FUTURE SRJ
FUTURE STUDIES RESEARCH JOURNAL: TRENDS AND STRATEGIES

PROFUTURO: FUTURE STUDIES PROGRAM
Scientific editor: James Terence Coulter Wright
Evaluation: Doublé Blind Review by SEER/OJS
Revision: Grammatical, normative and of layout

SCENARIOS PLANNING AS LEARNING

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ABSTRACT

Scenario planning has increasingly been utilised as a tool to test and improve organizational performance within dynamic environments. The purpose of this article is to demonstrate the potential of an experimental model of Scenario Planning to mobilize, encourage and provide added content to the organizational decision making processes, primarily as related to the Strategic Planning of two governmental institutions: a pharmaceutical industry and a foundation devoted to technological education. Here, phases are detailed, whereupon a hybrid model of scenario planning – herein under named Planning through Learning – is applied, by means of research and action. The scenarios that result from the experiment are presented and the most relevant results of an evaluation pertaining to this practice are laid forth. To this effect, two widely acknowledged Scenario Planning models – that of the Prospective school and Shell´s model – which posed as reference for the proposition and application of an experimental model concerning the two study targets, were analysed. The technique´s evaluation process was undertaken resorting to a questionnaire that collected high reliability indexes and also by means of participant interviews. Results testify the model´s efficiency in supporting the decision making process at competitive environments within which both researched institutions operate.

Key-words: Scenarios. Strategy. Organizational Learning.

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O PLANEJAMENTO DE CENÁRIOS COMO APRENDIZADO

RESUMO

O planejamento de cenários tem sido cada vez mais utilizado como instrumento para testar e melhorar o desempenho das organizações em ambientes dinâmicos. Neste artigo, objetiva-se demonstrar o potencial de um modelo experimental de Planejamento de Cenários para mobilizar, motivar e agregar maior conteúdo à tomada de decisão organizacional, principalmente no que se refere ao Planejamento Estratégico de duas instituições do setor público: uma indústria farmacêutica e uma fundação de ensino tecnológico. Descrevem-se as etapas de aplicação de um modelo híbrido de planejamento de cenários - aqui denominado Planejamento pelo Aprendizado - por meio da pesquisa-ação; apresentam-se os cenários resultantes do experimento; e delineia-se os principais resultados de uma avaliação realizada sobre esta prática. Para tanto, analisou-se dois modelos já consagrados de Planejamento de Cenários - a escola Prospectiva e o modelo da Shell - que serviram como referencial para a proposição e aplicação de um modelo experimental nos dois objetos de estudo. O processo de avaliação do impacto da técnica foi realizado através de um questionário que obteve altos índices de confiabilidade, e por meio de entrevistas com os participantes. Os resultados atestam a eficiência do modelo no suporte à tomada de decisão em ambiente competitivo, no qual se inserem as duas instituições pesquisadas.

Palavras-chave: Cenários. Estratégia. Aprendizado Organizacional.

1 INTRODUCTION

Ever since the Industrial Revolution (1860) – in special when "organizations realized that most of the issues they faced lay in the increased depletion and vulnerability of their traditional markets and that aggressive behaviour, no matter how aggressive would not solve this inadequacy" (Ansoff, 1977, p.53) – investments have been made to popularize decision making techniques particularly in terms of strategy.

Given the rampant rise of discontinuities in the environments within which organizations encounter themselves, these are driven to understand that trend based planning (envisioning that the past ought to repeat itself at any given future moment) is poor in terms of effectiveness. Subjectivity, once considered a justifiable reason to meander uncertainty, is thereafter considered an element taking part in any kind of decision making related methodology, whether one of short, medium or long term span. Schwartz (2000) suggests the existence of signs that once perceived along time may promote a less unpredictable future outcome. Day and Schoemaker (2005) state that such signs, much like that which takes place in human peripheral vision, are not easily seen or interpreted but may be vital to the success or survival of an organization. In public or private segments, concerns with the future centre on diverse contents and arise in different formats, some of which present themselves in a repetitive manner, as set forth in suit.

In 2003, the government of the State of Minas Gerais ordered a study of scenarios with a seventeen year timeframe (SEPLAG, 2003). This study envisioned four possible scenarios, utilising as basic directive axes the sustained development (or not) of the national economy; the efficiency (or not) and competitiveness (or frailness) of that State´s economic, political and institutional environment. These scenarios gave rise to a set of strategies, amongst which one was named management shock.

The State´s sound performance during this period was attributed to this initiative. In 2007, the revisiting of the scenarios built in 2003 lead to their temporal extension by an additional three year period. A similar exercise to that of the State of Minas Gerais was conducted, in 2006, by the government of the State of Espírito Santo (Espírito Santo, 2006), which identified three possible scenarios that laid the foundation for the 2025 Espírito Santo Development Plan.

In 1991, according to the journal *The Guardian* (1992), a Pioneer Scenario Planning experience in the governmental arena took place in South Africa. Named "*Mont Fleur* Scenarios" (after the convention centre where the studies were conducted) this project gathered 22 participants that shared relevance in the South African political, social and economic scene. Once again, in 2005, a new group of South Africans gathered at the same site and designed scenarios for South Africa in 2020.

At the Davos World Economic Forum in 2005, Shell - pioneer in Scenario Planning- demonstrated how their methodology had matured over the last years in a document entitled "Three decades of scenario planning at Shell". Here, the company presented the evolution of the methodology, at first focused on the behaviour of oil prices, to thereafter be applied to the entire corporation´s decision making process. "*People and Connections*" is the name of Shell´s scenarios for 2025 (Cornelius, Van de Pute & Romani, 2005).

Given the current global economic, political and social situation, plus the lack of academic studies concerning the Scenario Planning theme particularly in Brazil, this methodology ends up being a relevant object for research. Nevertheless, one verifies, over the last decade, despite only incipiently, the springing of its application, in different modalities, at human organizations, as a means of obtaining greater reliability when it comes to projections concerning the future.

For Varum and Melo (2010); Bradfield, Wright, Burt, Cairns and Van der Heijden (2005), Scenario Planning re-birth derives from the "boom" brought about by the raise in research and academic analysis concerning the theme itself. In Bain & Company´s (2009) studies concerning the use of management, Scenario Planning appears amongst the top 10 best management techniques that generate high satisfaction indexes at successful companies. At a similar research conducted in 1999, Scenario Planning shows up amongst the 4 tools with the highest retention levels.

This technical evidence might be related to the affirmation made by Martelli (*apud* Varum & Melo, 2010, p.362) whereby the use of scenarios "comes and goes in waves", yet have "come to stay". Scenario Model Plans have been designed ever since becoming popular thanks to Wack (1985) and Berger (2004), although neither provided a legate concerning how to build them.

However, scenario planning methodology has come across barriers at implementation. Verity (2003) identified three possible causes for its non-application at companies: high costs; management´s lack of confidence before uncertainty; and a trend concerning the fact that the process itself might be influenced by the dominant corporate cultural style.

Despite these obstacles, the Scenario Planning technique is still continuously utilised as a means for decision making. Given this fact, in this study the objective is to propose a scenario planning model and evaluate it as to the dimensions: methodological process, results and behaviour. To this effect, an experimental model was tested and assessed at two public sector companies using a research-action approach, as described during the course of this article.

2 SCENARIO PLANNING

2.1 ORIGINS

Scenario planning began in the army, during the exercise of war games whereby humans and machines interacted (Van der Heijden, 1996; Schoemaker, 1993). According to Schwartz (2000), scenario planning was extensively utilised by the American Air Force (FAA) in an attempt to foresee enemy actions and build alternative combat strategies. In the early 60´s, such methods became extremely mechanized and might have disappeared had it not been for the work of Pierre Wack and Ted Newland (Kleiner, 2003). It´s generally accepted that this methodology's public domain and improvement is due to the launch, in 1967, of the book "*The year 2000"* written by Herman Kahn, a former member of the FAA who popularized the theme (Van der Heijden, 1996; Schwartz, 2000; Wack, 1985; Cornelius et al., 2005; Buarque, 2003). In the book, Khan (1967) tells stories to describe possible manners concerning the use of nuclear technologies by hostile nations.

As of the 70´s, studies undertaken by Pierre Wack, a former head at Shell´s planning area, pushed scenario planning into a new dimension. At the time, Wack and his Shell colleagues were looking for events which might impact oil prices which had remained stable ever since the Second World War despite both growing demand and refining capacity. Given their predictability, these variables did not pose a major concern. The issue circumvented supply, more

precisely, the places where supplies would come from. For Wack, production decisions would no longer be made by refining companies but by those who controlled the reserves. Gradually, the Organization of the Petroleum Exporting Countries (OPEC), primarily Islamic, took on greater political standing and signalled that producing countries would refuse to supply petrol beyond true needs. As of this perception, Wack and his team envisioned that the Arabs would significantly increase oil prices and the uncertainty lay in when this would take place. They forecast the event might take place in and around 1975 (Van der Heijden, 1996; Schwartz, 2000).

During the year of 1972 and early 1973, the message set forth by Wack´s team spread throughout the organization across the world. The price of the barrel of oil could bolt from US$ 2 to an unimaginable high of US$ 10. Despite discredit on behalf of some executives, Shell started to implement some contingency actions (Kleiner, 2003). In October 1973, the high in oil prices and the energy crisis stroked the world; in 1975, the barrel reached US$ 13; in 1979, given the Iranian revolution, once more it soared now to US$ 37 the barrel. It was during this period that Shell, one of the less expressive amongst the seven greatest oil companies in the world, became one of the most lucrative. Since then, according to Russo and Schoemaker (2002), Shell has consistently been better in its forecasts than the other large petroleum corporations. Ironically, this is the same Shell that in the early sixties was called the "ugly sister" by Forbes Magazine, given its poor financial performance (Kleiner, 2003).

Literature also presents another line of thought according to which the origin of scenarios might relate to the term "prospective", utilized by the French educator Gaston Berger, in 1957, to demonstrate the need of an attitude oriented towards the future (Marcial, 2005). This approach and the herein named "Shell School of Planning" will be presented hereinafter.

2.2 CONCEPTS

According to Davis (1998), scenarios are plausible, pertinent and alternative stories concerning the future. They are powerful tools to direct what is fundamentally significant and unknown: the future. For Schoemaker (1995), the planning of scenarios is a disciplined method to imagine possible futures that the organization must utilize in a broad range of subjects. For Kahn and Wiener (1968), scenarios are narrative descriptions of the future which focus attention

on cause processes and on points of decision. For Project Milenium´s (Glenn, 1994) group of research concerning the future, precision is not the best way to evaluate good scenario planning but rather, plausibility, internal consistency, the description of cause processes and usability in terms of decision making. Godet and Roubelat (*apud* Mietzner and Reger, 2004) define scenarios as a description of a future situation and of the course of events that enable people to move ahead of the current situation, effectively, towards the future. From this perspective, one might state that scenarios decompose complex phenomena into analysable subsystems (Schoemaker, 1993).

Some authors, according to Mietzner and Reger (2004), distinguish between scenario building and planning. The construction of scenarios takes into consideration uncertainties that encompass the future: they evaluate and identify possible results for different futures. Under this concept, scenario building is the necessary foundation for Scenario Planning, an administrative methodology used by managers to articulate their mental models concerning the future and thus improve the decision making process. Others do not distinguish scenarios from planning itself but rather unify both.

Wright (2005) seeks to consolidate some of the main concepts concerning the theme of scenarios. According to the author, subtle variations in scenario concepts have been core to continued debate. Under a simpler interpretation, scenarios are stories (scripts). This appears as a surprise: *can stories be used as a management tool to communicate the strategy and stimulate dialogue?* However, simultaneously, increased interest in scenarios transformed story telling into a means of enhancing awareness, promoting creativity and contributing, so that decision makers better deal with complexity and uncertainties. Under this perspective, Schwartz (2000) states stories convey meaning; help explain why things might happen in a given manner: they organize and render significance to events.

Godet (2000) believes a scenario is a set formed by the description of a future situation and the course of events that enable transition from a current situation to a future condition. They fall under two large groups: exploratory scenarios that arise from past and present trends and lead towards probable futures; and anticipation or normative scenarios, built as of alternative future images that might either be desirable or undesirable.

Cornelius et al. (2005, p. 94) distinguish forecasts from scenarios: "Scenario Planning fundamentally differs from forecasts by accepting uncertainty, attempting to understand it and ensuring comprehension incorporates into the rationale". For this author, much like for Schwartz (2000) and Schoemaker (1993), scenarios are not projections, predictions or preferences but coherent stories that indicate future alternative paths. This affirmation was shared by Adam Kahane when scenario design took place at *Mont Fleur* (1992): "scenario is how one might look at the future, not predict it". On the other hand, according to Van Der Heijden (1996), predictions are based on the supposition that the past might be extended to the future, a tool for the rational strategist.

In the mid sixties, increased failures in planning based on predictions drove Shell into becoming interested in a form of planning ground on "qualitative causal thought". Under this perspective, scenarios are thus ideated through a causative thought process, not a probabilistic one (Van der Heijden, 1996).

2.3 SHELL SCHOOL X FRENCH SCENARIO PLANNING SCHOOL

According to Schoemaker (1993), the essence of scenario methodologies relates to several things amongst which art and science; induction and deduction. These multiple facets, per the referred author, ensure the method remains indescribable and distorted before academic parameters. Possibly that´s why the notion of "methodological chaos" - mentioned in Bradfield et al. (2005) and corroborated by Varum and Melo´s (2010) research – arose.

Next, two schools devoted to scenario studies are described, both of which are highlights in both use and organizational research: Shell´s School, popularized by Wack, Schwartz and Van der Heijden; and the Prospective one, lead by Michel Godet. Despite similarities, Shell and Godet´s models (French School) differ in the sequence steps are applied; in the greater and reduced use of quantitative models; in the intrinsic complexity of each approach (Chart 1).

STEP	SHELL SCHOOL	MICHEL GODET´S SCHOOL
A	Definition of the Problem, question or decision to be taken.	Definition of the problem, question or decision to be taken.
B	Key factors	Tree of competencies (diagnosis)
C	Macro environment driving forces	Key variables

Continues

Continuance

STEP	SHELL SCHOOL	MICHEL GODET´S SCHOOL
D	Hierarchy of variables; uncertainty and importance.	MACTOR
E	Definition of orthogonal axes	Consult specialists: Delphi
F	Scenario construction (narratives)	Strategic options
G	Strategic options	Options x Uncertainty
H	Indicators for monitoring purposes	Strategies and Objectives
I	-	Action plans and monitoring

Chart 1: Convergence and divergence of the Shell and French school´s Scenario Planning Models

Source: Prepared by the authors

Both schools present the following development sequence:

- ✓ **First Phase**: it is the same in both models, that is, one which starts off with an issue to solve, a question to be analysed or a decision that needs to be taken.
- ✓ **Second Phase:** the Shell school seeks to identify key factors that positively or negatively interfere in the core question or decision to be taken. On the other hand, the French school seeks to diagnose the organization as a whole, in the form of a tree: at roots one places technical competencies and knowhow; the truck holds the production capacity; branches represent product lines and markets. For Godet (2004), the tree of skills is vital to determining a company´s strengths and weaknesses. In the author´s own words, "*to understand where one wants to go you must understand where you came from*".
- ✓ **Third Phase:** the French school attempts to select key variables of both the internal and external system under study. For Godet (2004), this list of variables must not exceed 70-80 observations. Once having mapped the variables, these are paired and submitted to an assessment concerning the impact of one over another and influence is graded as: (0) nonexistent, (1) scarce influence, (2) medium, (3) strong and (4) potential. Once concluded, key variable identification per say takes place by means of direct and indirect classification. At the Shell school, this phase is restricted to the identification of the microenvironment's driving forces (an activity that is not undertaken under the French school´s method).

- ✓ **Fourth Phase:** the Shell school ranks identified variables by importance and uncertainty. The French school seeks - by means of the Player´s Method - Objectives and Force Relations (MACTOR), to evaluate the relations of power between players and study their convergence and divergence in relation to a number of positions and associated objectives.
- ✓ **Fifth Phase:** in Godet´s model, use is made of the Delphi Methodology which consults specialists on the theme at hand, by means of successive questionnaires, so as to precisely define the scope of investigation. At this point, scenarios are built, following the French methodology. On the other hand, at the Shell school, orthogonal axes which give rise to scenarios, are defined.
- ✓ **Sixth Phase:** in the Shell school model, scenarios are built as of a causative relation between factors and trends in the narrative form whilst in Godet´s model, strategic options are formulated.
- ✓ **Seventh Phase:** the Shell model resumes the core issue, defined in the first phase and formulates strategies. The French school evaluates the strategic options in light of uncertainties.
- ✓ **Eighth Phase:** the French school formulates strategies and respective objectives. The Shell school identifies scenario indicators which require monitoring.

The French school´s model presents yet another phase which comprises the definition of action plans and monitoring of the external environment.

3 RESEARCH-ACTION: THE MAIN TECHNIQUE UTILIZED IN THIS STUDY

Research-action is a method or a research strategy that combines various methods or social research techniques with which one establishes a collective, participative and active structure to seek information. As strategy, research-action might be understood as a means to ideate and organize a practical social research, which is aligned with action and requirements concerning player participation, in as much as the latter pertain to the issue. During implementation, researchers resort to methods and group techniques to deal with the collective dimension and with the investigation´s interaction, with registry techniques, processing, the presentation of results as well as, eventually,

to questionnaires and individual interview techniques as a means of complementing information (Thiollent, 2005). As a method, according to Brandão (1999), research-action, instead of devoting itself to the explanation of social phenomena once they have occurred, seeks the inverse path: to acquire knowledge during the process considered as one of "transformation".

Though incipient, at organizational and technological environments, this mode of research is relatively traditional as a means of obtaining information, negotiating solutions for issues of the organizational-technical kind and enabling greater participation of social players in the decision making process (Thiollent, 2005).

Tripp (2005) characterizes research-action as one of the numerous types of investigation-action (generic terminology for any process that follows a cycle whereby practice is improved by the systemic oscillation between acting in the pratical arena and investigating the same) as is the case, for instance, with learning-action - a reflexive practice -, experimental learning, PDCA cycles (*Plan*, *Do*, *Check* and *Act*) and others. True enough, as Thiollent (2005) demonstrates, one of the foundations of research-action lies in the constant feedback of information produced by the research. The author presents a script of four stages which, according to him, is one of the possible ways of tackling this kind of research: research, learning, action and evaluation.

The research-action method was utilised in two stages of this study as a means of obtaining relevant information concerning the practical application of the experimental Scenario Planning model. At the end of the technique, a questionnaire was applied. This was previously tested with a group of five executives during their strategic planning activities, following a Likert scale of 7 points. To ensure the reliability of this instrument, Cronbach´s Alpha was calculated via the *Statistical Package for the Social Sciences* (SPSS- VS 16), that resulted in 0,807 for the study´s main study object and 0,912 for the secondary object. Given both were above 0,6 results ensure the instrument´s internal consistency, according to Malhotra (2001).

Testimonials were also collected (participants were stimulated to describe their impressions concerning the experiment) and structured and non structured interviews were conducted (Marconi & Lakatos, 2006) with samples of two study objects and the sole question was: *What was your impression during*

participation in the Scenario Planning seminars in relation to methodology, activities developed and inter and intra group relations? What did you most enjoy? What did you not like?

The collection of data allowed for interference and verification concerning what was proposed in this study, as will be seen in the last item of this article.

4 THE EXPERIMENTAL MODEL PROPOSED: PLANNING THROUGH LEARNING

The proposed model takes into consideration two traditional Scenario Planning approaches, given that other models also hold in their core, the Shell and Godet schools (Figure 1). The time aspect was also taken into consideration, along with a strategic formulation based on a set of specific factors and objectives, as indicated by Porter (1992) in as much as macro scenarios are concerned.

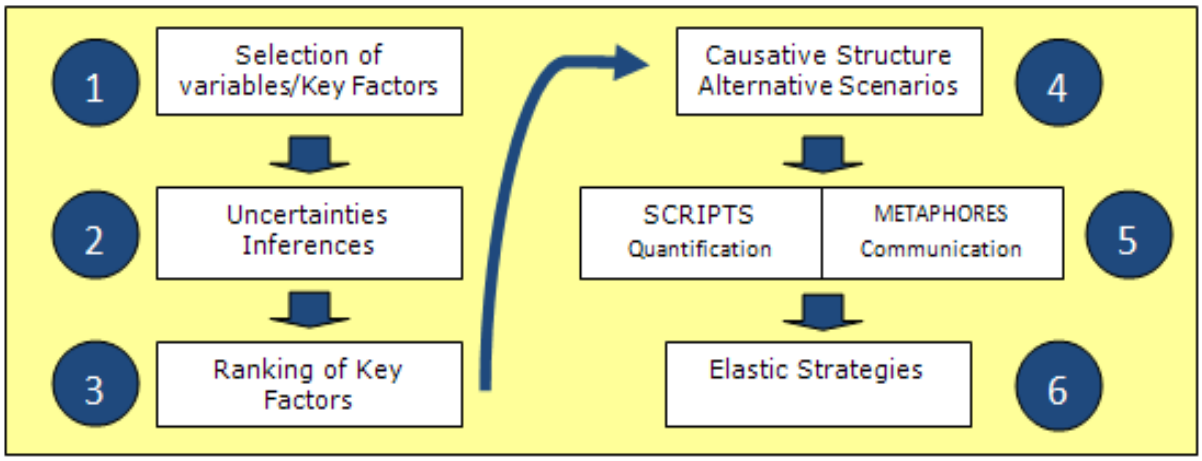

Figure 1: Proposed Experimental Model of Learning by Planning

The six phase experimental model (in the sequence named E) comprises the following set of activities:

E1: Selection of variables/key factors intervening in the object of study:

Here the starting point was not a theme, a question or a central issue given that, according to research undertaken; these factors are implicit in the very motivations of scenarios planning. "Scenarios are to systematically explore

the possible consequences of uncertainties for one´s option of strategies" (Porter, 1992, p. 412). "they are mechanisms for the production of information that are relevant for the decision at hand" (Van der Heijden, 1996, p.24). Thus, the final objective of scenario planning would be to verify how several factors combined behave in the future and which would be the main strategic options in light of the analysis of the charts presented.

E2: Classification of each factor´s level of uncertainty and proceed with the respective inference

At this stage, participants are stimulated to select a set of variables and factors as related to them and within the defined extended timeframe, classify factors (Courtney et al., 1997) into:

- ✓ very clear future when there is only one possible factor behaviour;
- ✓ alternative future when some possibilities of different directions may be taken by the factor;
- ✓ range of futures when an ever greater set of possibilities of distinct directions can be taken by the factor;
- ✓ true ambiguity when there is no base or foundation for any type of inference to be established.

Here, the content of inferences is extremely limited but sufficiently significant for comprehension and use during the next phases. In parallel to these, a research must be conducted to enrich inferences.

E3: Key-factor ranking

During this phase, participants identify the causative relation between factors, that is, which factor or set of factors influence the others and to what extent (it´s a variation of the French school´s dependence-influence plan without however assuming that factors should be excluded). At the end, a set of variables is obtained and pictured into four quadrants. The final objective of this phase is to identify scenario drivers, that is, those whose direction is strong and which present low dependencies.

E4: Causative structure construction – scenario generation

Once participants conclude a debate, the drivers which will give rise to the scenarios are defined. With the support of the chart produced during phase 3 of this model and the inferences of phase 1, the construction of the causative structures that arise in the scenarios, initiates.

E5: Script and metaphor preparation

At this stage, groups describe in text the scenarios which were originally built in the form of a cause and effect structure, now supported by inferences with greater content in terms of information. With structure and narratives at hand, the groups are stimulated to seek symbols or metaphors that characterize the content of the scenario and which might effectively communicate them to the other members of the organization and its surroundings.

E6: Elastic strategies

Up to this point, the external environment has been discussed. Here, groups identify the organization´s strong and weak points; the opportunities and threats of the set of scenarios and, by means of the Strength, Weakness, Opportunity, Threats (SWOT) Matrix, generate their strategic options.

Next, the study objects which were submitted to practical intervention are presented.

5 THE APPLICATION OF THE EXPERIMENTAL MODEL

The experimental model proposed - herein under named Planning by Learning - was applied and developed, at two public sector organizations at distinct markets, according to what the major research-action lines of thought recommend. Results observed at each organization are presented in this document but first, the two institutions are characterized and the model´s application processes are duly outlined.

5.1 THE CONSTRUCTION OF PLANNING BY LEARNING AT ALPHABIO

The main object of study (Alphabio) belongs to the pharmaceutical industry segment. In terms of market share, it is the second largest Brazilian pharmaceutical laboratory of the public segment.

The selection of this company as the prime object of this research is due, in first place, to the complex nature of its segment and, secondly, because it is the initial focus of the experiment, which in turn is the object of this study.

Alphabio is a centennial institution whose hierarchical structure comprises areas of serum, vaccine and medicine manufacturing, research and development, teaching, experiments, laboratorial diagnosis, logistics and distribution.

This institution is a world reference when the subject matter is venom from some type of poisonous animals such as snakes, lizards, scorpions and spiders. It is also national reference in the field of diagnosis and laboratorial experiments and is positioned amongst the best and largest manufacturers of medication in its segment.

In 2005, the teaching unit graduated 11.000 professionals for the health segment. Its management system is extremely well structured: there are targets per area, sector and division and the company uses strategic planning to cornerstone it’s long and short term strategies.

Compensation is linked to individual and collective performance. With 1181 employees (23 doctoral level, 36 masters, 57 specialists and 183 upper level graduates). Gross revenue estimates for 2006 were around some R$ 90 million; almost double that of the previous year.

5.2 THE CONSTRUCTION OF PLANNING BY LEARNING AT PHITEC

Founded in 1965, Phitec (secondary object of this study) is a public rights Institution, linked to the Government of the State of Minas Gerais. In sync with the current government´s directives, Phitec invests in the human and social improvement within the State. Improvement inspired by its mission to “form competent professionals for the labour market and offer services that contribute with the technological, social and economical development of the community”.

Given the vision of "becoming a reference institution in Professional Education, obtaining recognition for excellence in all services rendered to society", Phitec´s purpose is to promote education for work in any part of the national territory. It deploys professional qualification, technical formation and special upper education for professors.

Phitec has a solid experience in the development of projects in partnership with private and public entities, disseminating and promoting science and technology via the formation of human resources that will work with competence in the professional marketplace. Over the last five years, on average, 700 professionals per annum were prepared by Phitec.

The Systemic Management conducted by Phitec has enabled the insertion of the institution in a daring managerial environment, formerly restricted to private organizations, that currently present a strong tendency towards globalization in as much as concepts and practices are concerned.

5.3 MANAGEMENT STYLES AND THE BUILDING OF THE METHOD AT THE RESEARCHED INSTITUTIONS

Alphabio, ever since 2003, as formulated by Hideki (1981), was adapting itself strategically in function of the environment as observed. From a traumatic intervention - given the situation encountered during the first period of management - to an adaptive evolution over successive 2003 periods. The strategic formulation which took place in 2003, exclusively involved the upper management (first generation planning). Time after time, the technical staff claimed for greater participation in the decision making process. This was, ultimately, Alphabio´s prime motivation to initiate a new process which might take into account the "voices" of the other managers.

The project was named "Alphabio 2010" and was an integral part of an agreement between researcher and the president, which also involved the non-existence of a formal coordination for the entire project. People should feel free to allow their imagination to flow and to expose all of their mental models so as to contribute with the process. Thus proceeding, people would participate in the project in the modality, named by Tripp (2005) as collaborative, whereby participants work as co-researchers, giving rise to an emancipatory nature due to

the emergence of participation (Franco, 2005). The methodology to be used would be experimental. The president and remaining participants would be well aware of this given that it would be a learning experience for both the researcher and the institution. The slogan, linked to the project´s name "Alphabio2010", posed to mobilize people and the entire institution in a single and integrated direction. In fact, the president consistently acknowledged planning as collective learning.

On the other hand, upon taking office in 2004, Phitec´s new leadership focused on improving the company´s efficiency, with views to preparing it from an operational standpoint for greater challenges.

Once the major organizational processes were stabilized and under control, Phitec was ready to establish it´s long term strategies. To this extent, the company selected the collective strategy construction model along the lines of Hamel´s (2002) "emerging strategy", whereby, so as to emerge strategy, a given set of conditions are required which are in alignment with the planning model proposed in this study.

Therefore, it is pertinent to herein emphasize the Strategic Planning context at each institution. At Alphabio, the objective was to refine strategic decision making through collective participation; at Phitec, on the other hand, focus was directed towards the preparation of their first long term plan. These were, ultimately, the purposes proposed by the methodology.

At both institutions, meeting schedules were established following Thiollent´s (2005) auditorium model: the most appropriate arena for learning between researcher and participants. Combining technical and managerial knowledge and individual experiences, key collaborators at Alphabio and at Phitec formed discussion groups with distinct profiles, to outline alternative scenarios. Following the methodology´s logic, employees were divided into five theme groups corresponding to the variables intervening in each organization´s business. So as to constitute these groups and so as to reduce the natural tendency of the specialist in imposing his point of view, and to further truly ensure the sharing of knowledge, people were chosen to take part in groups where the themes were different from their regular fields of work. Groups were organized according to Chart 2.

ALPHABIO	PHITEC
G1: Information Management and Technology G2: Pharmaceutical Production and Human Resources G3: Research, Development and Marketing G4: Health Economy and Pharmaco-economy G5: Public Policies and Macro-economy	Team 1 – Economics and Finance Team 2 – Information and Knowledge Team 3 – Politics Team 4 – Market Team 5 – Pedagogical

Chart 2: Theme group organization

Source: research data

This strategy was incorporated into the methodology as a way of challenging people´s mental models and ensuring they refrained from ignoring reality (Davis, 1998; Schwartz, 2000; Senge, 1996; Wack, 1985).

In all, seven work seminars were held, which, in the form of lectures, instigated people´s thought concerning the behaviour of variables that influenced the organization. At Alphabio, external specialists were also present.

The sequence of activities followed the following structure (Chart 3):

SEMINARS	ACTIVITIES
1	Presentation of the dynamics, formation of groups and directions for the identification of variables and factors.
2	Presentation of variables and factors. Grouping of factors by affinity.
3	Scoring of factors. Definition of scenario axes.
4	Scenario design (causative structure).
5	Script development per scenario.
6	Presentation of the internal environment; identification of strong and weak points, threats and opportunities.
7	Definition of strategies and objectives; construction of the strategic map.
8	Presentation of scenarios and their respective metaphors.

Chart 3: Seminar organization

Source: research data

The set of scenarios generated by institutions (5 in total) were built using as drivers the high impact variables which were accountable for the behaviour of the remainder (Chart 4). By varying the major behaviour possibilities of the drivers, Alphabio (Chart 5) and Phitec´s scenarios were outlined and so were the respective metaphors.

ALPHABIO	PHITEC
- Financing; - State administrative reorganization; - Ruling Nbr. 8666/93 (bids); - Organizational structure; - Political interference; - Health policy; - Launch of new products and services; - Taxation; - Certification; - Planning; - Partnerships; - Investment policies; - Human resources; - Quality of life; - Competitiveness; - Environmental management; - Biotechnology; - Labour marketplace impact of the economy; - Intellectual property.	- Public investment; - Pertinent legislation; - Social responsibility; - State Social-economic performance; - Product launch; - Competition; - New entrants; - Partnerships; - Training/professional qualification; - Material and technological resources; - Information and Knowledge technology (TIC); - Innovation and Technology; - Electronic Governance; - Economic Outlook for Brazilians; - Specific market needs.

Chart 4: Variables utilised in the construction of scenarios

Source: research data

SCENARIO	DRIVER A	DRIVER B	METAPHOR
1	State administrative reorganization in **Advance**	**Favourable** National Health Policy	"road runner"
2	State administrative reorganization in **Advance**	**Unfavourable** National Health Policy	"turkey vulture"
3	**Stagnated** State administrative reorganization	**Favourable** National Health Policy	"*peripatus acacioli*"
4	**Stagnated** State administrative reorganization	**Unfavourable** National Health Policy	"sleeping tiger"
5	**Retracting** State administrative reorganization	**Favourable** National Health Policy	"tug of war"

Chart 5: Alphabio´s scenarios

Source: research data

SCENARIO	DRIVER A	DRIVER B	METAPHOR
1	Technological **Advance**	**Rising** Information and Knowledge Management	"Land of Oz"
2	Technological **Advance**	**Non-consolidation** of Information and Knowledge Management	"J.L. Seagull´s flight"
3	Technological **Stagnation**	**Non-consolidation** of Information and Knowledge Management	"Dorothy´s problem"
4	Technological **Stagnation**	**Rising** Information and Knowledge Management	"the seagull´s limits"
5	Technological **Advance**	**Slowly Advancing** Information and Knowledge Management	"windmill"

Chart 6: Phitec´s scenarios

Source: research data

These were organized in the form of a "causative structure" (Figure 2) to, subsequently, be described in association with their respective metaphors (Chart 7).

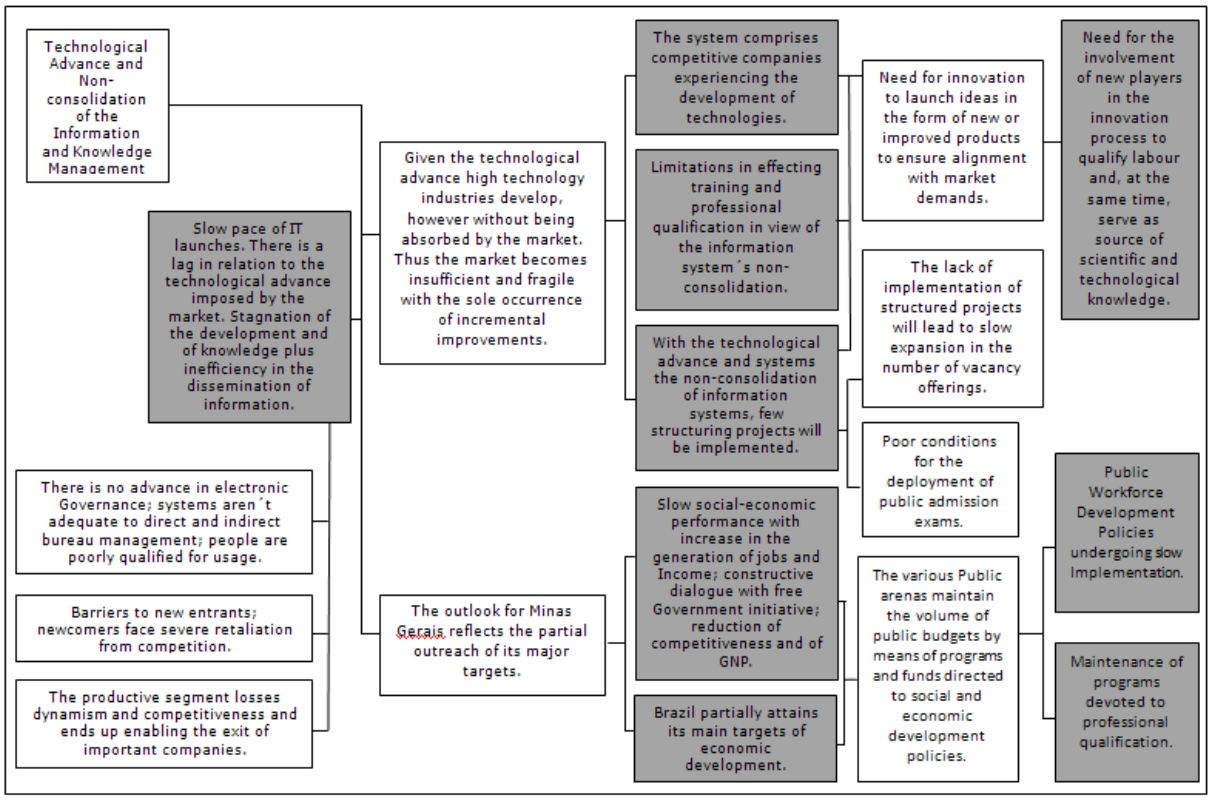

Figure 2: Phitec´s Scenario Structure

Source: research data

Alphabio, given the unfavourable National Health Policy, conducts an analysis of the context and implements its Strategic Plan due to the variables identified. The difficulty in **investing** in the launch of new products leads to the search of new sources of investments. The investment policy enables the efficiency of the administrative, financial and technological structure, optimizing the development process. The unfavourable Health Policy leads to market loss in as much as **biotechnology** is concerned given that Alphabio´s largest client is the public segment. Issues concerning best practices, human resources policies and environmental management are not impacted by the unfavourable health policy given that they are mandatory and indispensable activities for Alphabio.

A favourable State administrative reorganization ensures the feasibility of **partnerships** with the transfer, acquisition and absorption of technologies, facilitating the **launch of new products**, the efficiency of the administrative, financial and technological structure. Biotechnology is developed through the formation of public/private partnerships.

Transformed into a holding company, Alphabio is formed by a regulatory agency, a public corporation, an area of Research and Development and an Autarchy. Alphabio´s statute, defined with criteria concerning the occupation of managerial positions based on technical criteria, is not subject to **political interference** in as much as position nominations are concerned.

Alphabio´s image is strengthened by the implementation of the environmental **management** program of best practices and by the offering of products ground on biotechnology. A more **competitive** Alphabio launches new products and extends markets. It´s investment policy favours the **Human Resources** policy, where activities which promote an improved **quality of life** and professional qualification are developed. Institutional marketing strengthens the image, promotes environmental actions and new products, increasing competitiveness and improving the market´s perception of the corporation.

Analogy: the Turkey vulture survives under unfavourable conditions, adapting to adverse situations, transforming survival opportunities that others do not make good use of. Despite being vulnerable to predators, the vulture keeps itself alert and is fearless when confronting to defend its nest. In the same manner, Alphabio manages to make use of market dynamics opportunities under a scenario whereby the State´s Administrative Reorganization is in advance and the National Health Policy is unfavourable.

Chart 7: Summarized description of Alphabio´s Scenario Nbr. 2

Source: research data

As of these scenarios, strategic objectives were established corresponding to the timeframe of both sets and these were organized into the form of a strategic map which, subsequently, was unfolded by both institutions in the form of targets. Alphabio´s post-scenario period ensured it´s recognition before an important regional management excellence certifying instrument, the method having been characterized by the tool assessment team as a "refined management technique".

6 RESULTS

As previously mentioned, an evaluation of the application of the Planning per Learning method was undertaken at both companies, by means of questionnaires, with a handful of open questions, so that those involved might

provide their testimonials. Forty questionnaires were applied at Alphabio and forty at Phitec, and a greater return from Alphabio (28 questionnaires) than from Phitec (26 questionnaires) was obtained. In as much as endorsements are concerned, Alphabio also presented a higher feedback level: 34 testimonials versus 9 at Phitec. Alphabio´s assessments were also denser than those from Phitec, providing a larger volume and increased quality of information. Choice was made not to map data such as age, hierarchical position, years of working experience, sex nor subject birth origin, so as to maintain respondent confidentiality. Interviews followed a non-structured rule, with three samples of each study object. During these interviews, Phitec presented greater content (4 hours of duration) than Alphabio (3 hours of duration). Table 1 illustrates the results of this study´s data collection.

Table 1: Total quantities of data collection instruments at Alphabio and Phitec

INSTRUMENT	ALPHABIO			PHITEC		
	I*	R*	%	I	R	%
Questionnaires	40	27	67,5	40	26	65
Testimonials	40	34	85	40	9	22,5

*I= issued; R= received

Source: research data

As can be seen from Chart 7, questions contained in the questionnaire (Likert scale from 1 to 7) were grouped based on the following dimensions: methodological process, results and behaviour.

DIMENSION	VARIABLES	ALPHABIO QUESTIONS	PHITEC QUESTIONS
Methodological process	Knowledge	Q1,Q2	Q1, Q2
	Time	Q3	Q3
	Moment	Q6	Q4
	Participants	Q10	Q8
	Complexity	Q8	Q6
	Difficulty	Q9	Q7
	Use of specialists	Q4, Q5	-
Results	Objectives	Q7	Q5
	Impact	Q12	Q10
	Decision Making	Q13, Q14	Q11, Q12
Behaviour	Learning	Q15, Q16	Q13, Q14
	Satisfaction	Q11, Q17	Q9, Q15

Chart 7: Alphabio and Phitec: question organization

Source: research data

Given the length of the study, choice fell upon selecting the original research´s major summaries that meet the objectives of this article. The quantitative analysis of data is herein presented in a simplified manner so as to ensure better comprehension of the study, utilizing the results of the questionnaire evaluated under the Likert scale of seven points. It´s worth noting that this analysis seeks to corroborate results obtained during the research-action process, whose very nature is qualitative.

Chart 8 contains fragments of selected narratives utilized in the result analysis that is subsequently presented.

TYPE*	CONTENT
WIT.5	*The uniting of several areas and the analysis of the institution through the lens of other segments is learning to think and perceive the institution as a whole.*
WIT.6	*It was a pioneer experience. Private companies already perform this kind of planning and the current management demonstrated concern with the future scenarios.*
WIT.8	*We had some initial difficulties but these were overcome after much discussion and work.*
WIT.14	*Despite of interest (our highlight), the themes discussed by the lecturers before each of the [...] meetings, in my mind, were beyond the purpose of the seminar, sometimes demanding too much time or all of the available time in the afternoon, adding very little or almost nothing to group discussions.*
WIT.17	*The only difficulty I encountered in the project was in gathering the entire team together, given employee agendas.*
WIT.22	*The integration of agendas was tough. This is a project that requires greater commitment and more time.*
WIT.23	*The lectures delivered were of excellent level (our highlight) and served as foundation in terms of information and knowledge to participants.*
WIT.31	*The planning of scenarios was of fundamental importance to Alphabio, particularly at this moment it is experiencing.*
WIT.34	*The difficulties encountered during the event were available time for the meetings at the institution. The group was not always complete but the proposed activities were concluded.*
* WIT. = witness	

Chart 8: Fragments of Alphabio and Phitec testimonials

Source: research data

6.1 DIMENSION OF THE METHODOLOGICAL PROCESS

Knowledge variable: given that participants were questioned as to their involvement in other similar activities, the same number of occurrences was obtained for both Alphabio and Phitec: 5 (12,5% of the population). Questioned as to whether this experience was better or worse in relation to those they´d participated in, a lower standard deviation (dp=0,55) was verified at Alphabio,

which indicates greater homogeneity of respondents from that institution. The variation of the institution´s average from 4,5 (Alphabio) to 5,5 (Phitec) leads to the belief that the experiment of the kind undertaken by the participants, in general, is somewhat better than the other techniques experienced by respondents. It is important to emphasize that, on average, approximately 78% of respondents had not participated in an experiment of this nature, which makes this research relevant in terms of the efficiency of the proposed model.

Time variable: in terms of time availability, Alphabio presented a slightly lower than average score of the measuring instrument (m=3,5) and, once again, a lower standard deviation (dp=1,37) than Phitec (dp= 1,79). Phitec on the other hand, presented a slightly superior average (m=4,28) compared to Alphabio, leading towards the belief that at that institution, time was reasonable for the conclusion of the work plan.

Use of specialists variable: a high dispersion was verified as to this item, in both terms of need and of relevance of specialists to the performing of activities relative to the experiment. Once applying the 25% most favourable and 25% least favourable rule (Cooper & Schindler, 2003), for the need of specialists a score of 55,55% favourable and 7% unfavourable, was obtained; from 51,85% for effective specialist contribution against 18,52% as minor contribution. Actually, only two testimonials (WIT. 14 and WIT.23 - 6% of the sample) mention the use of specialists without, however, granting this variable any level of direct impact in the building of scenarios.

Complexity variable: the perceived level of complexity of the methodology at both institutions was slightly superior to the instrument´s average (Alphabio Average = 4,48 e Phitec Average = 5). This unveils poor comprehension of tasks and suggests high model complexity.

Difficulty variable: considering complexity imposes greater difficulties to execute a given activity, one infers that the level of difficulty presented was average (neither high nor low – Alphabio = 3,74; Phitec = 4,04) and, thus, proportionately reflects the previously presented level of complexity, at both institutions. Possibly, the major difficulty was managing time and attaining greater level of commitment and collective participation as endorsed by WIT. 8, WIT. 17, WIT. 22 and WIT. 34.

6.2 RESULT DIMENSIONS

Objectives variable: Phitec´s meeting of objectives (average = 6,35) was far more evident and less disperse than that of Alphabio (average = 5,15).

Impact variable: the impact of activities was also considered high at both institutions (average at Alphabio = 5,68; average at Phitec = 6,38), possibly given the need for self affirmation given the nature of both. Both had experienced a past history of lack of credibility, of scarcely relevant results and of social impact during previous management. Fragmented reports such as "pioneer", "of fundamental relevance" and "extremely timely" made by participants corroborate results obtained by the questionnaire (WIT .6 and WIT.31).

Decision making variable: here one might note the consistency of the methodology, a very low deviance (Alphabio dp = 0,92 and Phitec dp = 0,77) and a high average without any evidence of the distortion of results. On the contrary, both institutions tend to nudge the uppermost extreme of the measuring scale (Alphabio average= 6,04 and Phitec average = 6,44). This provides proof of the experiment´s efficiency in detriment of the intercurrences identified by the research instruments. Without scenarios, it is unanimous at these institutions that decision making becomes fragile (Alphabio average = 2,07 and Phitec average = 2,92).

6.3 BEHAVIOURAL DIMENSION

Learning variable: this topic proposes to verify if there was or not an effective contribution in terms of participant learning, whether technical (which involves sector inter-relationships), whether methodological - as to the learning of the methodology through participation at seminars. In as much as the variability of scores is concerned, Alphabio and Phitec were almost positioned at the same level. Thus there was no type highlight worthy of special mention.

Both institutions also maintained the same level of results in as much as the average of technical (Alphabio average = 4,52 and Phitec average= 5,27) and methodological (Alphabio average = 4,54 and Phitec average = 5,58) learning is concerned.

Thought of as being relatively high, one might suppose that the experiment enabled a high level of learning for participants. Fragments of the testimonials that follow (and WIT.5) support results presented:

Learn, learn. This was an amazing learning experience. I had no idea of what this would be like. I´d heard about it, but had never taken part. It was a surprise. At given moments we tend to think we won´t make it. We may not have at the end performed a 100%, 90%, 80% job but that´s what we accomplished. It is a tremendous dimension for the institution. (Interviewee 1).

Oh... I think one learns ... in terms of the work´s objective.... as to personal joint relations ... many, I hadn´t met ... hadn´t even talked to ... this was very good ... I got to know more people (Interviewee 2).

The results presented suggest the experimental model provides truesome organizational learning and that the core issues of a strategic plan mostly relate to the manner with which people interact at companies than with the barriers presented by Verity (2003).

7 CONCLUSIONS

As to the proposed model: as of the analysis of the research data, one might affirm that the proposed model – resultant from the identification and analysis of the described major scenario planning models – demonstrated adequacy and was acknowledged, at both institutions, as innovative, given it is a participative process which manages to meet its predetermined objectives within relatively enough time, for the destined purposes. What reinforces this statement is the absence of any reference to inconsistency in the model in the various assessment instruments applied to participants at Alphabio and Phitec. On the contrary, both institutions published and announced a document describing the experienced experiment in full. This document was praised by all stakeholders.

Of apparently lower complexity than the French school model and of greater quantitative content that the Shell school, the Scenario Planning model proposed in this study prove to be efficient in terms of its end purposes, given the results presented in the previous item. The hybrid character grants the model the sturdiness of planning based on facts and data, which privileges and takes into account the mental models of the diverse stakeholders involved in the process.

As to the deployment methodology: as in any other new experiment, the implementation methodology of the planning model required adjustments during the course of action given gaps observed (Chart 9). A tough task, considering the existing interconnection between objectives proposed in this study, which in turn operate in a simultaneous manner. Ability, promptness and in depth knowledge of the research method were essential at times when adjustments to the model were required, without compromising the results of the remaining forces involved. To this effect, the researcher noted that the command of the technique, the ability to deal with conflicts and re-conduct action, maintaining harmony within the auditorium are fundamental factors to the success of an experiment of this nature. These traits are mostly called upon during the period the experiment was conducted, when transposition to the other object occurs (as in the case of Alphabio to Phitec) and there is a more time for reflection and re-direction of the flow of activities.

PLANNED	RE-PLANNED
- Presentations concerning the methodology and subsequent activities	- Preparation of the supporting material reinforcing the methodology presented in electronic media and offering to participants; - Recap of previous meeting´s presentation prior to current activity presentation.
- Use of specialists	- Use of specialists: optional
- Write up of final document per owner as defined by the institution.	- Intensive researcher support in the write-up of the final document
- Scenario building in function of the systemic analysis of factors	- Building of scenarios utilizing orthogonal axes
- Use of ATLAS TI software in the construction of the causative relation	- Flexibility to use other software for the building of a causative relation
- Dissemination of the final document immediately after activities	- Flexibility to disseminate the final document

Chart 9: Major gaps in the course of action

Source: research data

As to the final result: the final result of experiment were two alternative plausible and richly detailed scenarios, which became, respectively, a referential for both institutions, in the form of a mechanism for the formulation of annual targets for the periods included in the timeframe determined therein and also, in as much as projecting the image of Alphabio and Phitec as comparative references for other institutions of similar nature is concerned.

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