

What do strategists have in their minds? The use of structural equation modeling to understand the strategy process

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ABSTRACT: This study is an attempt to understand how the dimensions of the strategy process (change, thinking and formation) are present in strategists' minds. The methodology used is exploratory-descriptive. During the exploratory stage, we carried out desk research, which resulted in the development of a measurement tool for the strategy process. For the descriptive stage, we conducted a virtual survey of a sample of 109 executives of different companies. The data obtained were submitted to multivariate analysis (factor analysis and structural equations modeling). The factors that formed the studied dimensions were identified, confirming the existence of paradoxes in the strategy process. The dependence relations and the correlations observed were used as an input for the construction of a model for the strategy process.

Keywords: strategy process; structural equations modeling; cognitive maps.

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1. INTRODUCTION

Business strategy is a complex subject and has multiple roles within an organization. Its primary purpose is to attain success by orienting management decisions (RUMELT; SCHENDEL; TEECE, 1995).

Considering that the literature on business strategy is vast and highly segmented (MINTZBERG, AHLSTRAND; LAMPEL, 2000), and considering companies' peculiarities and the various contexts they face, it is becoming increasingly difficult for managers to obtain orientation on the best path to follow.

The main activity of business strategists is to reach daily decisions, both simple and complicated. Because of the frequency of this activity, decision making should be an easy and well-understood process among executives. But the reality is otherwise, and decision making is more often a complex process.

This article examines the strategy making process from a perspective of how decisions are made at the individual level, focusing particularly on how those decisions are related to strategists' cognitive maps. Understanding these actors' way of thinking is a way to perceive strategists' beliefs and values regarding the paradoxes of the strategy process. A better understanding of how strategists face these dimensions can allow envisioning the future choices that can be made.

This article also aims to achieve a deeper understanding of the theory of the strategy process, and from this, to develop a measurement tool to investigate how this process occurs in the minds of strategists.

De Wit and Meyer (2004) suggested that business strategy is a field filled with paradoxes. According to Eisenhardt (2000), a paradox is the simultaneous existence of two states of consciousness, where each state is formed of arguments and dimensions. In the present work, we studied these opposed dimensions at the individual decision-making level and formulated a scale to measure the strategy process, which served as an instrument for further development of the study.

The purpose of the tool used to measure the strategy process in this work is to facilitate understanding the strategist's cognitive map and to shed light on the concordance and discordance in relation to the strategy dimensions proposed by De Wit and Meyer (2004).

In developing the research instrument, we considered the dimensions of the strategy process, which are strategic thinking, strategy formation and strategic change, according to the original proposal of De Wit and Meyer (2004). In each of these dimensions there is a tension between at least two opposed currents of thought, which represents the paradox.

This article is organized into the following sections: Paradoxes of the Strategy Process; Construction of the Strategy Process Measurement Tool; Method; Analysis of the Data; and Conclusions.

For better observation of the dimensions adopted, it is important to understand the implications of these paradoxes in studying the strategy process, the subject of the next section.

2. PARADOXES OF THE BUSINESS STRATEGY PROCESS

The study of business strategy is considered fairly recent in Brazil (BERTERO, 2005; GRANT, 1995), resulting in a need for more theoretical and empirical investigation of this subject.

The business strategy process is divided into three dimensions: thinking, formation and change (De WIT and MEYER, 2004). There are paradoxes in each of these dimensions

that need to be understood to undertake a better analysis of the strategy process as a whole. De Wit and Meyer (2004) define paradox as a situation in which two apparently contradictory or mutually exclusive factors appear to be true at the same time.

Paradoxes do not have a single solution, and there is no logical means to perfectly integrate the two opposites of a problem (De WIT and MEYER, 2004). Figure 1 depicts the dimensions and tensions (paradoxes) that are part of and were considered in the observation of the strategy-making process.

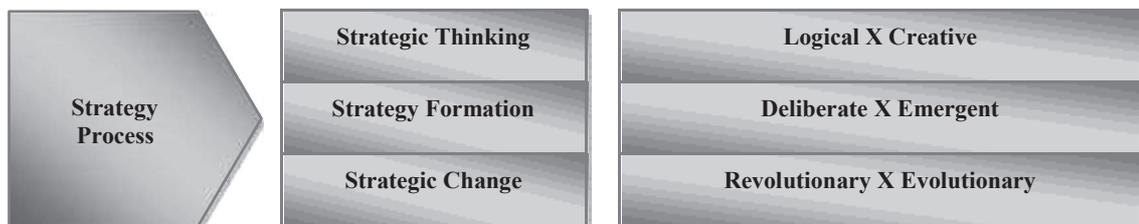


Figure 1 – Paradoxes of the Strategy-Making Process.
Source: Adapted from De Wit and Meyer (2004:13)

The focus of this article is to investigate how the strategy process occurs (thinking, formation and change) starting at the individual level. Thus the central point of the process is the strategist's mind. The cognitive map represents the way an individual thinks, so understanding how the map functions is fundamental to observe the actuation of the dimensions of the strategy process.

2.1 Cognitive Maps and the Strategy Process

One school of the study of business, stressed by Mintzberg; Ahlstrand; Lampel (2000), is the cognitive, by which the formulation of strategy is understood and viewed as a mental process. This school, based on the ideas of cognitive psychology, puts forward the argument that to understand the strategic vision and how strategies are formed, it is necessary to probe decision makers' minds, that is, to understand their mental models and cognitive maps.

Cognitive maps are mental representations of how the world operates. These maps are not configured in static models. They evolve through education, experience and interaction with other people and cultures (De WIT and MEYER, 2004).

The concept of cognitive maps also has important implications, suggesting that decision makers do not move directly within the reality of objective facts, but rather within a cognitive reality, a creation of reality (MACHADO-DA-SILVA, 1998). Hence, individuals' cognitive maps are their main influences, affecting business by the strategic decisions made by executives (MACHADO-DA-SILVA, 1998). Kahneman (2002) presents two models of cognitive functions: an intuitive model, in which judgments and decisions are reached automatically and rapidly; and a rational model, which is deliberate and slower. Figure 2 portrays the scheme of these models.

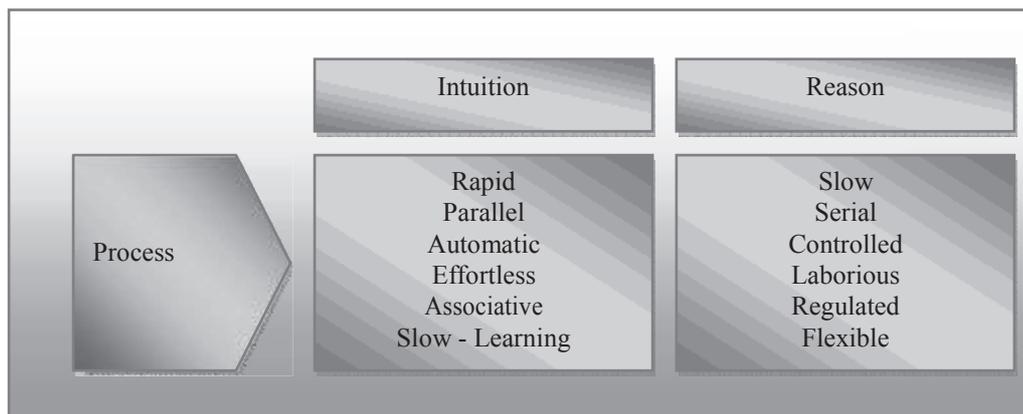


Figure 2 – Model of Cognitive Functions

Source: Adapted from Kahneman (2002:451)

Next we address strategic thinking, the first dimension of the strategy process, where the denominations logical and creative thinking are at the two extremes of a continuum, with space for variations between them, characterizing a paradox.

2.2 Strategic Thinking

As said, there is a tension in the strategic thinking dimension, represented by the paradox between logical and creative thinking (DE WIT and MEYER, 2004). Many authors advocate logical and rational thinking (Porter, 1986; Andrews, 1987), fruit of the heritage of economic thinking in the field of strategic management, while others believe creative and intuitive thinking is more important (Ohmae, 1982; Mintzberg and Westley, 2001). The search for the “right answer” torments minds in both the business and academic world, showing the relevance of this issue.

The study of strategic thinking examines the way strategists use their cognitive maps, by applying logic or creativity in the strategic management process. Logical thinking has a strong rational component, where all points must be analyzed carefully before a final decision is made. For Andrews (1987), the formulation and implementation of a strategy must occur in logical, analytical and rational form, because this leads to better results.

De Wit and Meyer (2004) argue that the advantage of logical thinking is that it keeps managers from erring from using processes that are outmoded or influenced by emotional factors and helps to distinguish “fantasies” from real possibilities.

Strategists who think logically argue that managers cannot base their strategy decisions only on intuition and creativity, because rational analyses must be used to improve decision making and to reduce the risks of business failure.

On the other hand, strategists who think creatively do not follow any set of predetermined rules, and permit their beliefs, established over time, to permeate their strategic decisions. Hence, these managers use their intuition as a strategy formulation tool, believing that their cognitive maps have a hidden logic that, although not understood, is valid to develop the strategy. Strategy formulation models are not utilized, because they are felt to be limited and insufficient. In this form, solutions are created and emerge as responses to unexpected situations, even if this creativity is fragile and hard to understand (MOORE, 2006).

It is interesting to observe that the same argumentation between more rational and more intuitive strategists can be used to defend their decision-making approaches. On the one hand, those who call themselves “rational” defend their posture by arguing that intuition is limited and insufficient to diagnose and resolve a problem. On the other hand, the “intuitive”

strategists attribute limiting and insufficient characteristics (Idenburg, 1993) to more analytical strategic models.

Intuition is not a mystical or irrational way to resolve problems. On the contrary, it arises from a previous framework of experiences lived and learned by people (OHMAE, 1982). For this reason, intuition is characterized as a tool that in many cases is effective for reaching decisions.

Rein (2006) suggests that not only the strategist should be creative, but the whole team needs to be encouraged to be creative and innovative. For Berris (2006), innovation is the key factor for a business to be profitable.

Cortello (2005) argues that once a firm creates a climate that stimulates creativity, the employees will be encouraged to react and adapt to changing conditions, and for this reason will not fear non-routine situations. Mintzberg and Lampel (1999) affirm that strategy is driven by the strategist's creativity, because in this way new ways of doing things are explored.

Creativity is identified as an important part of the strategic thinking process, as well as the formulation of strategies for those strategists who act creatively and intuitively (STEINER and KUNIN et al., 1983). For Mintzberg (1994), creativity is the center of strategic thinking and creative thinking in strategic terms is suggested as a source of competitive advantage for organizations (RAIMOND, 1996).

Therefore, both logical and creative thinking are important to achieve better thought out and formulated strategies. There is no one correct way of thinking. It depends on each individual's cognitive map.

Business strategists can use their imagination and ability for logical reasoning to hasten the effects of competition and the speed of changes. In other words, imagination and logic make strategy possible. Without them, behavior and tactics would only be intuitive or the result of conditioned reflexes (HENDERSON, 1998).

We now turn to strategy formation, the second dimension of the strategy process, where deliberate and emerging formations also pose a paradox.

2.3 Strategy Formation

As occurs with strategic thinking, the strategy formation dimension also contains a paradox. This involves the formation of strategies as deliberate (Chandler, 1998; Henderson, 1998) or emergent, with these being contradictory and complementary at the same time (DE WIT and MEYER, 2004).

There are basically four steps of strategy formation: identification, diagnosis, conception and realization. But it is important to understand that these steps do not necessarily represent the best way to form strategies. They are merely a logical suggestion for the process based on a deliberate strategy formation (DE WIT and MEYER, 2004).

Deliberate strategies, commonly associated with formal strategic planning, are seen as an analytic exercise that functions from the top down, involving only the firm's senior executives. Emerging strategies, in contrast, are viewed as interactive processes, from the top down and from the bottom up, involving daily decisions, actions and participation of the organization as a whole.

There is a potential risk related to formal strategic planning, since it does not consider new ideas, learning, innovation and the political environment (MINTZBERG, AHLSTRAND; LAMPEL, 2000).

Formal planning (deliberate strategies) and ongoing learning (emerging strategies) are characteristics that represent the extremes of the strategy formation paradox.

Mintzberg (1994; 1998) argues that the forecast can turn out to be a fallacy, since the competitive environment is dynamic by its nature and the work processes cannot be completely understood before the strategy is implemented.

Mintzberg and Waters (1985) conclude that the pure forms of strategy formation are not found in practice, but suggest eight intermediate positions with different characteristics that gradually approach the extremes, but are always in some aspect mixed in varying proportions between the two contradictory characteristics.

Deliberate strategies occur by means of predetermined actions (Ansoff, 1973). Since the manager analyzes and designs before acting, he is planning the strategy. The act of planning aims to show the firm's intention clearly and analytically. Planning facilitates direction, commitment, coordination, optimization and programming (HIGLEY 2000; BOURLAKIS and BOURLAKIS, 2001).

At the other end of the extreme is emergent strategy formation (MINTZBERG, AHLSTRAND; LAMPEL, 2000), because this enables aggregating the learning taking place in the process and the participation of middle managers in forming strategy. It is advocated because of the unpredictable element of the business climate.

It is important to note that both types of strategy formation are important and must be considered by strategists. There is no single best type of formation, but rather the best type for each organization, environment and people. The choice of one or another form will depend on strategists' cognitive map.

Next we address strategic change, the third dimension of the strategy process, where revolutionary and evolutionary changes stand at the opposing poles of a continuum, characterizing a paradox.

2.4 Strategic Change

As occurs with the other dimensions of the strategy management process, there is also a tension within strategic change between two types of change: evolutionary and revolutionary.

For De Wit and Meyer (2004), there can be two types of changes, operational and strategic. Operational changes entail improved operational performance and maintenance of the management system. Strategic changes, on the other hand, involve the creation of new configurations between firms and their environments.

Strategic change can be seen as an intervention by the strategist through the use of techniques of the behavioral sciences to overcome organizational inertia (TICHY, 1983). There are many reasons to change, such as movement to diversify, a technological change or a new product design.

As said, the tension in strategic change is between the evolutionary and revolutionary varieties. Revolutionary changes require organizations to break with the existing standard (DE WIT and MEYER, 2004).

Revolutionary change is the key to market leadership. Marrick (1998) Tushman and O'Reilly (1996) suggest there are at least three points in its history that any company should undergo a revolutionary change to evolve toward a better level of performance.

Evolutionary changes (QUINN, 1978), in turn, involve small changes, which can occur throughout a company's lifetime and are guided by organizational learning. Imai (1986) argues that evolutionary changes have the power to change the organization gradually and produce both individual and organizational learning.

Both evolutionary and revolutionary changes have their place on the organizational agenda, since at some moment in the history of any organization changes will take place,

whether continuous or not. Just as with the previous paradoxes, the type of change should be suitable to the moment experienced by the organization and the context, among other factors. Nevertheless, the choice of the type of change will depend on the cognitive map of the leaders, because as said previously, these maps guide individuals' minds.

The next item explains the scientific method used in this study.

3. METHOD

Our methodology is exploratory-descriptive in character, with the exploratory study serving as the basis for formulating the hypotheses, isolating variables and key relations for the descriptive analysis (MARCONI e LAKATOS, 2002). This phase consisted of a literature review, leading to the construction of the measurement instrument of the strategy process at an individual level.

The main objective of a descriptive survey is to expose a phenomenon (MALHOTRA, 2006). In the present study, the phenomenon observed was the individual strategy formation process. Figure 3 shows the methodological scheme used in this work.

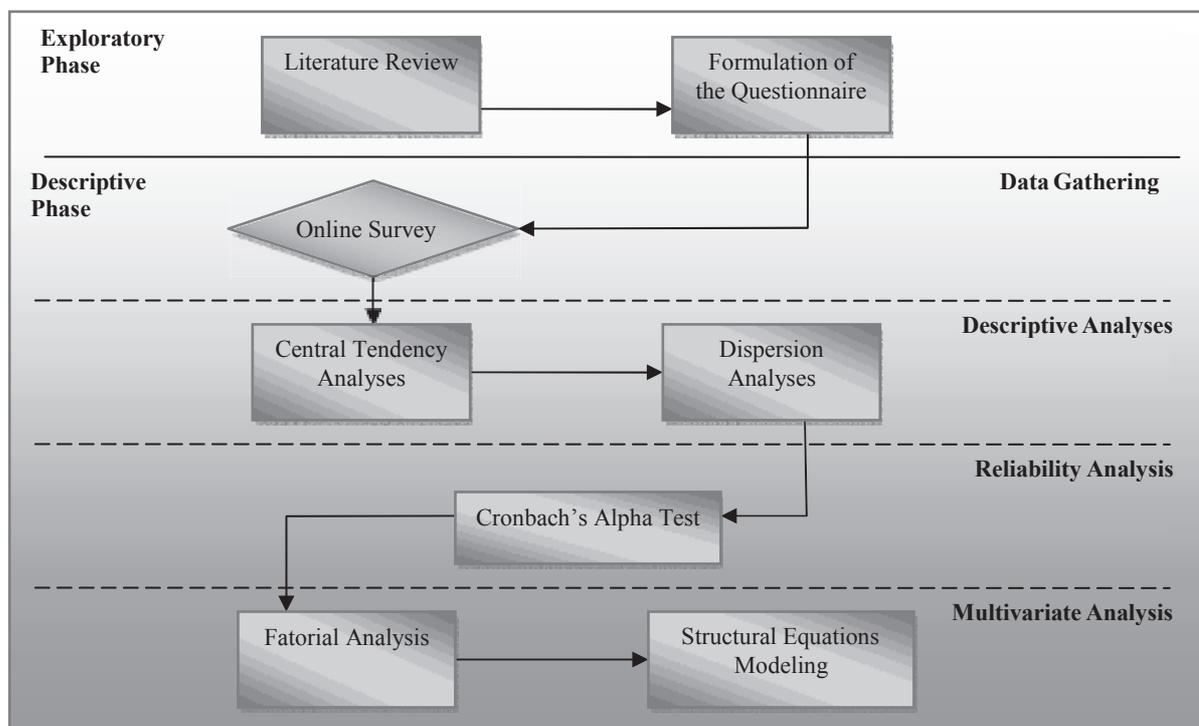


Figure 3 – Methodological Diagram

Source: Authors.

As can be seen above, in this study we used both analyses of descriptive statistics and multivariate analysis techniques (factor analysis and structural equations modeling). In the descriptive phase, we conducted an online survey to collect the data, along with descriptive and multivariate statistical analyses and the scale reliability (Cronbach) test.

3.1 Construction of the Instrument to Measure the Strategy Process

From the knowledge gained in the exploratory phase of the study, we identified three main dimensions that form the base of the strategy process (thinking, formation and change). For each dimension, we constructed a scale of ten items.

We used the work of De Wit and Meyer (2004) on the process, content and context of strategy as a reference to develop the items, because those authors present a theoretical framework and stress the existence of paradoxes in business strategy.

We took the ten items of each scale from the literature and make reference to the characteristics found in strategists. We tried to divide the items on each scale evenly, so that of the ten items, five correspond to one extreme of the paradox and the other five correspond to the other.

We used a Likert scale, ranging from one to five points. The level of agreement rises according to the greater number of points assigned, with Point 3 considered neutral. This type of scale is ordinal and permits determining whether an object has more or less of a characteristic than another object, but does not permit quantifying this difference. The use of nonparametric analysis tools is recommended for ordinal scales (MALHOTRA, 2006).

It is important to stress that the aim of the scale was to gain insight into individual characteristics, so the scales were prepared in the first person to facilitate the interpretation of the items by the respondents. In the questionnaires, the scales composed a single block of questions with their items distributed randomly to induce respondents to reach all the items before answering.

After creating the scales, we carried out a pretest to observe the the questionnaire's behavior in the field. This allowed us to improve some of the items, In the final version of the questionnaire, the alternatives were arranged randomly in a single block of questions, so as to alternate questions to facilitate the participants' responses (MARCONI; LAKATOS, 2002).

The items of the scales are shown in Tables 1, 2 and 3.

Dimension	Paradox Position	Item	Label
Thinking	Logical	I usually reflect critically on my beliefs and way of thinking.	Critical Reflection
	Logical	I analyze the internal environment of the firm and the sector where I work before formulating strategies.	SWOT Analysis
	Logical	I test my organizational beliefs to improve them and to be able to apply them.	Test of Beliefs
	Logical	I test my assumptions to avoid basing strategies only on intuition.	Test of Assumptions
	Logical	I develop strategies formally, following a clear logic.	Formality
	Creative	I use my imagination as a source of strategy creation.	Imagination
	Creative	I'm intuitive in formulating strategies and base my decisions on my understanding of things.	Intuition
	Creative	I formulate strategies based on my way of thinking and seeing things.	Personal Vision
	Creative	I believe that strategies arise from good ideas and not from good observations of the facts.	Good ideas
	Creative	I formulate strategy based on creativity.	Creativity

Table 1 – Scale to Measure Strategic Thinking

Source: Authors.

Dimension	Paradox Position	Item	Label
Formation	Deliberate	I believe a strategic plan must be completely finalized before starting to carry it out.	Finalized Plan
	Deliberate	I create strategies with long-term orientation.	Long-Term Strategy
	Deliberate	I document and make explicit the strategic plans defined for the business or activity.	Explicit Plans
	Deliberate	I map out well-defined targets and/or objectives to guide strategies.	Targets and Objectives
	Deliberate	I believe a good strategy must be able to describe people's actions, avoiding improvisation.	Strategy Describes Actions
	Emergent	I believe that a strategy also can be constructed or modified as actions are being carried out.	Emerging Modification
	Emergent	I think that strategies arise from daily experience, as things are happening.	Daily Strategy
	Emergent	I believe that strategic plans can arise as new opportunities for action are identified.	Take Advantage of Opportunities
	Emergent	I'm sure that new strategies can arise from people's experiences or initiatives.	Experience and Initiative
	Emergent	I create strategies that are essentially flexible.	Flexible Strategies

Table 2 – Scale for Measuring Strategy Formation

Source: Authors.

Dimension	Paradox Position	Item	Label
Change	Revolutionary	I note that the changes with the best results are those that reinvent the way the business or activity functions.	Best Changes Reinvent
	Revolutionary	I implement changes with big impact and speed to minimize people's resistance.	Impact and Speed
	Revolutionary	I believe that to achieve change it is necessary to have the courage to break with the existing undesirable situation.	Courage and Rupture
	Revolutionary	I develop skills to carry out big changes in strategy, considering the pressure from competitors or new government requirements.	Ability and External Pressure
	Revolutionary	I'm sure that for a strategic change to occur, a big organizational change has to occur.	Large Change
	Evolutionary	I believe in the firm's ability to learn and that changes must accompany the pace of this learning.	Learning
	Evolutionary	I think that change is something naturally present in a firm's daily routine.	Daily Change
	Evolutionary	I perceive that alterations in routines and processes need a certain amount of time to be understood, tested and applied.	Alterations Take Time
	Evolutionary	I think that my firm does not have a single person with the strength to carry out a big change that alters strategy.	Single Person Change
	Evolutionary	I implement various small organizational changes that cumulatively will become a big change in the firm's strategy.	Small Changes

Table 3 – Scale for Measuring Strategic Change

Source: Authors.

With the objective of knowing the sample better and deepening the analyses, we included three nominal questions (gender, position and area of college degree) and four ordinal questions (level of academic degree, hierarchical level within the firm, time of professional career and time in current position).

The survey was applied online. The questionnaire was posted at a link on the Internet and the respondents were invited by e-mail to access the site to answer the questionnaire.

3.2 Analysis of the Data

We obtained responses to 109 of the online survey questionnaires. Hair et al. (2006) state that for the use of multivariate analysis, a sample must have at least 50 respondents, but the recommended number is 100 or more. This is corroborated by Arkin and Colton (1970), who suggest that the ideal size of an infinite sample, with confidence coefficient of 95.5% and margin for error of plus or minus 10% is 100 respondents.

The non-probabilistic sample was composed of managers of 109 companies. Of these firms, 69 were in the information technology sector and 40 in the foreign trade area, either purely exporters or both. We did not include companies characterized as purely importers in the sample.

These two sectors were considered in this study because they reflect a growing reality in emerging countries, particularly Brazil, competing in dynamic environments that require more complex administrative capacities from strategists.

3.2.1 Reliability and Factor Analysis

To test the reliability of the scales we used Cronbach's alpha. The expected reliability values for this indicator, according to Malhotra (2006), are at least 0.6. Indices equal to or less than this do not have sufficient internal consistency.

We then subjected the three scales used to factor analysis, aiming to analyze the internal relations among a given number of variables and investigate the common latent factors to these items. The objective is to find a means of condensing information into a smaller number of variables (factors) while a minimum of acceptable loss (HAIR et al., 2006).

The factor load for an item to be considered a member of a determined latent factor in a sample of 100 questionnaires is at least 0.55 (HAIR et al., 2006). We excluded variables with smaller loads from the survey so as not to compromise the analyses.

For internal consistency, factor analysis must have significance of at most 0.005. The Kaiser-Meyer-Olkin measure of sampling adequacy is an index used to evaluate the adequacy of the factor analysis and varies from 0 to 1. Figures above 0.5 are considered high, that is, the factor analysis is considered adequate (MALHOTRA, 2006).

Another index of the adequacy of the factor correlation matrix is Bartlett's sphericity test, where the chi-square and degrees of freedom are calculated. For the chi-square, the higher the absolute value, the more adequate the matrix is (MALHOTRA, 2006).

The strategic thinking scale obtained a reliability alpha of 0.685 with 10 items. The matrix resulting from the factor analysis rotated by the varimax method in four iterations can be observed in Table 4. The KMO observed was 0.686 with 45 degrees of freedom and chi-square of 204.162, significant at the 0.000 level.

Items	Logical Thinking	Intuitive Thinking	Creative Thinking
Critical Reflection	.692		
Test of Assumptions	.653		
Test of Beliefs	.647		
SWOT Analysis	.640		
Formality	.558		
Intuition		.807	
Personal Vision		.785	
Imagination		.712	
Good Ideas			.925
Creativity			.684

Table 4 – Factor Analysis of the Strategic Thinking Scale
Source: Authors.

It can be seen in Table 4 that the logical thinking items are grouped in a single factor (1), thus called “Logical Thinking”. The theoretical dimension of creative thinking presented an internal division, whereby the strategists of the industries investigated perceived (3) “Creative Thinking” as a different dimension that (2) “Intuitive Thinking”. According to the empirical findings, these three factors are then considered as components of “Strategic Thinking” in the following analyses.

The strategy formation scale obtained an alpha reliability index of 0.624. The matrix resulting from the factor analysis rotated by the varimax method in five iterations is shown in Table 5. The observed KMO was 0.625 with 45 degrees of freedom and the chi-square was 179.516, significant at the 0.000 level.

Items	Learning	Deliberate Formation	Daily Formation
Flexible Strategies	.779		
Take Advantage of Opportunities	.750		
Experience and Initiative	.683		
Strategy Describes Actions	-		
Targets and Objectives		.736	
Explicit Plans		.701	
Finalized Plan		.651	
Long-Term Strategy		-	
Daily Strategy			.854
Emerging Modification			.757

Table 5 – Factor Analysis of the Strategy Formation Scale
Source: Authors.

It is important to observe that the “Strategy Describes Actions” and “Long-Term Strategy” items did not have a load above the minimum of 0.55 required in this study (HAIR *et al.* 2006) and for this reason were excluded.

The intersection of the variables of the first factor is the organization’s capacity for “Learning”, so we designated this as the name for this grouping (1). The items of the second latent variable (2) refer to “Deliberate Formation”, and the other items form factor (3), “Daily Formation”.

The strategic change scale obtained an alpha reliability index of 0.623 with 10 degrees of freedom. The matrix resulting from the factor analysis rotated by the varimax method in

three iterations was 0.626 with com 45 degrees of freedom and chi-square of 159.704, significant at the 0.000 level.

Items	Reactive Change	Change Requires Courage	Learned Change	Proactive Change
Ability and External Pressure	.703			
Daily Change	.698			
Small Changes	.675			
Impact and Speed	.555			
Courage and Rupture		.814		
Alterations Take Time		.713		
Learning			.668	
Single Person Change			.637	
Best Changes Reinvent				.835
Large Change				.578

Table 6 – Factor Analysis of the Strategic Change Scale

Source: Authors.

The outcome of the factor analysis of Strategic Change did not behave as predicted by the theory. Theoretically opposed items were grouped as common factors. It is necessary to examine the reasons for this.

The factors (3) “Learned Change” and (4) “Proactive Change” behaved as expected, presenting pure characteristics, respectively, of Evolutionary Change and Revolutionary Change.

The variables making up the latent factor (1) “Reactive Change” overlapped because the respondents believed that changes occur based on external stimuli, which are reactive or evolutionary.

In factor (2), “Change Requires Courage”, we observed that regardless of its nature as evolutionary or revolutionary, changes need the strategist to have courage to guide them, and this process can take a certain amount of time to get under way.

The factors found served as an input for the structural equations modeling.

3.2.2 Structural Equations Modeling

Structural equations modeling (SEM) is a statistical method that seeks to explain the relationship among multiple variables. This technique examines structures of interrelationships, expressed in a series of equations, similar to a series or multiple regression equations (HAIR et al., 2006).

Structural equations modeling can be viewed, according to Hair et al. (2006), as an extension of multiple regression, where the most obvious difference between it and other multivariate techniques is the way of dealing with the sets of dependent variables. The concern in this technique is with the order of the variables. In the regression “X causes Y”; in SEM is “X causes Y and Y causes Z”, so a dependent variable shifts role and becomes an independent variable in a following relation (HAIR et al., 2006).

The use of SEM is of particular importance in the construction of models (representations of the theory). Theories can be defined as a symmetric set of relationships that furnish a consistent and comprehensive explanation of a phenomenon (Hair et al., 2006).

For Maruyama (1998), path analysis is related to models with one-way causal flow, where the measures of each conceptual variable are perfectly reliable. Starting from this premise, it is believed that there is no error in the measurement or specification of the

variables. That is, each measure is seen as an exact manifestation of the theoretical variable.

Certainly it is not realistic in the social sciences to assume perfect reliability. This fact restricted the application of this data analysis technique in this field of science for a long time. A partial solution found for this problem was the inclusion of unobserved, or latent, variables, as well as errors in the theoretical model. These indicators reveal the quantity of variance not explained by the exogenous (independent) variables specified (FARIAS and SANTOS, 2000).

The starting point to apply SEM is the theory utilized by the researcher regarding the causal relations of a set of variables. The researcher must be well grounded in the theory regarding the specification of the causal relations. With this as a premise, this theory is presented formally and clearly in a model, which can be expressed either in words or in a diagram. Hence, the diagram can be understood as a group of statements that summarize a set of hypotheses (FARIAS and SANTOS, 2000).

The most critical error in the development of models is the specification error. This failing consists of omitting one or more independent variables. Hence, all structural equation models are afflicted, in one way or another, by this error, considering that a potential construct or indicator can be excluded (HAIR et al., 2006).

To carry out this analysis, it is necessary to have data for each variable of the model. The variables must be measured in an interval scale, or possibly in an ordinal scale that can be treated as an interval one (FARIAS and SANTOS, 2000).

There are two types of variables in a structural equations model: endogenous and exogenous variables. The values of the endogenous variables are explained by one or more of the model's exogenous variables. The exogenous variables are assumed as given, that is, the model does not try to explain them. This distinction is similar to that made between dependent (exogenous) and independent (exogenous) variables in regression analysis. However, in SEM, a variable can be both dependent and independent (LOEHLIN, 1998; MARUYAMA, 1998; HAIR et al., 2006).

Figure 4 shows the strategy process model developed based on De Wit and Meyer (2004).

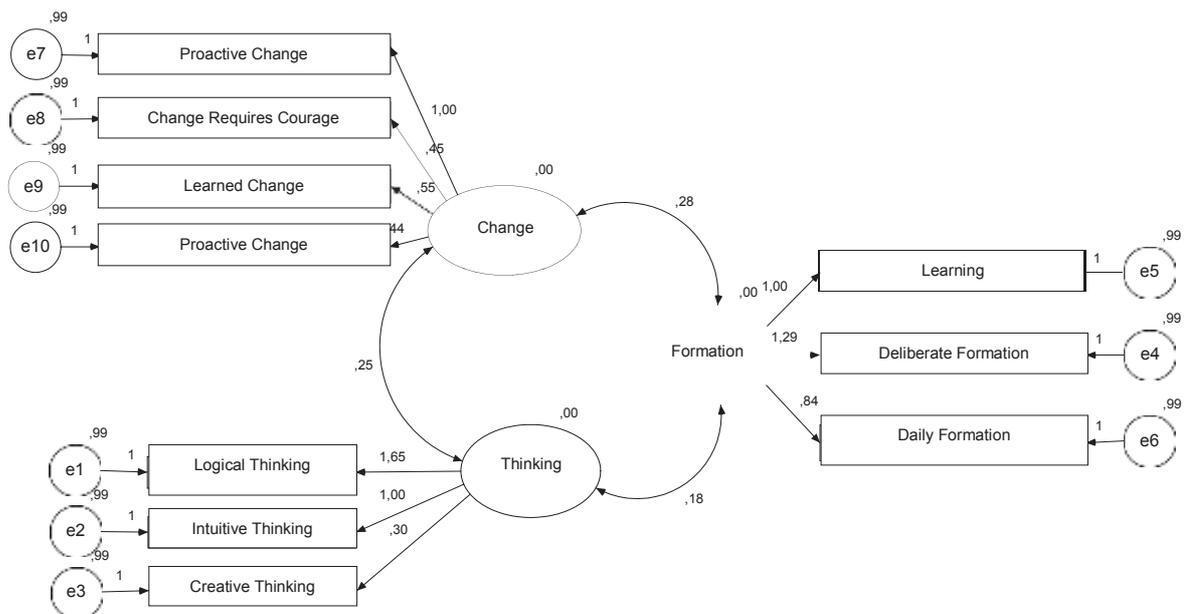


Figure 4 – Strategy Process Model
Source: Authors.

We measured the following indices of fit of the model to verify its reliability: GFI (0.940); CFI (0.967); and RMSEA (0.036).

According to Hair et al. (2006), to indicate the model's reliability, the first two values (GFI and CFI) must be above 0.900, while values under 0.080 are expected for the RMSEA.

The estimates obtained in this survey for the correlations between the dimensions of the strategy process are shown in Table 7.

Dimensions	Estimate	Standard Deviation	Significance
Thinking <input checked="" type="checkbox"/> Change	.254	.080	.001
Formation <input checked="" type="checkbox"/> Change	.284	.077	.000
Formation <input checked="" type="checkbox"/> Thinking	.181	.061	.003

Table 7 – Correlation between the strategy process dimensions
Source: Authors.

All the correlations tested were significant, confirming the ideas of De Wit and Meyer (2004) on the existence of these three dimensions in the process of making strategy.

It is also possible to identify cause and effect relations between the empirical factors observed in the factor analysis and the dimensions proposed by De Wit and Meyer (2004). These relations are shown in Table 8.

Dimensions	Estimate	Standard Deviation	Significance
Deliberate Formation <input checked="" type="checkbox"/> Formation	1.289	.366	.000
Daily Formation <input checked="" type="checkbox"/> Formation	.845	.270	.002
Logical Thinking <input checked="" type="checkbox"/> Thinking	1.652	.516	.001
Learned Change <input checked="" type="checkbox"/> Change	.551	.176	.002
Proactive Change <input checked="" type="checkbox"/> Change	.443	.159	.005

Table 8 – Relation between the dimensions of the strategy process and the factors identified empirically.
Source: Authors.

The values estimated in this table represent the weights of the regressions carried out. There were some particular behaviors for the sample investigated. The “Learned Change” and “Proactive Change” dimensions, which combine revolutionary and evolutionary components, were significant for the Strategic Change construct, thus presenting behaviors not predicted by De Wit and Meyer (2004).

“Deliberate Formation” and “Daily Formation” represent the paradox predicted between prescription and emergence, confirming the theory proposed by De Wit and Meyer (2004).

“Logical Thinking” was significant, as indicated by De Wit and Meyer (2004) in their preliminary studies, but the creative thinking variable did not show strength, contrary to other findings in the literature. We believe this is a particularity of the sample studied.

6. FINAL THOUGHTS

From the literature review and empirical findings, we constructed a model of strategic thinking that united the three dimensions proposed by De Wit and Meyer (2004) with the factors identified in the factor analysis.

We observed behavior peculiar to the two samples, that of strategists of information technology firms and those who work with exportation or importation and exportation, especially in the perception of strategic change. We believe this behavior occurs due to the dynamic context of these sectors, which face constant changes, including of variables of the

external environment that are not controllable by the firms, such as legislation, exchange rate, new technologies and new competitors.

An understanding of the strategy process is fundamental to comprehend how strategists act. This study contributes to the identification of which factors are most relevant in composing the dimensions of the strategy process, besides confirming the theoretical proposal of De Wit and Meyer (2004) on change, thinking and formation as components of this process.

Through structural equations modeling, we verified that the three basic dimensions of the strategy process are correlated, so that alterations in any one of them will cause variations in the others.

The scales used to measure the strategy process presented good reliability indices and the correlation estimates of the structural equations modeling showed behaved as expected based on the theory, thus indicating that the research instrument is reliable and really is measuring the originally proposed dimensions.

For future studies, we recommend use of the research instrument proposed here to measure the strategy process in other sectors, to investigate and understand the peculiarities of each sector with respect to the process of making strategy.

7. REFERENCES

- ARKIN, H.; COLTON, R. R. **Statistical Methods**. Barnes & Noble Books. 1970.
- ANDREWS, K. R. **The concept of corporate strategy**. 1987. In: DE WIT, B; MEYER, R. *Strategy: Process, Content, Context. An international perspective*. Minneapolis/St. Paul: West Publishing Company, 2004.
- ANSOFF, H. I. **Business Strategy**. Great Britain: Penguin Books, 1973.
- BERRIS, J. The ten faces of innovation: strategies for heightening creativity. **E-learning age**, September 2006.
- BERTERO, C. O.; BINDER, M. P.; VASCONCELOS, F. C. **Estratégia empresarial: a produção científica brasileira entre 1991 e 2002**. In: BERTERO, C.O.; CALDAS, M. P.; WOOD JR., T. *Produção científica em administração no Brasil: estado da arte*. Editora Atlas São Paulo, 2005, Chapter 2, pp.19-34.
- BOURLAKIS, M. A.; BOURLAKIS C. A. Deliberate and emergent logistic strategies in food retailing: A case study of the Greek multiple food retail sector. **Supply Chain Management**, 6, p.189, 2001.
- CHANDLER, A. D. **Introdução à estratégia e estrutura**. In: . *Ensaio para uma teoria histórica da grande empresa*. Rio de Janeiro: Fundação Getúlio Vargas, 1998.
- CORTELLO, C. Fostering creativity. **Industrial Engineer**, 37, 10, p.26, 2005.
- DE WIT, B.; MEYER, R. **Strategy: Process, Content, Context. An international perspective**. Minneapolis/St. Paul: West Publishing Company, 2004.
- EISENHARDT, K. M. Paradox, spirals, ambivalence: The new language of change and pluralism. **Academy of Management Review**, vol. 85, n. 4, pp. 708-705, 2000.

FARIAS, S. A.; SANTOS, R. C. Modelagem de equações estruturais e satisfação do consumidor: uma investigação teórica e prática. **Revista de Administração Contemporânea**, v. 4, n. 3, Sept./Dec. 2000.

GRANT, R. M. **Contemporary Strategy Analysis: Concepts, techniques, applications**. UK: Blackwell Publishers Inc., 1995.

HAIR, J. F. Jr.; BLACK, W. C.; BABIN, B. J.; ANDERSON R. E.; TATHAM, R. L. **Multivariate Data Analysis**. 6th ed. New Jersey: Prentice Hall, 2006.

HENDERSON, B. D. **As origens da estratégia**. In: MONTGOMERY, C.; PORTER, M. E. *Estratégia: a busca da vantagem competitiva*, São Paulo: Editora Campus, 1998.

HIGLEY, J. Bass focuses on deliberate agenda. **Hotel and Motel Management**, 215, 19, p. 3, 2000.

IDENBURG, P. Four styles of strategy development. **Long Range Planning**, v. 26, n. 6, p. 132-137, December 1993.

IMAI, M. **Kaizen: The key to Japan's competitive success**. 1986. In: DE WIT, B.; MEYER, R. *Strategy: Process, Content, Context. An international perspective*. Minneapolis/St. Paul: West Publishing Company, 2004.

KAHNEMAN, D. **Maps of bounded rationality: A perspective on intuitive judgment and choice**. Prize Lecture, Princeton University, 2002.

LOEHLIN, J. C. **Latent Variable Models: An introduction to factor, path, and structural analysis**. Mahwah, New Jersey: LEA, 1998.

MACHADO-DA-SILVA, C. L. Mudança e estratégia nas organizações: perspectivas cognitiva e institucional. In: **XXII Encontro Anual da ANPAD, 1998, Foz do Iguaçu. Anais do XXII ENANPAD. Rio de Janeiro: ANPAD, 1998. v. 1. p. 15.**

MALHOTRA, N. K. **Pesquisa de marketing: uma orientação aplicada**. 4th ed. Porto Alegre: Bookman, 2006.

MARCONI, M. A.; LAKATOS, E. M. **Técnicas de Pesquisa**. 5th ed. São Paulo: Atlas, 2002.

MARUYAMA, G. M. **Basics of Structural Equation Modeling**. Thousand Oaks, CA: Sage, 1998.

MARRICK, C. Revolutionary change is key to market leadership. **Credit Union Magazine**, 64, 10, 1998.

MINTZBERG, H.; WESTLEY, F. Decision-making: It's not what you think. **Sloan Management Review**, vol. 42, n. 3, Spring 2001.

MINTZBERG, H. **A criação artesanal da estratégia**. In: MONTGOMERY, C.; PORTER, M. *Estratégia: a busca da vantagem competitiva*. 2nd ed. Rio de Janeiro: Campus, 1998, pp. 419-437.

_____ ; AHLSTRAND, B.; LAMPEL, J. **Safári de estratégia: um roteiro pela selva do planejamento estratégico**. Porto Alegre: Bookman, 2000.

_____ ; LAMPEL, J. Reflecting on the strategy process. **Sloan Management Review**, 40, 3, 1999.

_____. The fall and rise of strategy planning. **Harvard Business Review**, vol. 72 n. 1, pp. 107-114, 1994.

_____ ; WATERS, J. Of strategies deliberate and emergent. **Strategic Management Journal**, 6, 257-272, 1985.

MOORE, M. The ten faces of innovation: IDEO's strategies for beating the devil's advocate. **Human Resource Planning**, 29, 3, p. 39, 2006.

OHMAE, K. **The mind of the strategist**. 1982. In: DE WIT, B.; MEYER, R. *Strategy: Process, Content and Context. An international perspective*. Minneapolis/St. Paul: West Publishing Company, 2004.

PORTER, M. E. **Estratégia competitiva**. 7th ed. Rio de Janeiro: Elsevier, 1986.

QUINN, J. B. Strategic change: Logical incrementalism. **Sloan Management Review**, 1978.

RAIMOND, P. Two styles of foresight: Are we predicting the future or inventing it? **Long Range Planning**, vol. 29, n. 2, pp. 208-214, 1996.

REIN, R. 10 Ways to spark creativity at leadership retreats. **Successful Meeting**, 55, 11, p. 26, 2006.

RUMELT, R.; SCHENDEL, D.; TEECE, D. Fundamental issues in strategy. In:_____. (Ed) **Fundamental Issues in Strategy: A research agenda**. Boston: Harvard Business School Press, 1995.

STEINER, G. A., KUNIN, H.; KUNIN, E. Formal strategy planning in the United States today. **Long Range Planning**, vol. 16, n. 3, 12-7, 1983.

TICHY, N. **Managing Strategic Change**. New York: John Wiley, 1983.

TUSHMAN, M. L.; O'REILLY, C. A. Ambidextrous organizations: Managing evolutionary and revolutionary change. **California Management Review**, 38, 4, 1996.