

A CYBERNETIC DECISION MODEL OF MARKET ENTRY*

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ABSTRACT

This paper analyzes a firm's decision of entering a new market - or staying outside – and considers five decision models – optimizing, satisficing, incremental, cybernetic and random - and their domain of applicability in order to discuss how fit they are in describing this specific decision. As the cybernetic decision strategy appears as the most appropriate to deal with the entry decision, the work goes deeper into this model focusing on the degree of uncertainty that the environment represents to the decision-makers and to the state of the conflict of interest that arise as this decision implies a coordination problem.

Keywords: contingency theory, entry, organization, decision models, cybernetics, uncertainty.

1. OVERVIEW

The aim of this work is analyzing a firm's decision of entering a new market in the perspective of the more accredited models of organizational decision behavior. This kind of approach is embedded in the “contingency theory of organization” paradigm (Lawrence and Lorsch 1967; Hofer 1975; Hambrick and Lei 1985; Donaldson 2001) that grounds on the basic property of relating the study of organizational structures to the environmental conditions they deal with.

Several *decision models* have been proposed so far in the literature; an alternative and more recent way of looking at them is reading these models as behavioral alternatives among which the decision-makers can choose. As Mitroff and Betz (1972) point out, each agent has to face a “meta-decision problem” and follows a particular decision strategy in dependence of the characteristics of her task. Moreover, these models show definite properties in dealing with two fundamental dimensions of decision-making, i.e. *uncertainty* and *conflict of interest*. Hence, I define a specific decision strategy - entering a market or staying outside - in terms of three sets of rules concerning search, choice and learning (Einhorn and Hogarth 1981); subsequently, I consider five decision models – optimizing, satisficing, incremental, cybernetic and random- and their domain of applicability (Grandori 1984) and analyze how fit they are in describing this specific decision. There are a number of serious disadvantages to misapplying prescriptive decision models. If the assumptions are not met, then the models cannot be trusted to provide useful inputs. Furthermore, forcing decision makers to adjust to the needs of inappropriate prescriptive models, their proficiency can be reduced. That is why it is important to understand the basis of decision expertise in order to enhance decision-makers’ abilities.

2. THE ENTRY DECISION

Market entry and exit decision problems pose a major concern to economists and sociologists (Sundali et al 1995). Starting with the work of Chamberlin (1933), economists have pursued extensive research of the role of entry in oligopoly and strategic aspects of entry deterrence and competition for market shares (see, among others, Geroski 1995; Klepper 1996; Das and Das 1997). Industrial organization literature conceptualizes the entrepreneurial decision of starting a new business as the entry of a new firm into a market: more specifically, Mueller (1991) refers to a “firm that supplies a product within an industry without having supplied it previously”. According to the neoclassical theory, entry plays a re-equilibrating function: when an industry exhibits extra-profits with respect of the market long-run equilibrium (where entry does not occur), new firms come in and “erode” these rents. The probability of entry is negatively affected by the presence of barriers that might prevent potential entrants to exploit profitable market

opportunities and allow incumbent firms to earn super-profits. Thus, it is industry characteristics, both in terms of industry profitability and in terms of the level of structural or behavioural barriers, that determine or not a firm's entry decision.

Sociologists have mostly approached the entry choice empirically, mainly focusing their investigation to the analysis of case studies and to archival methods (Hannan and Freeman 1985). Market entry problems are also of interest to experimental economists and psychologists studying organizational behavior. Recently, industrial economics theories have tried to integrate the analysis of entry determinants related to the industrial structure with an investigation of the biases and limitations that can affect firms' decision. Potential entrants' expectations of success determine entry choice, but these expectations may be affected by mistakes that concern one's own abilities and probability of success. The most famous contribution is represented by Camerer and Lovallo (1999)'s paper that tests the hypothesis that business failure could be the result of entrepreneurs' overconfidence about their relative capabilities and unreasonable optimism about future. This approach moves apart from the traditional "pure economic" one and focus mostly on behavioral and cognitive issues: the entry process is analyzed as the systemic result of individual entry decisions that turn to be affected by cognitive biases. The authors stress the importance of overconfidence in leading the entry decision and show that entrants are able to predict the amount of competitors correctly, but lack in evaluating their performance with respect to their peers. Not only they overestimate their capabilities, but also seem to reason as they were alone in the competitive arena ("reference group neglect" phenomenon). This work opened up a strand of literature that involves psychological insights to understand the entry decision (e.g. Moore and Cain 2004; Moore, Oesch and Zietsma 2007; Hogarth and Karelaia, 2008). Several studies show how entrepreneurs failures in intuitive reasoning may play a role in the findings of a number of recent studies in entrepreneurship. Entrepreneurs seem to be affected by cognitive biases like the ones qualified as heuristics by Kahneman, Slovic and Tversky (1982). Cooper, Woo and Dunkelberg (1988), among others, show that entrepreneurs perceive their prospects for success as substantially better than those for similar businesses. Moreover, their degree of optimism appears to be higher if they have already made the commitment to become business owners: the

theory of cognitive dissonance studies decision makers' attitude to bolster or exaggerate the attractiveness of an option after it has been chosen (Abelson and Levi, 1985). The traditional way to characterize the entry decision involves several implications in terms of uncertainty and conflict of interests: I will show that these properties are even amplified if we move to a not purely economic perspective. In essence, the long-established method of reading the decision each firm faces has been sketched as a choice between entering a market and receiving an uncertain payoff - whose magnitude is determined by the decisions of the other firms- or staying out of this market and earn a fixed payoff. Uncertainty is related to the former payoff, which may be positive or negative, and may or not be private knowledge; moreover, this payoff is a monotonically decreasing function of the number of entrants and consequently turns out to be related to the result of a non-cooperative game where tacit coordination may emerge or not. This branch of economic theory studies experimentally coordination behavior in a class of non-cooperative market entry games featuring symmetric players, complete information, zero entry costs and randomly presented values of the market capacity. All these simplifying assumptions are removed by the more recent approaches, which frequently exhibit the influence of psychological studies. The need of referring to an auxiliary perspective emerges from the difficulty that a pure economic approach faces in interpreting the data. Many empirical studies show that entry is a pervasive phenomenon, as proved by the huge level of the entry rates, which tend to be extremely high independently on the sector and the country we consider. Moreover, most new businesses fail within a few years. Therefore, entry and exit seem to coexist temporally and spatially, and this stylized fact contrasts with the common explanation of entry as driven by expected profits: new firms were thought to enter because attracted by the possibility of earning extra-profits in an unexplored sector. The number of sustainable firms has to increase until the extra-profits are completely eroded; from that moment on, no one wishes to start a business and, moreover, the competition among the existing firms drive out the less efficient ones. Entry and exit should therefore occur in different moments, but the empirical evidence is strictly different. The entry decision, therefore, must be explained in an alternative way. Models of neoclassical flavor, like the ones by Jovanovic (1982) and Ericson and Pakes (1994), assume all the firm's decisions – the entry decision included – as

the result of an evaluation by the firm itself about its own performance: as it is not aware of the entire information needed to appreciate its efficiency, it is only able to learn – passively or actively by means of investment effort - on the basis of market feedbacks. Horvath, Schivardi and Woywode (2001)'s model shows the relevance of uncertainty and information disclosure in determining entrants' decision. After observing other firms' performances, potential entrants reduce their uncertainty: the larger the number of firms in the market, the wider information available to potential entrants and the higher the frequency of entry choices, that is governed by a self-reinforcing mechanism.

The evolutionary perspective, on the contrary, models the entry decision as the outcome of internal routines, defined as choice procedures implemented daily by agents who operate in an uncertain and changing setting, but also shaped by the characteristics – in terms of opportunity, appropriability, cumulativeness and knowledge – of the external environment.

2.1. A COGNITIVE APPROACH TO ENTRY

The brief discussion of the previous section shows that many questions of economics cannot be answered simply by determining what would be the rational action, but require an understanding of the procedures used to reach rational decisions. The "real world" cannot be equated with the world as perceived and calculated by the economic agent, whose computation capabilities are scarce and whose ability to adapt successfully to a particular situation is determined by the efficiency of his decision making and problem solving processes (Simon 1955, 1978). The real world is too complex, too uncertain, too rapidly changing to let the objectively optimal actions to be always identified and implemented. The birth of a new firm and, more generally, the exploration for a new product, resemble the search for a good chess move more than the search of a hilltop. Therefore, the computing capabilities and search strategies of firm managers and engineers are crucial to any theory of firm or of interfirm competition. If neoclassical perceptiveness presupposed an objective representation of the world, in the form of coherently organized – and hopefully true – beliefs, the empirical evidence shows that the representation of informational data is often unreliable and incoherent. This attitude derives from the action of

different classes of bounds, respectively related to the presence of information costs, to the limit to computational capability (and more generally to knowledge reliability) and to the problems arising from the paradoxes of choices and impossibility of conflict resolution.

A fundamental component of the correctness of informational inputs is related to the mechanism of memory: the corpus of beliefs, i.e. the factual foundation of rationality, depends on the accuracy and reliability of memorization mechanisms. The factual data base used in the inference often corresponds only to a part of the beliefs available in long term memory: people cannot gain access to a significant part of their knowledge and consequently the resulting inferences are generally wrong (Viale 1992).

These limitations manifestly affect also the entry decision. The excess of unsuccessful entry, in fact, witnesses the presence of some distortions in the perception of the opportunity of such a choice: otherwise, firms will take into account the high probability of failure and consequently try their luck less frequently. An accredited explanation for the frequency of entrants' collapse enlighten the fact that many entry decisions are mistakes, made by bounded rational decision-makers. The explanation of this behavior is chargeable mainly to two different reasons: entrants know their own skills but fail to appreciate how many competitors there will be, or they forecast competition accurately but overconfidently think to succeed while most other firms fail. These cognitive biases get worsen as uncertainty and conflicts of interest raise.

2.2. UNCERTAINTY ABOUT ENTRY

As decision-making behavior is a function of its environment, in this section I will focus on one highly significant aspect of this environment, i.e. on the degree of uncertainty that it represents to the decision-makers.

The definition of uncertainty that usually appears in the literature assumes that all the relevant states of nature are known, all the possible relevant alternative actions or choices are known, and that the values of each action-state of nature pair are known. The only cause for uncertainty is that one cannot predict what particular environment will occur, because the probability distribution across the set of possibilities is unknown. But such a definition completely ignores

the type of environment in which most organizational decisions take place (Leblebici and Salancik, 1981). In fact, in several situations involving organizational decision making, a major problem is to establish the values that are to be attributed to the various possible actions/state of the world pairs. Even if perfect foresight were feasible, there is still some doubt about the action the organization should choose, and that's due to the fact that the values for any of the individual action-state of the world pair are unknown within the predominating utility structure. In addition, it's difficult to determine the whole set of the possible states of nature which might exist in regard to a given decision situation: the decision-makers may even ignore what tomorrow might bring. Finally, a decision-maker is often aware that she is unaware of the various actions she might make: she can generally presume she has the possibility to uncover them, but this determination undoubtedly involves a cost of search. Hence we should also consider the uncertainty caused by the possibility of an unbounded set of actions available to the decision-maker (Conrath 1967).

Moreover, uncertainty is not just a property of the environment but also of the observer faced with a decision in a given environment. Thompson (1964) argues that decision making involves two sources of uncertainty, due to disagreements about cause-effect relations and to disagreements about preferred outcomes. Thompson and Thuden (1959) have defined four classes of decisions that require different decision strategies and structures. Given agreements about preferences, one can use computational strategies when means-ends relations are certain and judgmental strategies when they are uncertain. If there were no agreements about preferred outcomes, inspirational strategies would prevail when causal beliefs were uncertain, while compromise bargaining strategies would otherwise. Each source of disagreement requires not only a different decision strategy, but also different organizational structure. The perception of uncertainty comes not from an awareness of the environment, but from an awareness of the uncertainty particular to decision situations. Consequently, the structural devices and procedures that organizations develop to deal with uncertainty come not from a direct association with the global qualities of the environment but in response to the different decision situations in the organizations. Therefore, uncertainty is a function of both one's knowledge of cause-effect relationships and the probabilistic conditions of the environment within which outcome takes place.

2.3. ENTRY AS A COORDINATION PROBLEM

Most writers assume that each decision is to be made by an entity, a single person or a multiple source that is capable to acting as one. The problem of utility function amalgamation is generally ignored. In his well known monograph, Arrow (1963) showed the impossibility of deriving, at least analytically, a multi-person decision making algorithm that satisfied certain defined criteria of reasonableness. Nevertheless, the vast majority of decision making situations involve more than one person, they are multiple in character: this is true for the preponderance of the more important decisions that are made in an organizational context. Much of the decision theory literature, as well as limiting itself to entity decision making algorithms, concentrates on the decision itself, ignoring the process by which the decision is reached. In addition, the behavior that is elicited during the process of making a decision is likely to influence the decision itself, and hence it is worth studying as a factor in the decision.

Focusing on entry, the problem of coordination emerges at two levels. Does the entry decision arise from the systemic interaction among more agents? If so, the problems deriving from the conflict of interest would become relevant. But, as the entry decision represent the first decision for a firm – at least if we restrict the analysis to greenfield entry - it is likely that the whole organization is not yet created but it is originated just when the decision of entry has already been taken and therefore turns out to be an entrepreneur's decision.

On the second hand, in a broader perspective, the necessity of coordination arises at a market level as only a limited number of operating firms is sustainable in a market with a fixed dimension which may be known – or, more realistically, conjectured - or not. The decision, in this perspective, must take into account the expectations about the potential competitors' behavior. This framework has been generally modeled in a context of non-coordination: under the usually simplifying assumptions (symmetric agents, perfect information, no entry costs...) coordination in a non-cooperative way emerges. But, if we eliminate them to get nearer to the real world, the outcome may end in a coordination failure that may reasonably be a coherent explanation of the excess entry phenomenon. Each firm tends to make mistakes in estimating the

amount of firms that will be taking the same decision and therefore the degree of competition in the market. Bounded rational decision makers may have “competitive blind spots” as they fail in evaluating the number of competitors and underestimate the amount of entry, so that industry profits turn out to be negative. This story becomes even more complex when the market capacity is not known –as happens in the real world – not because of a bad forecast, but as a consequence of a decision based on a limited set of information. Anyway, Camerer and Lovallo (1999) shows that the informational rationality of this forecasts is quite good: subjects are not generally irrational in processing information; excess entry is not the result of an underestimate of the level of competition. It is another component, namely their overconfidence about their own skills, that seems to play a more relevant role.

3. WHICH DECISION MODEL IS THE ‘FITTEST’ ONE?

The characterization of the entry decision I presented so far had the aim of enlightening the properties of the entry decision in terms of uncertainty and conflict of interest. These two fundamental dimensions, which are crucial to define any decision situation, strongly contribute in determining the choice of the decision model that better represents the strategy we are concerned with. In this paragraph, I will briefly recall the distinctive properties of the most accredited decision models with the aim of discussing their ability to fit with the connotation of the entry decision I previously provided.

Each strategy can be thought as a set of procedures for relating some outcomes to some objectives of the organization in a specific domain of applicability, that requires to be defined in terms of uncertainty and conflict of interest (Grandori 1984).

In the economic literature concerning decision making, rationality is usually defined in a way that implies some forms of *optimization* such as the constrained maximization of subjective utility. The agent chooses the unique and the best – and it must be “the best” in any possible case – suitable alternative. Outcome probability distributions may be unknown, but the problem structure is nevertheless given in terms of the combinations of possible actions and states of nature: this implies that a reliable model of the problem can be constructed, if the problem solver

is able to define it. If a model of pertinent dependable information is available, the decision makers can adopt value maximizing choice rules; moreover, search rules in this framework lead to an exploration of the problem space that goes on until enough information is collected to calculate the optimum; finally, learning rules are connected with the reevaluation of probability assessments on the basis of outcome observations. But, as March and Simon (1958) point out “only in exceptional cases, human decision making, whether individual or organizational, is concerned with the discovery and selection of optimal alternatives”. An optimizing strategy, in fact, is not applicable if all the classes of objectives, alternatives and consequences that are relevant to solve a problem are not known or if a collective preference function cannot be defined as a consequence of the difficulty in representing in it the power goals of all the organizational subunits. Entering a new market – in all the issues it implies - involves a series of combination of options that may be considered infinitive. Therefore, this turns to be a sort of ill-structured problem, in which the decision situation lies outside the domain of applicability of an optimizing strategy: as a result, a decision maker should turn to other strategies.

The *satisficing* alternative, suggested by Herbert Simon as a constructive answer to his critiques to the neoclassical paradigm - and elaborated coherently with the assumption of the bounded rationality criterion - is more strictly related to the psychological theories on perception and cognition. The core of his argument relies on the statement that the interaction between individual needs and the environmental restrictions generates the aspiration levels; the failure of the optimizing paradigm in explaining the decision process is attributable to an overvaluation of the human rationality and to a description of human behavior in mechanicistic terms. A satisficing strategy, therefore, is applicable in conditions of uncertainty and conflict which are too extended to apply an optimizing strategy, as happens when the problem space cannot be completely specified. A satisficing strategy can nevertheless produce solutions that are coherent with the organization objectives, filling a gap that an optimizing strategy leaves empty. Instead of comparing the alternatives, choices rules in this case compare the consequences of each alternative with the decision maker’s aspiration level. The problem space is explored only partially without pursuing the aim of generating the whole decision tree but just in order to find

acceptable alternatives: only when one is found, the search process stops and that alternative is retained. The aspiration level is endogenously determined: if acceptable solutions cannot be found, decision makers can apply learning procedures to make the process converge by broadening the set of considered alternatives or reducing the aspiration level. On the contrary, when discovering satisfactory alternatives is easy, an agent can raise its aspiration level so as to generate superior alternatives. In general, a satisficing strategy is effective in situations of conflict when an optimizing strategy is not applicable because of the difficulty of not being able to define a collective utility function: a satisficing strategy can resolve many states that are impossible to solve in a maximizing framework. The convergence of satisficing to optimal solution on series of decisions depends to well-defined and stable problem spaces: if nothing is known about the boundaries of the set of relevant alternatives, a rational actor has no reason for stopping at the first acceptable solution; moreover, when acceptable solution are not found, there is no rationale to modify the aspiration level. A satisficing strategy, therefore, can be applied only if it is possible to compare the consequences of single alternatives with aspiration levels, and when it is possible to agree on a set of a relevant aspiration level to be satisfied. What about the entry decision? A firm- in the person of the entrepreneur- that makes a first move in a completely new activity is not likely to be able to define a specific aspiration level, as it usually has no terms of comparison. It faces a series of unexplored issues and it typically is not able to infer about its own capabilities, as it may be affected by several types of biases like overconfidence. The outcomes related to each alternative, moreover, may even not be acknowledged: this may arise from the fact that only one option can be pursued and actually evaluated. It can happen that not simply the set of relevant alternatives is indefinable: also the consequences of each alternative with respect to some relevant aspiration level is unpredictable. In such a situation, even the satisficing strategies are not feasible; again, a decision maker should turn to other strategies.

The *incremental* strategy can be reconstructed as a set of procedures that are able to deal with such conditions. In fact, it is connected with both uncertainty and conflict of interest on the basis of a risk-reducing assumption: small moves will not produce unanticipated big effects, particularly negative effects about which agents are more concerned. In this way, an incremental

strategy protects an organization from consequences on categories of interest that cannot be taken into account a priori: this is possible as a priori negotiation costs can be saved and it turns to be particularly effective when the interests of the organization's various subunits are numerous or when the attention of the other actors are focused on other problems. The incremental strategy requires that the decision maker is able to define at least one attribute for comparing an alternative course of action with the existing one: an entrepreneur that decides to enter a new market can't be easily considered aware of the outcomes it would reach if behaving in a different way. A new comer has no sufficient knowledge to forecast adequately the response of the market and the interaction with the incumbents: that's the reason why the incremental model is not entirely fit to describe the entry decision. Generally speaking, the most feasible strategy is clearly the *random* one, because it does not require any initial knowledge to be implemented. If there is extreme uncertainty about preferences, technology and other competitors, an organization can adopt random search and choice rules. But it does not make sense when the organization has the possibility and the advantage to take into account the already available solutions and the experience from the past. The entrepreneur can usually observe, even if only from an external perspective, the performance of the incumbents and therefore learn from their mistakes and imitate their success: that's why firms are not likely to adopt a totally random strategy, as they are rational – even if bounded - agents that obviously use all the information available to make their best choice. These relations between actions and outcomes are exploited by entrants, that – at least *a posteriori* – relate their objectives with incumbents' performance. In fact, they are usually not able to evaluate their own capabilities – as the rise of overconfidence shows – but can at least imitate the incumbents' choices in similar circumstances and repeat actions with positive observed outcomes and avoid actions with negative ones. When an organization is not even able to perform limited comparisons between the existing solution and an incremental alternative, but have nevertheless a certain level of initial knowledge, the incremental and the random model seem not to fit our characterization of the entry decision, that exhibits some features of an almost blind trial- and- error procedures. The *cybernetic* strategy succeeds in describing the situations of uncertainty that can arise when the information about the existing state of affairs is that it works

or not: in the case of the entry decision, the entrant observes when a trial succeeds even if it has no knowledge of its internal structure, but can only infer something about its own capabilities and learn from the incumbents' experience. As the cybernetic decision strategy appears as the fittest to deal with the entry decision, we will devote the following paragraph to go deeper into this model, also taking into account the fact that the higher uncertainty the more the decision strategy is likely to change into a random strategy.

4. A CYBERNETIC MODEL FOR THE ENTRY DECISION

As emphasized above, the prevailing paradigms in decision research have limited utility in operational domains characterized by high time pressure, uncertainty, and ambiguity, continually changing conditions, ill-defined goals, and distributed decision responsibilities (Klein and Calderwood 1991). Previous researchers (see Connolly, 1982, among the others) have commented on the importance of making research methods more responsive to applied needs. This paragraph will go deeper into the cybernetic strategic decision model in order to emphasize its properties in dealing with uncertainty and conflicts of interest and to evaluate if it may turn to fit the entry decision. Results of decisions are hard to evaluate, thus in the absence of commonly agreed criteria, or methods, - which exist in business management - the judgment whether a decision was correct or not, depends on the later success (survival) of the respective organization or individual politician. The Cybernetic Paradigm is grounded on the bounded rationality concept and the cybernetic decision model of Steinbruner (1974). In complex situations decision makers, inherently constrained by cognitive and information processing limitations, typically do not optimize expected value, – they satisfice, and minimize uncertainty. The word “cybernetics” (Weiner 1948) is here used to describe self-repairing systems based on feedback: in fact, more broadly, it refers to the study of systems of control and communication in animals and in electrically operated devices and – more specifically - to the interaction between automatic control and living organisms.

Cybernetics is considered a key principle recommended for refining and substantiating management decision making (Veney and Kaluzny 2005). First cited as a term in 1948 by Weiner,

cybernetics has become “popular as a way of defining a methodological approach to a wide variety of scientific and management endeavors and is closely linked with general systems theory and its application in the social organization” (*ibidem*). But it is only in more recent years that cybernetics has been applied to scientific work and business management to make these more efficient..

A firm who enters a market is a self-repairing system based on negative feedback that requires an understanding of the whole system and its causal relationships: in fact, entrepreneurs tend to shape their choices on the basis of the responses from the market previously received by the incumbents and try to make a connection between their successes or failure and the internal structure of their organization, even if it can be observed only from outside. Systematic attempts by repair are usually actions which include amelioration of the others’ observed behavior, i.e. interventions to deal with the supposed symptoms or consequences of the fault, but, frequently, not a proper and effective treatment of its root causes, as they can be seldom observed from an external point of view. Cybernetic self-repair usually implies automation, in the sense that it is possible and effective even in the case of lack of conscious and rational input: choices are often made by means of the implementation of routines. This kind of learning turns to be necessarily limited, as it reflects the information and assumptions that can be extracted from others’ experience – of course not entirely comprehensible - and consequently tends to be less robust than a Olympic rational choice. In fact, cybernetic mechanisms achieve uncertainty control by focusing the decision process on a few incoming variables and by eliminating entirely any serious calculation of probable outcomes as the potential entrants have not the capabilities to do them.

Decision-making within firms is usually a complex system with multi-factors, many hierarchies and many goals. According to Bai and Wang (2008)’s classification, there is some “white information” known to people as well as some “black information” that is still unknown to people. Nonetheless, more information is “gray” because people can know only a little but cannot know it fully, so the creation of a new firm can be looked as a grey system that is complex and changeful. how to make full use of some information provided by real data to analyze and instruct actual business starting is a problem that should be solved.

The entrepreneur who has to decide whether to enter or not is sensitive to a reduced set of information that goes into through an established highly focused feedback channel, while many factors which actually affect the outcomes have no effect on his decision process. This argument may also represent an explanation for failures: decisions are taken only on the basis of a biased sample. In fact, potential entrants tend to underestimate the probability of collapse because they only look at successful entrants – the ones who survive and remain in the market – and forget the high frequency of failure, as the exiting agents' experience is not immediately visible, through a sort of non-purposive adaptation and allowing the use of heuristic procedures for partial approaches to the problem. This permits to impose a sort of structure on uncertain situations and to reduce uncertainty by categorical inferences rather than through probabilistic judgments.

Veney and Kaluzny (2005) identify some components of cybernetics that make it of particular relevance and value to entrepreneurs. One is that, in any system, there are the interrelated variables of inputs, throughputs, and outputs responsible for “a process of accomplishing an end.” The authors note that this process is not intended to replace any existing system (like a new entrant firm), but to improve or refine one in place by making it more informed and pertinent. Some of the aspects of environment the firm faces are regulated and controlled by decisions made on the basis of feedback of information about the state of the system. As suggested above, cybernetics is largely, though not completely, a monitoring of the “communication of information in any system.” This can be done in such a way that intended outcomes can be compared with actual outcomes. The cybernetics' methodology makes this comparison affordable: the gap between intended outcomes and actual outcomes can be reduced as much as is possible in the real world of entrepreneurs characterized by pressures of “decision making, employee changes, effects of new technology and government regulations, and constant competition” (*ibidem*).

5. CONCLUSIONS

As economic agents, in general, are not in a position to calculate rationally optimum solutions for their problems, the assumption of rational behavior turns to be not realistic. The analysis presented in this paper is meant to recall that a decision maker has to deal with the state of

uncertainty and conflict of interest which characterizes a decision situation; often, she has to select a feasible strategy that turns to be less powerful, in terms of the quality of possible solution, as she is restricted in the resources which can be allocated a priori to information processing.

In this paper I focus on a specific decision, i.e. the entry decision, and discuss the properties of five decision models in describing it, founding that the cybernetic decision strategy seems to be the fittest one. In order to exploit the fruitful dialogue between a particular problem and its corresponding model, I auspicate to devote further work to investigate the entry decision by going deeper into the heuristic procedures that the agents employ in such a domain characterized by uncertainty and conflicts of interests.

REFERENCES

- Abelson RP and Levi A (1985) Decision making and decision theory, in Lindzey G and Arenson B (Eds) *The Handbook of Social Psychology*, New York: Random House.
- Arrow K (1963) *Social Choice and Individual Values*. New York: Wiley.
- Camerer C and Lovallo D (1999) Overconfidence and excess entry: An experimental approach, *American Economic Review*: 89(1), 306-318.
- Chamberlin EH (1933) *Theory of Monopolistic Competition*, Cambridge: Harvard University Press.
- Connolly T (1982) On taking action seriously: Cognitive fixation in behavioral decision theory, in Braunstein DN and Ungson GR (Eds) *Decision Making: An Interdisciplinary Inquiry*, Kent, OH: Kent Publishing,
- Conrath DW (1967) Organizational decision making behaviour under varying conditions of uncertainty, *Management Science*: 13, 487-500.
- Cooper AC, Woo CJ and Dunkelberg WC (1988) Entrepreneurs' perceived chances for success, *Journal of Business Venturing*: 2, 97-108.

- Das S and Das SP (1997) Dynamics of entry and exit of firms in the presence of entry adjustment costs, *International Journal of Industrial Organization*: 15(2), 217-241.
- Donaldson L (2001) *The Contingency Theory of Organizations*, Thousand Oaks, CA: Sage.
- Einhorn HJ and Hogarth RM (1981) Behavioral decision theory: Processes of judgment and choice, *Annual Review of Psychology*: 32, 52-88.
- Ericson R and Pakes A (1992.) An alternative theory of firm and industry dynamics, *Cowles Foundation Discussion Papers* 1041, Cowles Foundation, Yale University.
- Geroski P (1995) What do we know about entry? *International Journal of Industrial Organization*: 13(4), 421-440.
- Grandori A (1984) A perspective contingency theory view of organizational decision making, *Administrative Science Quarterly*: 29(2), 192-208.
- Hannan M and Freeman J (1984) *Organizational Ecology*, Cambridge M.A: Harvard University Press.
- Hogarth RM and Karelaia N (2008) Skill, luck, overconfidence, and risk taking. Available at SSRN: <http://ssrn.com/abstract=1374235>
- Horvath M, Schivardi F and Woywood M (2001) On industry life-cycles: Delay, entry, and shake-out in beer brewing, *International Journal of Industrial Organization*: 19(7), 1023-1052.
- Jovanovic B (1982) Selection and evolution of industry, *Econometrica*: 50(3), 649-670.
- Jovanovic B and MacDonald GM (1994) The life cycle of a competitive industry, *Journal of Political Economy*: 102(2), 322-347.
- Kahneman D, Slovic P and Tversky A (Eds.) (1982) *Judgment under Uncertainty: Heuristics and Biases*, Cambridge: Cambridge University Press.
- Klein GA and Calderwood R (1991) Decision models: Some lessons from the field. *IEEE Transactions on Systems, Man, and Cybernetics*: 21(5), 1018-1026.
- Klepper S (1996) Entry, exit, growth and innovation over the product life cycle, *American Economic Review*: 86(3), 562-583.

- Lawrence PR and Lorsch JW (1967) *Organization and Environment: Managing Differentiation and Integration*, Division of Research, Graduate School of Business Administration, Harvard University: Boston, MA.
- Leblebici H and Salancik GR (1981) Effects of environmental uncertainty on information and decision processes in banks, *Administrative Science Quarterly*: 26(4), 578-596.
- March JC and Simon HA (1958) *Organizations*, New York: John Wiley & Sons.
- Moore DA and Cain DM (2005) Overconfidence and underconfidence: When and why people underestimate (and overestimate) the competition, *Carnegie Mellon Tepper Working Paper*: 2003-E76.
- Moore DA, Oesch JM and Zietsma C (2007) What competition? Myopic self-focus in market-entry decisions, *Organization Science*: 18(3), 440-454.
- Mueller D (1991) Entry, exit and the competitive process, in Geroski PA and Schwalbach J (Eds.) *Entry and Market Contestability: An International Comparison*, Oxford: Blackwell.
- Roll R (1996) The hubris hypothesis of corporate takeovers, *Journal of Business*: 59(2), 197-216
- Simon HA (1955) A behavioral model of rational choice, *The Quarterly Journal of Economics*: 69(1), 99-118.
- Simon HA (1978) Rationality as process and as product of thought, *American Economic Review*: 68(2), 1-16.
- Steinbruner JD (1974) *The Cybernetic Theory of Decision: New Dimensions of Political Analysis*, Princeton N.J: Princeton University Press.
- Sundali J, Rapoport A and Seale DA (1995) Coordination in market entry games with symmetric players, *Organizational Behavior and Human Decision Processes*: 64(2), 203-18.
- Thompson JD (1964) Decision-making, the firm and the market, in Cooper WW, Leavitt HJ and Shelly MW (Eds) *New Perspectives in Organizational Research*, New York: Wiley.

Thompson J.D and Thuden A (1959) Strategies, structures and processes of organizational decision, in Thompson JD, Hammond PB and Tuden A *Comparative Studies in Administration*, Pittsburgh, PA: University of Pittsburgh Press.

Veney JE and Kaluzny AD (2005) *Evaluation and Decision Making for Health Services*, Englewood Cliffs, NJ: Prentice-Hall.

Viale R (1997) *Economia Cognitiva*, Torino: La Rosa.

Wiener N (1948) *Cybernetics or Control and Communication in the Animal and the Machine*, The Technology Press: Cambridge, MA.