consequences (professional, financial, psychological or even image- related) that accompany any decision in the real world. However, research suggests that designing games as simulations and generating immersion effect, players do actually perceive risk. Moreover, decision patterns tend to be transferable, regardless they are made in a game or in the real world (Sterman, 1989; Gonzalez, 2004). In practice, the desired level of players’ involvement can be achieved through appropriate selection of motivational factors, such as goal setting, providing benchmark or competitors, as well as rewarding players after a game (Wardaszko, 2013b). The question whether people behave in experimental situations in the same or similar way as in the field is debated in many disciplines. The laboratory situation has an advantage of isolating variables of interest from possible confounding factors, yet it does not include all real – life factors that might affect behavior in the field (Bradsley, 2005). However, a few empirical studies in the field of economics indicted relationships between behaviors in experiments and decisions outside laboratory (Karlán, 2006; Carpenter and Seki, 2004; Benz and Meier, 2008).

Information crucial for decision is usually easily and quickly available in the most simulation business games, so players might forget both the cost and availability of information in the real world. Some games solve this problem, as an administrator can manipulate both timing and availability of information, and players need to pay for it. Technological developments nowadays make games more complex, and the number of decision variables they include can grow exponentially. Therefore, the growth of game’s realism results in its growing complexity which might affect practical aspects of conducting research with a simulation game, that is the duration of an experiment and abilities of subjects (players) to use all information available in the course of an experiment. Last but not least, it impacts the abilities of players to adequately prepare for participating in a game, and appropriately command it. Selecting appropriate game for research requires that both limitations of players and possible problems they might encounter are considered, such as time needed to process information and make decisions. This might limit the desired level of realism (for example market variables). To certain extent this problem is solved with the capacity of information processing the latest games offer, quickly and easily processing growing sets of data, accounting for complex functional relationships. More important, computerized games nowadays

can easily incorporate stochastic variables, strengthening the level of a game's realism. When the latter one is important criterion of selecting a game for research, a researcher should consider: the existence of relationship between functional areas of companies, possibility to replicate real market dynamics, the presence of adequate level of risk and uncertainty, possibility of data gathering (for both players and an administrator), learning possibilities (using available analytical tools in progressing game), possibility to incorporate (even in limited extent) of some organizational problems, demonstration of the value of planning and strategic thinking (Diagues- Barreiro et al., 2011). Despite all the above discussed limitations of games, they provide much higher level of realism than other types of laboratory experiments. How realistically simulation recreates the real area of research compared to laboratory experiment depends on a game itself, and how it is conducted by a researcher- administrator, whose important responsibility is maintaining the right dynamics and realism of a game (Diagues- Barreiro et al., 2011).

Another important problem posed by using simulation business games as research method in experimental research is internal and external validity. Internal validity is game's ability to generate stable results, that is whether they result from experimental manipulations, or are accidental effect caused by confounding variables, which experimental research is typically susceptible to (Schlenker and Bonoma, 1978). Hence, internal validity relates to possible negative impact of reality's simplification in laboratory setting and manipulation with research subjects on the identification of the key variables and their relationships. In result, a researcher can wrongly define measures and relationships between variables. On the other hand, a simulation business game can be used to confirm the variables and relationships identified already in field research. External validity is concerned with generalization of results of experimental studies on other populations of subjects, other measurement methods of the same variables and other contexts or situations (Schlenker and Bonoma, 1978). It is strictly linked to the most important problem related to using simulation business games as research tool- replication of results of one experiment in another (for example conducted with different subjects and place), and how realistically it emulates the real world.

To summarize, the limitations of simulation business games as research tools include: limited mundane realism, limited experimental realism (possible tendency of participants not to behave in realistic way due to the lack or shortly lasting consequences of their decisions), the cost of designing and developing game when the desired parameters are not offered by existing games (or cost of license with proprietary games), small samples, possible disruptions of results due to long- term dynamics of a game (while experimental manipulations are constant, participation conditions might change due to evolving conditions such as success or failure in a game).

6. Concluding remarks

Although experimental research with simulation business games might require validation with results of field research, it could provide sufficient empirical data for theory verification (Babb et al., 1966). Moreover, they can prove very useful in researching complex phenomena such as managerial decision making. Laboratory experiments are most effective when combined with other methods of field research (Schwenk, 1982). They are useful when data cannot be gathered with more conventional research methods. Complementing the results of experiments conducted with simulation business games with other methods of primary research, such as surveys or in- depth- interviews is currently common practice in research into educational effects of games. Triangulation of data and research methods is justified also when simulation business games are used as research method in other areas, as it can generate more in- depth picture of phenomenon investigated and avoiding at least some of the problems associated with this particular tool. The potential of simulation business games in marketing has not yet been fully exploited, but this should change with growing sophistication of games and their realism.

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