Project Portfolio and Strategic Alignment through Technology Roadmapping for Medium Sized Organizations and Business Units

Camilo A. Castro Gama, David Güemes-Castorena

Tecnológico de Monterrey, Escuela de Ingeniería y Tecnologías de Información, Monterrey, N.L., México

Abstract--**Purpose: The objective of this research is to provide a step by step guide with a mix of tools for managers to align strategic objectives with the business unit project portfolio.**

Design/methodology/approach: The proposed model is applicable for business units and medium enterprises. It is a sequential model that gives a smooth transition from strategic vigilance to a selection of projects and programs which helps the organization to attain a competitive advantage in industry environment. Based on the most common tools of strategic planning and foresight, the main idea is to generate some sense of sequence and feedback process, in order to select the best ideas for the resource allocation optimization.

Findings: When the project portfolio is defined by a set of rules or criteria, the construction of a technology roadmap is the next logical step, not only to classify the projects but to create a path through which the organization can implement them. A methodology to plan all this process was developed.

Originality/value: This proposed model helps in the integration of the strategic planning with the step-by-step process at the functional level to run the projects and programs.

I. INTRODUCTION

Organizations exist to associate people with a common purpose. This common goal is to provide goods or services and to profit from it, in most cases. Regardless of the activity of the organization, it provides jobs, pays taxes and improves the quality of life of people who are in connection therewith. But this is not an easy task because the customers are always changing, and the organization is trying to meet their needs in the best possible way. It is when organizations have a difficult task because they must respond to customer requirements not only in the best way possible but also in a fastest way than the competition. Making a profit is based on having customers who want your product or service. The challenge now is being competitive, reducing costs, enhance income, making good relationships with customers and employees, and giving the customer an experience more than an expected product or service.

From the beginning of the quality revolution, Dr. W. Edwards Deming focused on the need for management leadership in the transformation of organizations into world class performers [1]. Instead of being a slow progression, excellence is required in every aspect within the organization, being *innovation* the most important aspect in the present [2]. Breyfogle et al. [3], claim that as the competition gets tougher there is more pressure on organizations to improve quality and customer satisfaction while decreasing costs and increasing output. Being this a complex task, many managers fall into the misunderstanding of the environment elements that encloses the organization. Following the analogy of Mintzberg et al. [4], every manager tried to define "the animal" without enough information and because of the pressure, the story did not have a well ending.

In spite of either the pressure, or the excellence requirements, a strategy is needed. Mintzberg [5] declares that there are four strong reasons to define and apply a strategy: (1) setting direction, (2) focusing effort, (3) defining the organization, and (4) providing consistency. Strategic planning also involves developing a sense of where we are and a sense of where we want to be. In typical business terms, we talk about our mission and our vision. The resources we get are the enablers of achieving that vision [6].

Despite of methodology or philosophy applied to problem solving within the organization, the main issue is the deployment. The main problems for the deployment are, according to Niven: 5% of the labor force understands strategy, 60% of the organizations does not link the budget with the corporate objectives and only 25% of managers have had linked the strategy with initiatives [7]. This is to stress the need to properly align resources with strategy. It is useless to have good tools and methodologies available if you do not have clear goals. This is the main purpose of the proposed model. The construction was possible in three stages. The first one was data collection such as specialized literature, papers, thesis, and dissertations; it was intended to gather the most relevant information about related items and - in some cases- discussion and further research. The second stage was model study, where the tools and models were selected. The final stage was the construction and validation of the model.

II. LITERATURE REVIEW

As soon as a management decision is made, regardless the level -could be at the corporate or functional level such as marketing, supply chain, research and development (R&D), and others- then other questions emerge as a consequence for such decision. One of these might be how to monitor action performance, and there are plenty of solutions in market - every consulting group has a different one. They must identify opportunities for optimizing profitability and growth; and the idea is to use performance measures to add value, instead of simply measuring for a formality [8].

A. Strategic Planning Models

For this research four different models were studied, and then they were consolidated in few steps identifying common analysis and tools. The first studied model was from Hax and Majluf [9], who pose a formal strategic planning process.

This model describes strategic planning process at every organization. Not only it describes the three levels of the process, but also points out the deployment. The model also has competitive intelligence elements: in every planning perspective the responsible of the strategic planning process has to do an internal scrutiny and environmental scan. It also has the differentiation in every planning perspective about information flux and how it is connected as feedback for other processes in the formulation and budgeting processes as represented in Figure 1.

The second model revised was the proposed by Pearce and Robinson [10]. It has many similar elements of the Hax's and Majluf's model [9], but it has the feel of a complex issue within the organization. At first sight, could be proposed a simplified model with just key elements. It did not have

strategic planning level differentiation, but it has a clear differentiation in terms of short-term and long-term planning.

Pearce and Robinson´s model has competitive intelligence process implicit too, the feedback (as a dashed line), compares the actual strategy with new elements found in the environment, for a new strategic planning process. Another key element was the type of program stratification, into long-term and short-term objectives. This stratification or project classification is vital for strategic alignment and technological roadmapping purposes.

The Hill and Jones model has the similar strategic planning elements too. Nonetheless, it emphasizes in the SWOT analysis and the deployment from it. Hill and Jones [11] deepen in the possible branches which an organization could have, and how to strategically manage them.
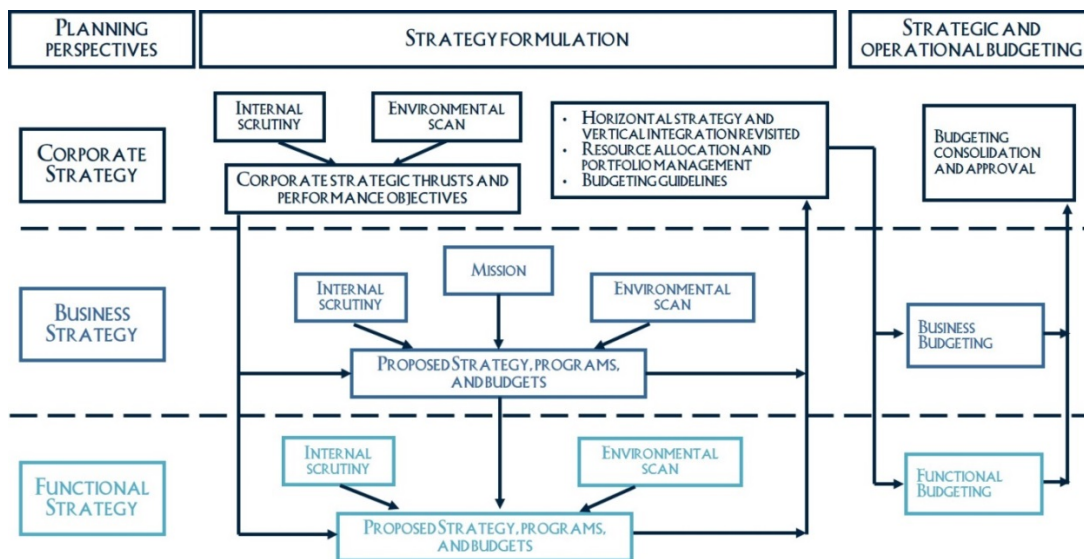

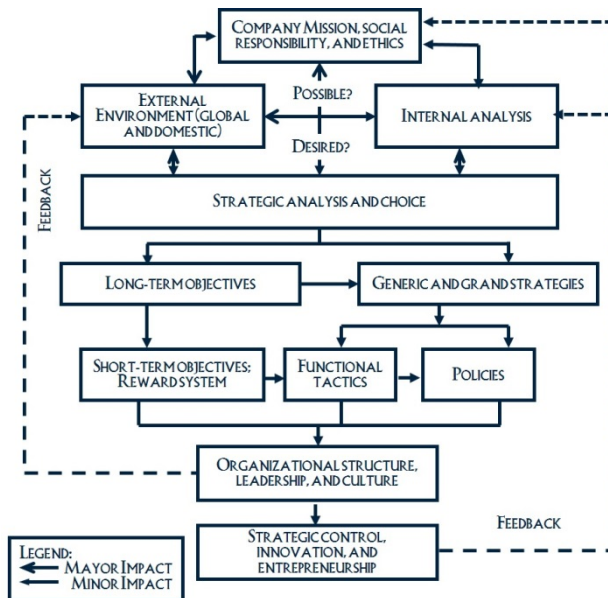Figure 1 A Formal strategic planning process - Hax and Majluf [9].

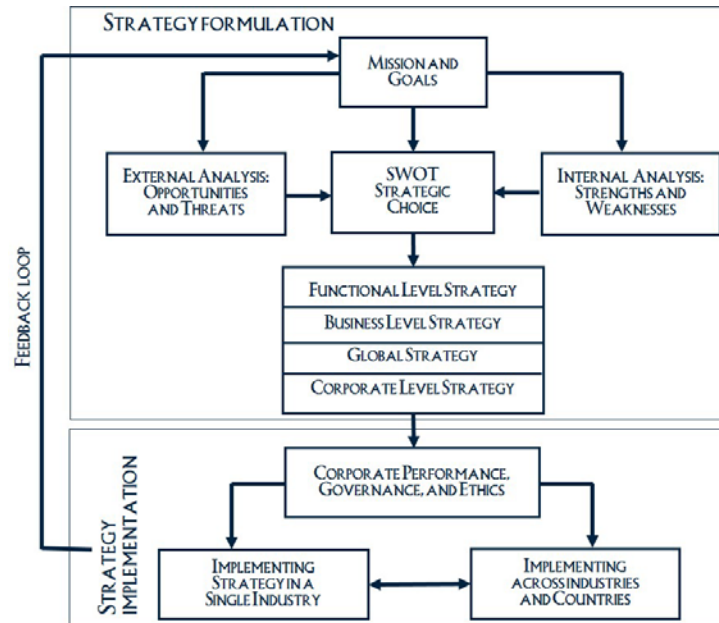Figure 2 Strategic management model - Pearce and Robinson [10].

Figure 3 Main components of the strategic planning process - Hill and Jones [11].

From this model it was extracted the merge of the internal scrutiny and the environmental scan in one big step. However, these processes are done separately, but filtering information is done through SWOT analysis.

The next model studied, from Thompson, Peteraf, Gamble, and Strickland III [12], gives the illusion of sequence but they explain in fewer phases the strategic planning process; they make it easier to understand the process. They also emphasize the fact that the process should be reviewed in every step, not only in the current phase but also in the former phases. The model also shows the competitive intelligence process and the feedback loops.

Steiner [13] proposed a strategic planning process where such elements like corporate expectations, the SWOT analysis, and the deployment of programs and plans can be easily identified. At the end of the process is the review or feedback element.

Nieboer [14] claims that Kotler [15] presented a model similar to Steiner's [13]. He also states that the following figure (figure 6) is from Kotler's [15] 2003 book. In these two models are presented the information flux and step/phase sequence.
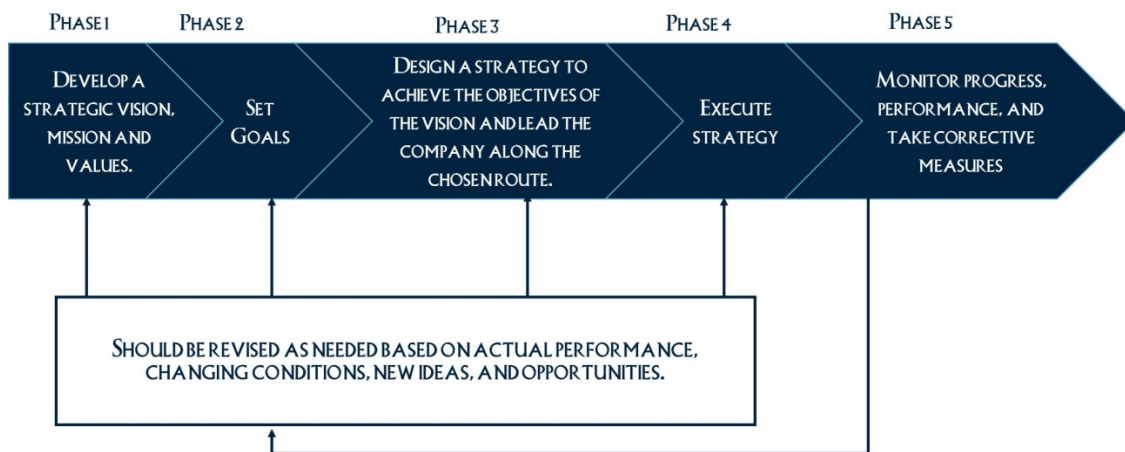

Figure 4 five-step strategic planning model - Thompson, Peteraf, Gamble, and Strickland III [12].
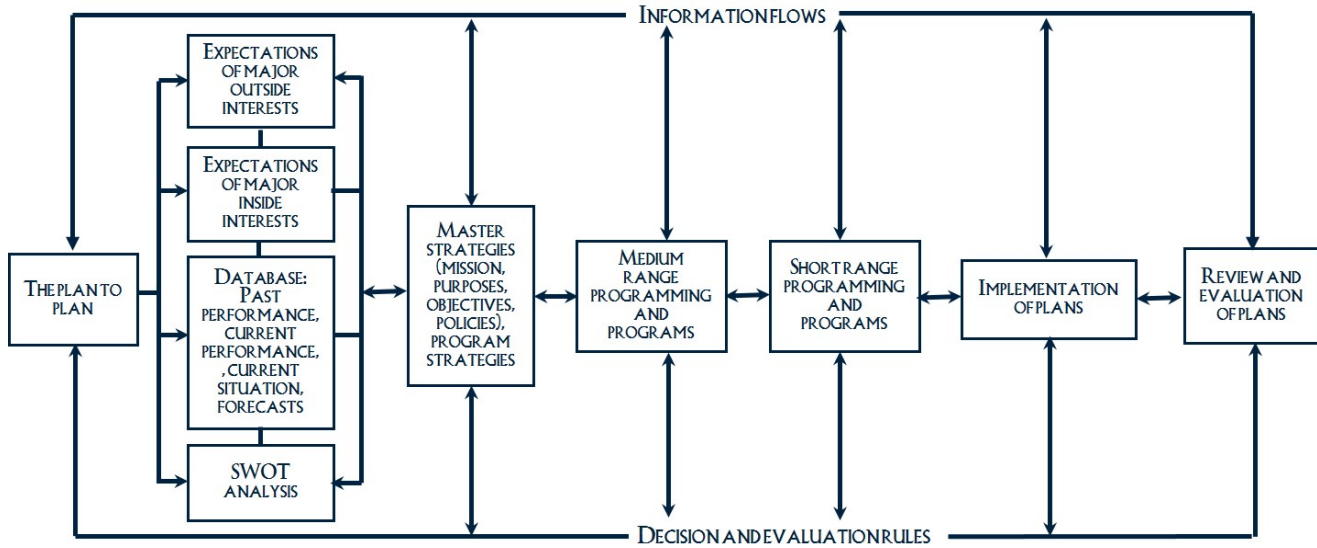
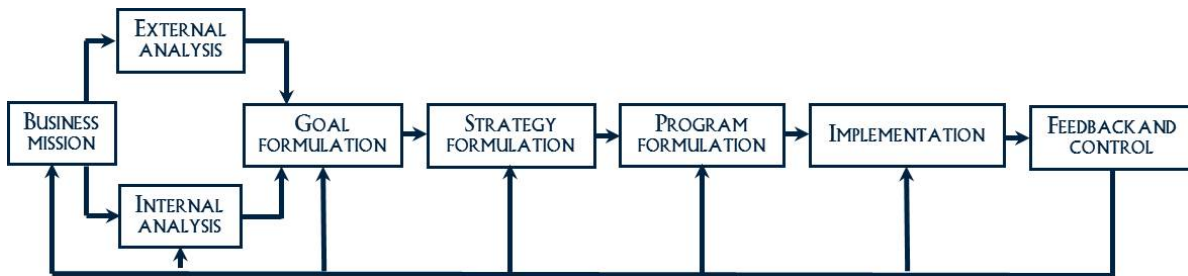Figure 5 Steiner's [13] strategic planning process model.

Figure 6 Kotler's [15] strategic planning process model.

With this information about literature and some more gathered from journals, the main bases for our model were identified: the presence of competitive intelligence, feedback in the whole process, external and internal analysis, and goal translation into strategies. In the final common base, because of the application focus (business units and medium sized organizations), and because of the problems recognized among organizations (i.e. the portfolio definitions and the projects and programs strategic alignment) it was decided to work with some recommended tools by the Product Development Management Association (PDMA) [16] for the portfolio management (portfolio development and portfolio tools) and technology roadmapping with the purpose of tracing, tracking, and validating strategy, which will be explained in the following sections.

B. Technology Roadmapping (TRM)

A way to present those decisions or plans is the technology roadmap, which could be established as a visual and integrated long term strategic planning tool. Phaal et al. [17] claim that roadmapping process brings together people from different parts of the business, providing an opportunity for sharing information and perspectives and providing a vehicle for holistic consideration of problems, opportunities,

and new ideas. Kostoff et al. [18] argue that the main benefit of roadmapping is provision of information to help make better investment decisions, recognize several potential uses and resulting benefits.

The uses of a TRM could be: (1) it helps to develop a consensus about a set of needs and the technologies required to satisfy those needs, (2) it provides a mechanism to help experts forecast technology developments in targeted areas, and (3) it can provide a framework to help plan, and coordinate technology developments both within a company or an entire industry.

Also, they identify the following benefits: (1) identifying critical technologies or technology gaps that must be filled to meet product performance targets and identifying ways to leverage R&D investments through coordinating research activities either within a single company or among alliance members; (2) it is a marketing tool, it can show that a company really understands customer needs and has access to or is developing (either internally or through alliances) the technologies to meet their needs; and it may (3) identify technology requirements that a company can support.

The TRM creates a framework to answer questions like: where the company is positioned, where it is going and how to get there. Furthermore, it can be easily integrated with

other techniques, such as methods of portfolio, Balanced Scorecard and phase of product development [19] and is related to the PERT and Gantt charts. This tool has different forms that represent the development of the company and its evolution with respect to competition, markets, products, technologies, and interactions between different drivers of success [20]. By using TRMs, companies can create the connections between general strategies to integrate and transform these strategies into specific actions.

Technology Roadmaps are used by several innovative companies like Philips [21], Lucent Technologies [22], and SIA [18], however there are records that mention your application began from the 70's [23] [24] [25].

In order to develop a TRM, organizations need to have defined from the beginning the ultimate goal. This ultimate goal is defined by organization members based on knowledge and expertise. The Figure 1 explains graphically the steps to build a TRM; in the left of the figure are shown some levels called success drivers- step 2; those drivers could be aligned with purpose (Know-why), proposal (know-what) and resources (know-how). It is important to be aware and pick only those which helps to develop strategy.

Once the company has defined the drivers of success, the working group should develop the concept based on activities, goals and projects to meet or develop for the range of time expected. Then participants must establish connections between different elements within each promoter of success that allows seeing relationships and precedencies

that will meet certain objectives in the short, medium and/or long-term. It is in this way that the participants will be able to develop a physical TRM that allows them to visualize the development of the strategy over time as well as the action plans.

To build a TRM it is recommended to follow the steps described in Figure 7. and to discuss until people agree in the map elements/drivers and the chosen and alternate routes as well.

C. Portfolio Development

A recurrent problem among organizations is to align project portfolio with strategic objectives. This problem is tackled in two fronts: the first one is the strategic planning process including the project portfolio management (It is a critical and vital senior management challenge, according to best practices studies [27] [28]) and the second one is the use of technology roadmapping. These tools give the strategist an ample way to see the deployment of strategic projects within the organization and across time.

There are four goals in portfolio development [16]:

(1) *Maximizing the value of the portfolio*, or the main issue of resource allocation but having in mind the project portfolio value namely having a business objective;

(2) *Balanced portfolio*, balancing portfolio with different variables that are defined by management i.e. high-risk and low-risk projects,
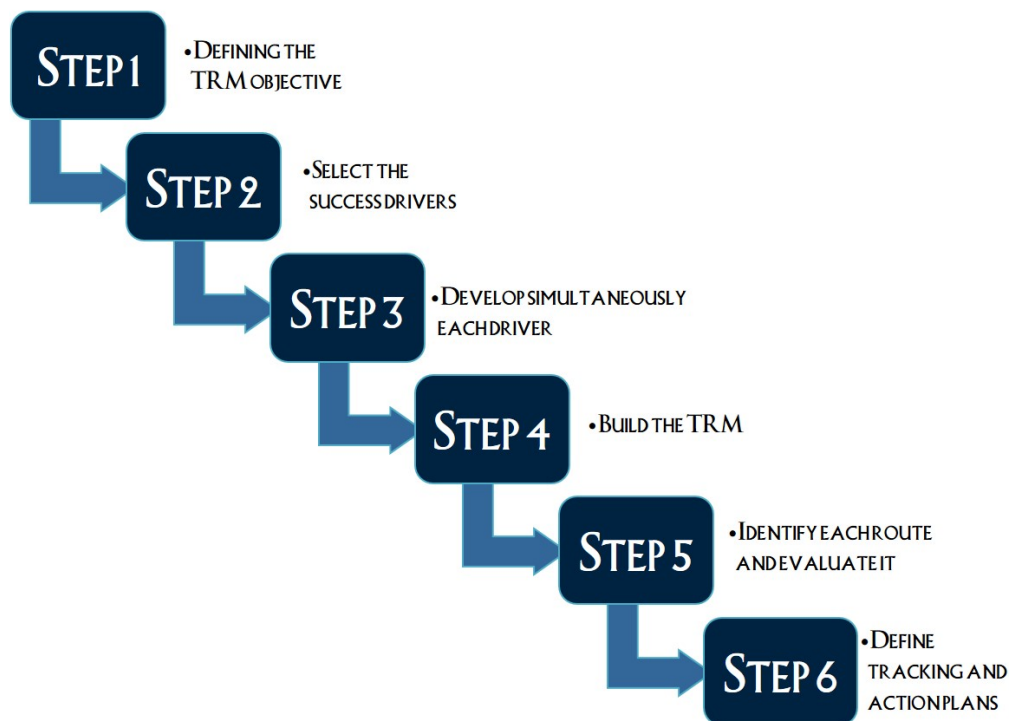

Figure 7 6-Steps to build a TRM [26].

TABLE 1 POPULAR BUBBLE DIAGRAM PLOTS (RANK ORDER BY POPULARITY) [28].

Rank	Type of Chart	First Dimension Plotted		Second Dimension Plotted	Percentage of Businesses Using Bubble Diagrams*
1	Risk vs. Reward	Reward: NPV, IRR, benefits after years of launch, market value	by	Probability of success (technical, commercial, overall)	44,40 %
2	Newness	Technical newness	by	Market newness	11,10 %
3	Ease vs. Attractiveness	Technical feasibility	by	Market attractiveness (growth, potential, consumer appeal, life cycle)	11,10 %
4	Strength vs. Attractiveness	Competitive position (strengths)	by	Attractiveness (market growth, technical maturity, years to implementation)	11,10 %
5	Cost vs. Timing	Cost to implement	by	Time to implement	9,70 %
6	Strategic vs. Benefit	Strategic focus or fit	by	Business intent, NPV, financial fit, attractiveness	8,90 %
7	Cost vs. Benefit	Cumulative reward	by	Cumulative development cost	5,50 %

(3) *Building strategy into the portfolio*, ensuring that the project portfolio really reflects the organization's strategy, and

(4) *The right number of projects*, or having the correct amount of projects for the limited resources available.

D. Portfolio Management Tools

Consequently with the four goals in portfolio management, it is important to pair these objectives with recommended management tools by the PDMA in their tool book [16].

(1) *Maximizing the value of the portfolio*, Net present value (NPV), Expected commercial value (ECV), Productivity index (PI), and Scoring models as portfolio tools (Cooper et al [16] identifies typical criteria for scoring models: Strategic alignment, Product advantage, Market attractiveness, Ability to leverage core competencies, technical feasibility, and Reward vs. risk.);

(2) *Balanced portfolio*, Visual charts -such as bubble diagrams- (see table 1), ellipse diagrams, Monte Carlo simulation, portfolio maps, and traditional charts such as pie diagrams, histograms, etc.

(3) *Building strategy into the portfolio*, Cooper et al [16] found these issues when discussing linking strategy to the portfolio: Strategic fit and spending breakdown. To help in this matter, they propose the scoring models and strategic buckets model.

(4) *The right number of projects*, Cooper et al [16] draw our attention to answering three questions that should highlight key problems: *Do you have enough of the right resources to handle projects currently in your pipeline?*, *Do you have enough resources to achieve your new product goals?*, and *determine the person-days required to achieve this goal*.

III. PROPOSED MODEL

This model is attempted to be used in business units or medium sized enterprises, the main reason is because in Mexico the SMEs do not plan systematically their innovation efforts, even though they know the tools individually (in Mexico the SMEs account for 72% of employment and 52% of GDP [29].

Systems can be modeled with block diagrams as long as the model represents each of the elements and the relationships among them. A modeled system can be plants, processes, artifacts, organizations, etc. Figure 10 represents the generic control system, for electronic and mechanical systems, which will allow us to explain the proposed model using this concept.
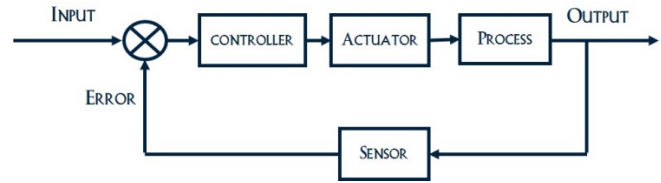

Figure 8 Control System for electronic and mechanical systems [30].

Ogata [30] claims that a business system might consist of many groups. Each task assigned to a group will represent a dynamic element of the system. Feedback methods of accomplishment reporting in each group must be established for proper operation of the system. The cross-coupling between functional groups must be taken to a minimum in order to reduce undesirable delay times in the system. The smaller this cross-coupling is, the smoother the flow of work signals and materials will be.

The blocks in the diagram of Figure 11 have the following meaning – representing and industrial organization:

1. Management
2. Research and development
3. Preliminary design
4. Experiments
5. Product design and drafting
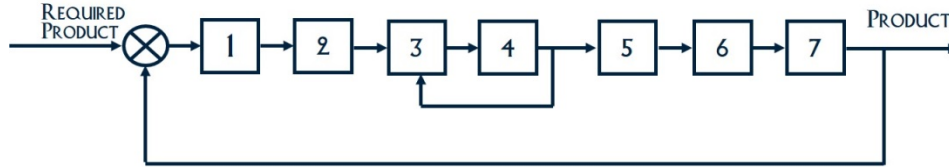6. Fabrication and assembling
7. Testing

Figure 9 Block diagram of an engineering organizational system - Ogata [31].

Ogata [30] also specifies that a business is a closed-loop system. A good design will reduce the managerial control needed. Having this concept in mind, business and control strategy can be seen in the same way. Therefore, a model of strategic planning can be established by using this key concept.

The input of the system, in this case will be the planned scenario. The controller (the one that identifies the difference between the planned and real scenarios) is the strategic process itself; the actuator (the element that can change the necessary elements in the organization) is the business unit. The process is what the business unit does –the projects -and finally the business unit collects the feedback given by the customer, market and shareholders. The difference between the planned scenario and the real is therefore the "error" for this control model.

Figure 10 Proposed model of a control system of a planning process.

With the model of Ogata [30] in mind and with the models from the literature review, the authors studied the models in order to find similarities and differences, to state a simpler model and trim strategic planning. This led to the following result:

In the following figure is the strategic planning process proposed model. It has 5-steps:
1- Corporate inputs
2- Environmental scan and Internal Scrutiny
3- Project Portfolio
4- Technology Roadmapping
5- Validation and tracking

Each one of the steps has clear inputs, tools and outputs. Along with the model a five-step strategic planning guide was built. The main idea of the guide is the application in SMEs, so this guide is the blueprint of the application itself. The steps are described in Table 2. The first and second columns have the number and name of the step. The third column provides the key elements of the step. The fourth column describes the objectives of the step and aligned with the fifth column which provides some recommended tools. The sixth column describes the deliverables for each of the steps. The last column provides the organizational level where this step is performed (corporate or business level).
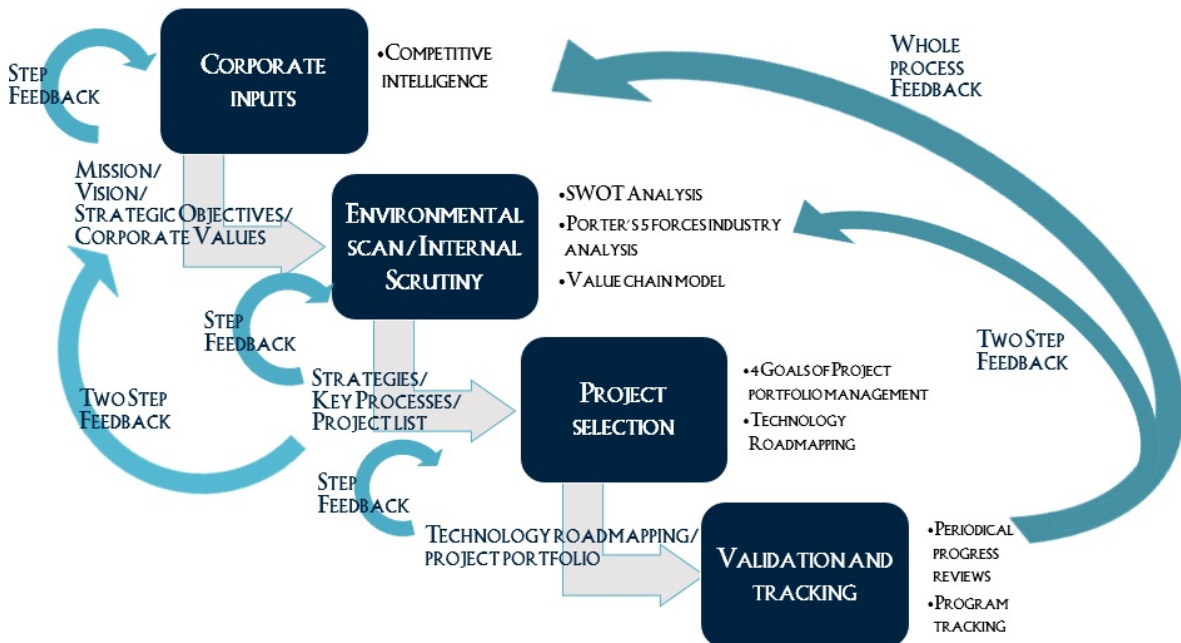

Figure 11 Proposed strategic planning model framework. (From Hax and Majluf [9], was extracted for the development of the proposed model: the systemic vision of the strategic planning process, the differentiation of information at every level, process sequence, and proposed tools by the authors.)

TABLE 2. FIVE-STEP MODEL EXPLANATION.

#	Name	Elements	Objectives	Tools/techniques	Deliverables	Strategic planning level
1	Basic inputs	Competitive intelligence	Monitoring and compiling all the environmental information relative to the organization	CI model	Strategic vigilance report	Corporate level
			Identifying the resulting challenges emerging from those changes			
		Mission, Vision, Values	Defining clearly the elements needed for the initialization of the process	Definition of product-market segments and alternative for growth strategies 2x2 Matrix	Mission, vision, and values statement	
			Detecting the changes to be undertaken in business scope and core competences			
2	Environmental scan	Strategic vigilance	Filtering the information of the environment	Benchmarking of the organization	Match between weaknesses and threats as well opportunities and strengths	Business Level
				Five-forces model		
		External scan	Identifying the strategic variables in the environment that surrounds the organization	SWOT		
					Project list	
	Internal scrutiny	Internal scrutiny	Defining of the differentiated competencies, capabilities, key activities and added value processes	The value chain Model	Identification critical success factors and strategies	
				Generic competitive strategies		
3	Portfolio management	Project portfolio selection	Identifying the projects which aligns with strategy statement	Four goals of project portfolio management	Portfolio alignment with strategy statement	Business Level
			Finding the right number of projects	PDMA Recommended tools	Diagrams, lists, or tables needed	
4	Technology roadmapping	Technology road-mapping	Visualizing the project portfolio and the organizations goal	Technology roadmapping creation sequence	Technology Roadmap	Business level
5	Validation and tracking	Periodical review	Reviewing the overall process, and the process of execution in the organization	Specific program tracking and meetings	Tracking reports	Business unit level and functional level

There are 5 steps in the proposed framework; the 1st step is conformed by the (1) competitive intelligence and (2) mission, vision and values statement, which aims at providing industry information and guidelines form the corporation; the results are the strategic vigilance reports and mission and vision statements. If that information is not available, the business unit is responsible to get it. Then there is the 2nd step; this step is well known by the SWOT acronym – Strengths, Weaknesses, Opportunities and Threats- and performed by and environmental and internal scrutiny. From this step, the expected output is a list of projects that will make the organization more competitive by using the best strengths of the organization and applying them into products and services that the market will consume. This first step is a key step, because the project portfolio will dictate the organization´s strategy. Following this, is the portfolio management, where the organization uses different techniques to prioritize and align the projects to the strategy, and forming the "strategic project portfolio." Then, the project portfolio will be put in a technology roadmap for their later tracking and validation.

To close the process, the validation and tracking step will be done at the business and functional level. As soon as possible the process must be validated and tracked to identify the projects that are not performing well and those that may need more resources – since the projects were labeled as strategic and they will improve the competitiveness of the organization.

A. Corporate inputs

The first step is performed at the corporate level, since planning for this model in particular is a required input. It provides the context input of the whole model. The activities to accomplish this step must be [9]:
 i.   Definition of the time frame.
 ii. Geographic segmentation.
 iii. Identification and analysis of economic factors.
 iv. Identification and analysis of primary industrial sectors.
 v.   Analysis of basics external factors and definition of alternative planning scenarios.
 vi. Identification of key opportunities and threats.

A useful way to perform a further analysis in the product-and-market scope dimensions of the business mission statement is exemplified in Figure 14 [9].

	EXISTING MARKET SCOPE	**NEW MARKET SCOPE**
EXISTING PRODUCT SCOPE	Market Penetration	Market Development
NEW PRODUCT SCOPE	Product development	Diversification

Figure 12 Definition of product-market segments and alternative for growth strategies [9].

A useful competitive intelligence (CI) and strategic surveillance model is described by Berges and Triviño [31]:
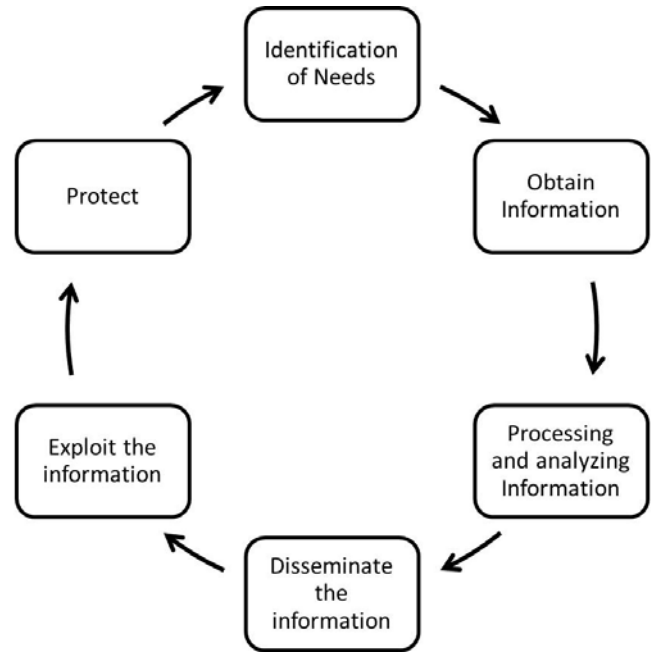

Figure 13. 6-step methodology to do competitive intelligence and strategic surveillance [31].

This model contains all relevant elements needed in CI. It is important to highlight that the start can be in any phase, but as seen it must be a cyclic task at the organization's interior. If this process is not yet implemented in the organization, it can be started at the obtaining information phase, either looking for information on products or services, or making a benchmarking of the organization and processing that information in order to identifying the strategic variables, new strategies, new product development opportunities, new marketing campaigns, market positioning, R&D projects, new tendencies, analyzing reactions, benchmarking, weak spots (such as bottle necks, weaknesses, finances etc.), new opportunities, detecting new alerts, and detecting new alliances and partners.

The corporation processes this information and generates the statements for the mission, vision, values, corporate philosophy, and organizational structure. The start point is competitive intelligence, which supports the next steps by providing the information needed. Then a benchmark could be constructed in order to find the correct comparison between similar organizations (See Table 3).

TABLE 3. PROCESS DESCRIPTION OF PHASE 1: CORPORATE INPUTS.

Inputs	Process	Outputs
Information and data from industry and organization's environment	Gathering information and relevant data about environment	Competitive intelligence reports
		Mission, vision, and values statement, and strategic objectives

B. Environmental scan/internal scrutiny

The model's second step is the study of information and data captured by competitive intelligence at the first step. The information must be filtered and segregated into two categories: environmental information and internal information. Having this in mind, that information will be part of three studies, the porter's five forces analysis [32] (studying the industry behavior), SWOT analysis, and value chain analysis (identifying key processes and how to be placed the product(s) in market). This study is made at business-level. In other words, the process consists of processing the information and focusing in developing a strategy for the organization to get into the chosen market. This can be translated into relevant information on how products and services are perceived, how to cover some customers´ needs or trends previously identified from the market, etc.

It is pertinent also to perform a good benchmarking having in mind three purposes: (1) best practices (comparing organization or business unit with similar successful/ market leading organizations-knowing the gap in fundamental for tracing the proper strategy), (2) product or service offered (comparing similar products and services or additional/complementary services gives the full illustration of where the organization is), and (3) innovation (this brings information about how much advantage competitors have in quest for market dominance through technology and development).

Once information has been compiled, it is time to think about strategy: what path to choose and follow. Relying on the generic strategies you can make a decision at business unit level.

After developing the full analysis, i.e., the 5 forces of Porter [32], the value chain [33], and SWOT, those ideas are translated into initiatives or projects, then these statements will be defined appropriately in each of the programs (innovation and continuous improvement) in the required

manner (because every methodology has different guidelines for this process.). This list of projects will be the main input for the next steps in the proposed model. For example, if there is a market opportunity that can be approached through a new product, a complimentary service, or through a combination of both, the project statement would be "the development of new products or product improvements with a determined methodology".

Specifically talking about the analysis of the value chain [33], benchmarking, SWOT and Porter's 5 Forces [32], some of the outputs are initiatives that may become both innovation and continuous improvement projects. This allows for a much larger potential project portfolio to approach areas of opportunity and capitalize on the untapped market opportunities. It depends on how the team transforms this information into a project, i.e. the translation of a statement into a project initiative.

C. Portfolio Management

Once again after information and data analysis, idea filtering, and strategic variables review, comes project selection. The project selection is not only *continuous improvement* but also in *innovation* is critical for any program success. Several tool options are exhibited in the tools chapter in order to make that kind of decisions (go/kill – resource allocation, strategic priority etc.).

The main idea of this step is to make go/kill project decisions as well as resources allocation, with the alignment to the strategy. If those variables are not in the same page, it could be successful but lacking of strategic value, due to the non-existent strategic basis. It is ideal if just the strategic projects are running along the organizations. That is why technology roadmapping is used as support, to warrant the alignment. Technology roadmapping brings strategic alignment and the capability of being used with the balanced scorecard.

TABLE 4. PROCESS DESCRIPTION OF THE PHASE 1&2: ENVIRONMENTAL SCAN/INTERNAL ANALYSIS.

Inputs	Process	Outputs
Competitive intelligence reports	Process information and data in Porter's five forces model [32]	Industry status
	SWOT analysis	Environmental strategies to follow
Organization's information and data		Project list
	Process information and data in value chain model [33]	Market strategies

TABLE 5. PROCESS DESCRIPTION OF THE PHASE 3: PORTFOLIO MANAGEMENT PHASE.

Inputs	Process	Outputs
Project list	Project classification into continuous improvement and innovation.	Balanced and strategic aligned project portfolio
	Matching strategic statement.	
Technology roadmapping	selecting strategic variables and tracing technology map	Organization's technology roadmap

TABLE 6. PROCESS DESCRIPTION OF THE PHASE 5: VALIDATING AND TRACK PHASE.

Inputs	Process	Outputs
Technology roadmap	Validating and track information across time	Keep strategy route, retracing strategy or include more elements on the map
Project portfolio	Validating and track projects development across time	Go/kill and resource reallocation decisions in projects
	validating and track the progress of the portfolio of projects in each program	Go/kill decisions in projects

At the end of the phase the project portfolio and the organization's technology map, provides enough idea of how strategy is deployed. Thus corrections on the organization's strategy because of the environmental changes will be minimal, and can be scheduled or predictable.

D. Validation and Tracking

Validation and tracking in this model is viewed from two fronts: tracking of the preceding activities, validation of the previous steps, and tracking the approved project portfolio. This might be done tracking of the whole process with its validation of the previous steps and tracking of the chosen strategy along with its evolution across time. For the project portfolio projects it might be made via specific program tracking and validation of every step. As an example Stage-Gate has many feedback points at every end of the stage for tracking and validating the step.

It is in consideration having periodical meetings, an open process to discuss new information gathered with competitive intelligence, because it is a non-stop process.

IV. CONCLUSIONS

The strategic planning models' study is a very hard task because it involves not only understanding the process, but the flow of information through it. Being a task that is not only quantitative, but mostly qualitative, the information is not always accurate nor has defined rules, making the process very complicated. That is why every organization must learn to do this type of process by following a model that contains most of the reference frame content so that it is easier to implement their plans and validate their results over time.

As could be seen, shaping project portfolio can be done in several ways. Work teams must ensure the resources and organization's projects align with strategic objectives. This is where innovation tools play a key role. Contrary to continuous improvement efforts, it has a clear purpose from the beginning: continuous improvement. On the other hand, innovation´s objectives must be aligned and not fall into the development of new product / processes and their successful introduction into the market. For this reason, the tools described are fundamental to such processes.

The technology roadmapping as described in this study provides the organization the ability to bring the strategic goals and align them with projects and programs within the organization, generating desired empathy between available resources and the daily routine. The integration of this element in the strategic planning process, provides validation and process's flexibility and ability to change strategy, not only when there are sudden changes in the industry environment given by disruptive innovation but when trends and megatrends are identified or foreseen in the market, which can exploit opportunities or new growth opportunities.

Taking into account the purpose of making the implementation simpler, and by presenting the suggested tools, there were some examples in the study that can clarify why we recommended using these tools. Although the proposed framework was designed to be robust, it is easily integrated with more tools in any of the process´s stages. It is natural – as in any framework - the improvement by adding / changing with other tools to accommodate to the company´s needs.

The model has several elements to remark in this section of the research. The sequential view, in which the model is divided have distinguishing features that enable understanding and to determine a strategic approach to implement and coordinate efforts of a continuous improvement or innovation programs. The vision of simplicity is pragmatic and functional, being that it intends to implement programs successfully in a few weeks. Finally, the systemic approach in decision making functional level recognizes the voice of the customer, and the business process that is essential for a successful practice.

Following the literature search and the construction of the theoretical framework, it can be demonstrated the importance of strategic planning, translation into the portfolio of projects and their successful deployment within organization. This analysis leveraged the tools used to identify the actual situation of the organization in the competitive environment, proposing a context of action and a set of goals to work on different terms and teams. It is the desired alignment between strategic planning and desired scenario, which is intended to reach to achieve a competitive advantage.

V. CONTRIBUTIONS

The contributions achieved in this research are:
- ✓ The study of many different strategic planning models to propose a lean and simpler model.
- ✓ The proposed model for business units and medium sized organizations.
- ✓ The integration of the proposed model, with tools which help the strategy deployment through the organization.
- ✓ The combination of strategic planning tools with portfolio management and technology roadmapping in a comprehensive planning framework.

✓ The reduction of steps in strategic planning process for business units and medium sized organizations – aiming at a quicker implementation.

VI. FUTURE STUDIES

The next step on this research are:
✓ The model integration with corporate level (strategy creation) and with functional level execution.
✓ Describing the entire process of application and opportunity areas of it.
✓ The integration with IT with the proposed model.
✓ The incorporation of data analysis with interactive techniques.
✓ Monitoring of the enterprises/firms/organizations/business units that embraced the model.

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