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**Portfolio Management: A Quantitative Study of its Implementation and  
Challenges Found**

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**Abstract:** Portfolio Project Management (PPM) has been evolving over time. It is a project management activity which binds strategic activities with the routine of project development. The goal of this paper is to identify the current state of PPM in Brazilian companies and the relationship between this state and the issues and challenges found. This relationship was established by using quantitative data of a survey applied to 45 companies, where we found that most companies are actually using PPM tools, but there are still improvements to be made in resource allocation, project selection based on power and the quality of the information being used to name a few. These challenges are statistically related to the categorization of projects, the selection tools being used, to the feedback from current projects, to strategic planning and to the participation of the senior management in the whole process.

**Key words:** Project management, portfolio management, issues.

## **1 Introduction**

Project portfolio management can be defined as a series of models, procedures and processes which aim to manage a set of projects in a systemic way (Carvalho e Rabechini Jr., 2008).

The importance of this theme relates to the necessity companies have to get an advantage with projects that meet the competitive strategy adopted by the organization while using limited human, financial and technological resources (Rozenfeld et. al, 2006).

In a study developed by Block & Frame (2001), it was described that only 41% of the companies that have Project Management Offices (PMO) actually used this resource to work on project portfolio management issues. Nevertheless, Rodrigues, Rabechini and Csillag (2006) identified that 65.28% of Brazilian PMOs understand that portfolio management activities should be included on their office's attributions.

Project portfolio management activities include the identification of project opportunities, an initial evaluation of opportunity and viability, an evaluation of potential projects which follow the strategic criteria, project prioritization, project selection, resource allocation, follow ups on the current portfolio and feedback on the portfolio performance on projects selection and strategic planning.

The subject of portfolio management was born with Markowitz (1952), and it only considered portfolios for investment. This subject was first approached targeting project portfolios in the 70's, but the most relevant works were in the 90's, when project portfolio management started to grow as an academic research subject. Given the degree of newness on the theme, many companies still face challenges and complications when using these concepts. Based on this scenario, the main objectives of this paper are:

- 1) Identify the current state of implementation of project portfolio activities on Brazilian companies;

- 2) Establish if there is any relationship between the degrees of implementation of these activities with the issues of keeping a project portfolio that meets the strategic needs of said companies.

This paper unfolds, in order to meet these goals, was structured on the following sections: Literature Review: discussing the main concepts of Project portfolio management; Research Methodology: describing the research protocol and the procedures for gathering data; Results: presenting the main results of descriptive statistics and statistical inferences; Discussion: relating to the results with the implications on the theoretical framework and Conclusion: describing the contributions of this paper and its limitations.

## **2 Literature review**

According to PMI (2006), a portfolio could be defined as “a collection of projects or programmes and other work that are grouped together to facilitate effective management of that work to meet strategic business objectives”, hence it follows that the portfolio is not a temporary activity as projects are.

Pursuant to Castro (2008), “PPM activities are concentrated in the tactical level, once their objective is to identify the actions that should be taken by the company to meet the strategic goals and objectives. (...) However, there is a strong relationship between the strategic level — where the goals and objectives are defined — and the operational level — where the projects are actually take place”.

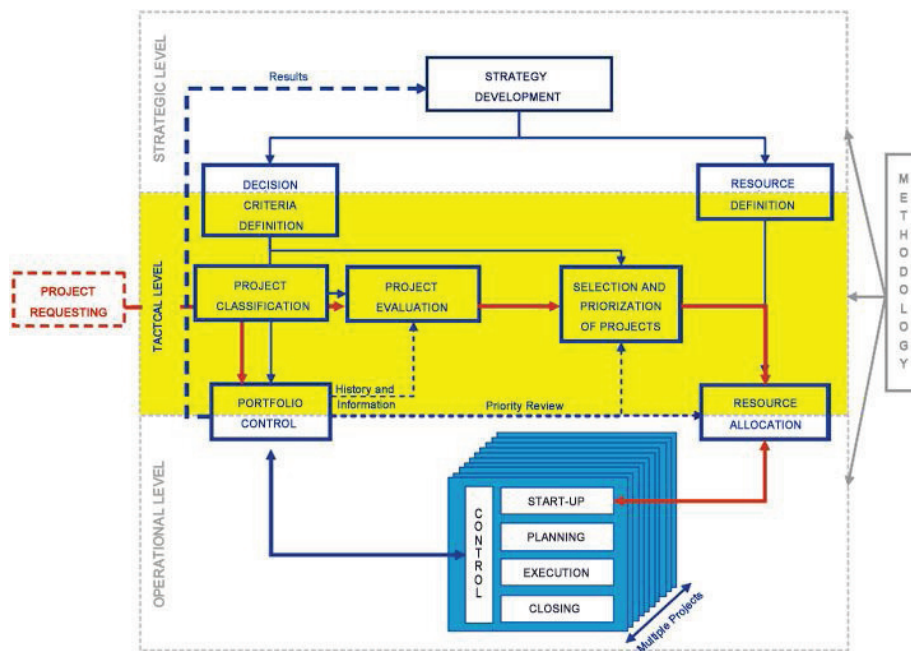


Figure 1 – Portfolio Management Process (Castro, 2008)

Therefore, Portfolio Project Management (PPM) is a dynamic process where the ongoing projects are in constant review. In this process the current projects and the new projects are constantly evaluated, prioritized and selected. (COOPER et al.,1997). Chien (2002) mentions that the reason for evaluating all projects as a whole is due to the need of understanding the independent attributes of the portfolio, that is, the individual characteristics of each project; the interrelation of portfolio attributes, related to risk mitigation and the portfolio volatility and the positive interactions between projects as geographic synergies and scale advantages.

Project portfolio management is growing as a subject of academic research, specially under the approach of specific criteria on New Product Development (NPD) (COOPER ET AL, 1997; GRIFFIN, 1993; MONTOYA-WEISS & CANTALONE, 1994; WHEELRIGHT e CLARK, 1992), on the pharmaceutical industry (SENN, 2003), and on the Information Technology scenarios (BARDHAN e SOUGHSTAD, 2004). Those authors refer to the intrinsic uncertainty of decision taking on this kind of Project,

conflicting with the strategic interest on these projects because of the need of innovation.

**H1: The more uncertain and innovative the project development environment is, the more difficulties should exist in the management of the portfolio.**

Rabechini Jr (2005) proposes a model to project portfolio management which comprehends the stages of preparation for the portfolio implantation, Project identification, evaluation, the constitution of the portfolio and its management, review and control.

The Stage-Gate framework on project portfolio management proposed by Cooper et al (2007) describes the collection of strategic needs, the verification of Project priority, verification of balance and strategic alignment, and portfolio adjustment. In between stages, this model proposes a Gate where the company should decide if each Project passes to the next stage or dies.

However, in the Archer & Gasemzadeh (1999) mention in their model the following phases: pre-evaluation, individual project analysis, evaluation, optimum portfolio selection, portfolio adjustment, project development, project evaluation and closure.

On PMI (2006), the phases of project portfolio management are: identification, categorization, evaluation, selection, prioritization, balance, authorization, review and publishing the results.

According to Archer & Ghasemzadeh (1999), the Project portfolio management process should include:

- Strategic evaluation of the projects: understanding the internal and external factors that affect the business and the budget premises that rule those factors;
- Clear pre-evaluation project criteria, preventing projects that do not meet minimum requirements from even getting to the Project selection process;

- Methods that do not overload the decision makers with irrelevant data;
- Standard parameters for evaluation, allowing for the evaluation of each applicant project alone, but also allow for a fair comparison between projects;
- Flexible methods which allow the *stakeholders* to feel comfortable with the tools of prioritization, but also employing the analysis of relevant data and decision making;
- Evaluation of the whole portfolio under the approach of interaction between projects and resource sharing;
- Periodic evaluation of portfolio, considering the impact of any eventual changes in the initial premises used during selection, and also allowing the portfolio to adapt to changes in the company environment.

Elonen and Artto (2002) identify that these Project portfolio management activities are not always developed with the expected results, generating issues on the portfolio that could cause the following problems to the organization:

- Lack of connection between the strategy and project selection: the priorities defined on the strategic plan are not present in the selected projects, and it is entirely possible for the company to make investments on non strategic themes.
- Poor portfolio: weak projects, with little chance of success, are not properly separated from projects with greater potential.
- Reluctance in killing projects: changes in the internal or external environment of the company that no longer justify a project, or projects whose development is far less than expected will be carried out to the end, even if their existence is questionable
- Lack of focus versus few resources: an exaggerated number of projects as opposed to few resources available, which leads to delays and loss of quality.
- Exclusively Prioritizing quick and easy projects: selection of projects that does not take into account the best opportunities for the company, but only the simplest, causing a loss on important advantage creation.

- Excess of information and information devoid of quality: managers are overloaded with information on potentials projects, and much of this data is questionable, making the decision process more complex and uncertain.
- Choice of projects based on power: when there is no reliable information for the selection of themes, decisions are interdependent and there is discord. It is possible that the process of selection of projects is dominated by political decisions, undermining the characteristics of the portfolio.

As in Griffin (1997), the more complete the use of each stage on the Project portfolio management process, the greater the probability of success for the project in the portfolio, avoiding the aforementioned pitfalls. Considering the range of activities proposed by Archer & Ghasemzadeh (1999) for project portfolio management and considering the findings of Griffin (1997), it is possible to wonder how strong the relationship between the implementation of those activities and the prevention of the issues described by Elonen and Artto (2002) is.

**H2: The deeper and more complete portfolio management activities are in the organization, the less issues they should present the company during development.**

Cooper et. al. (1997) mentions that there is also a relationship between the tools used on the process of selection, evaluation and prioritization and the performance of the portfolio. Even though they present in their paper the financial methods as being the most commonly used, the best results are achieved when more than one method is used; remarkably so when the financial methods are balanced with other tools to represent the other strategic needs of the organization.

Many authors are working on quantitative methods for decision making in project portfolios by developing more friendly tools to balance the financial maximization with business strategy and risk, taking into account the available resources and thus

maximizing the benefits not only on the financial point of view (ROGERS, 2002; LIN, 2004; LIN, 2008; HENRIKSEN e TRAYNOR, 1999)

**H3: The more tools are used in the portfolio management, the less issues they should present in their development.**

There is no consensus between the main authors in regards to the recommending the separation of portfolios under different categories. Some authors defend that, in order to get a better evaluation of the project, projects that are similar in nature should be grouped in categories with specific resources and compete for them (WHEELWRIGHT; CLARK, 1992; ARCHER; GHASEMZADEH, 1996). The categorization of the projects is also defended by PMI (2006), which recommends that each project be assigned to a category, each of which with a strategic purpose. Wheelwright and Clark (1992) propose that an ideal blend of projects should be persecuted by category balance.

Otherwise, Cooper et al. (1997) claims that the company has a limited amount of resources, so the competition for them will occur regardless of typology or categorization. Thence it is important for the portfolio managers that these conflicts be identified independently of the project's category.

**H4: When organizations use project evaluation based on categories, there is less risk of poor portfolios.**

However, on what concerns the theoretical frameworks regarding the allocation of resources for the projects, most of the literature mentions the importance of this activity, however it does not describe it in full detail. (WHEELWRIGHT AND CLARK, 1992; COOPER ET. al., 1997; ARCHER and GHASEMZADEH, 1999). Most contributions in this theme come from the Operational Research area. It proposes an algorithm to optimize the use of the available resources according to the priority of the projects

### **3 Research methodology**

A survey questionnaire was formulated containing 18 closed questions and 2 open questions. The closed questions used a Likert scale type of answer, except when multiple responses were allowed.

The sections of the instrument concerned the respondent's identification, general questions about the kinds of projects developed by the organization, the existence of project portfolio management and its scope, portfolio activities periodicity, participants of the portfolio committee, tools used on decision support, issues and questions found on the project portfolio, demographic questions about the respondent and the company, percentage of the company involved in projects, existence of a formal PMO and its profile based on size, influence and experience.

The questions about portfolio management practices and the respondent's profile were based on the survey instrument of Castro (2008) and the questions regarding challenge and problems were prepared by the author based in Elonen and Artto (2002)

Through this instrument, we proposed 7 response variables, 20 explanation variables (unfolding in 26 categories), and 3 moderator variables (project types, enterprise size and segment) for the challenges met in Portfolio Project Management (PPM).

This survey was published over the web using a survey tool (Survey Monkey), which keeps track of the IP addresses that access the survey to prevent multiple answers from the same user.

A link to the survey was sent by email on July 20, 2009 to 76 companies of several segments from Brazil, addressed to the head of the project department. Until September 05, 2009, 45 forms had been answered (a 59% response ratio), of which 29 forms were 100% filled (64% of all answered forms or 38% of the initial sample)

The answers in Likert's scale were converted to points aiming to treat them as a quantitative variable. This was done to evaluate accurately the extension of the

relationship between this study's data and performance, which is a primary need of researchers that seek to understand the cause-effect relations in Portfolio Project Management (MONTROYA-WEISS & CANTALONE, 1994).

#### 4 Results

From the demographic variables in the study group we can see that the surveyed companies greatly differ in their segments of activity. In most cases we perceive that that majority of the people involved in conducting projects do so only part-time, and that 11 companies, 39.3% of the respondents, have their own projects office.



Figure 6 – Segments of activity

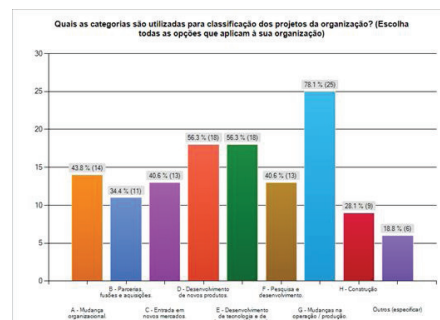


Figure 8 – Frequency of existence of Project Offices in the companies surveyed.

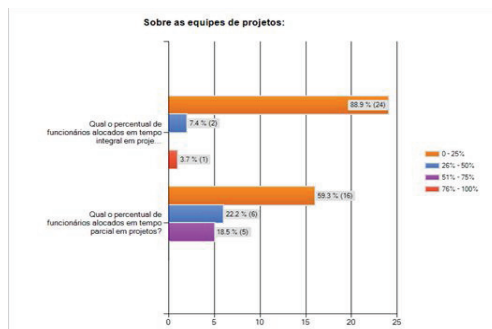


Figure 7 – Percentage of people allocated part-time or full-time to projects

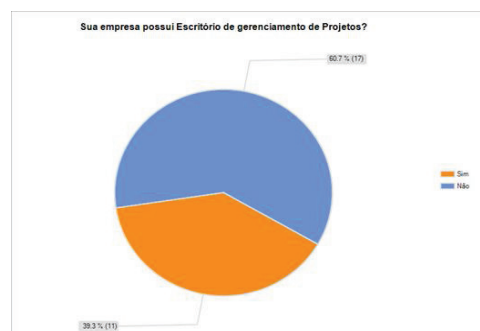


Figure 9 – Project Typology in the companies surveyed

The respondents informed what themes are dealt with projects in their organizations. We verify that the most commonly mentioned themes were changes in operation and production, development of new products and development of new technologies and information systems.

Of all the surveyed companies, 19 (59.4%) agree totally or partially that their organizations have a systematic standardized evaluation of projects, 7 (21.9%) present a neutral evaluation and 6 (18.8%) deny having structured activities for portfolio management.

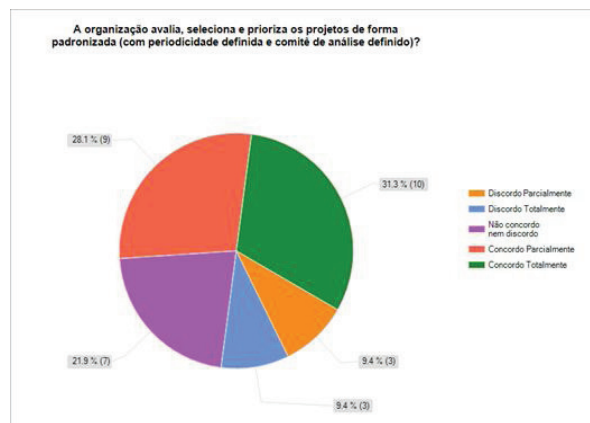


Figure 10 – Company agreement to activities of Portfolio Management.

When questioned about the kind of activities developed in portfolio management, most respondents agree, either totally or partially, to the propositions described on table X. The organizations, however, show different criteria on project evaluation; 12 (41.38%) of them make a general assessment for all kinds of projects and 18 (55.17%) separate the evaluation in categories.

Table 2 – Degree of concurrence of organizations regarding the kind of activity developed in the portfolio management.

	<b>Totally</b>	<b>Partiall</b>	<b>Do not</b>	<b>Partially</b>	<b>Totally</b>
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	Agree	y Agree	Agree nor Disagree	Disagree	Disagree
1. The Organization is clear of their strategic priorities.	<b>13</b> <b>43.33%</b>	<b>12</b> <b>40.00%</b>	3 10.00%	1 3.33%	1 3.33%
2. The Organization classifies projects in different categories.	<b>12</b> <b>41.38%</b>	<b>11</b> <b>37.93%</b>	1 3.45%	3 10.34%	2 6.90%
3. The Organization evaluates projects according to strategic priorities.	<b>10</b> <b>34.48%</b>	<b>11</b> <b>37.93%</b>	5 17.24%	1 3.45%	2 6.90%
4. The Organization is clear on the availability of resources (human, technological, financial) for the management and execution of projects.	6 20.69%	<b>8</b> <b>27.59%</b>	4 13.79%	<b>7</b> <b>24.14%</b>	4 13.79%
5. The organization evaluates, selects and prioritizes projects in a specific way for each category.	5 17.24%	<b>9</b> <b>31.03%</b>	<b>8</b> <b>27.59%</b>	2 6.90%	5 17.24%
6. Projects are compared with each other and compete for the same resources regardless of category.	6 20.69%	<b>6</b> <b>20.69%</b>	4 13.79%	<b>8</b> <b>27.59%</b>	5 17.24%
7. All projects of the same category are compared with each other and compete for the resources destined for that	5 17.24%	<b>11</b> <b>37.93%</b>	4 13.79%	4 13.79%	<b>5</b> <b>17.24%</b>

category.					
8. Projects are evaluated, selected and prioritized individually and do not compete for the same resources with other projects.	3 10.34%	5 17.24%	2 6.90%	7 <b>24.14%</b>	12 <b>41.38%</b>
9. Resource availability is considered in the selection and prioritization of projects.	13 <b>44.83%</b>	7 <b>24.14%</b>	4 13.79%	2 6.90%	3 10.34%
10. Resources are allocated to projects according to priority	9 <b>31.03%</b>	12 <b>41.38%</b>	6 20.69%	1 3.45%	1 3.45%
11. Information regarding projects being executed is considered during evaluation, selection and prioritizing and resource allocation.	9 <b>31.03%</b>	10 <b>34.48%</b>	6 20.69%	2 6.90%	2 6.90%
12. Projects being executed are often reevaluated and can be stopped so resources can be destined to other projects.	9 <b>31.03%</b>	9 <b>31.03%</b>	6 20.69%	2 6.90%	3 10.34%
13. Information regarding projects being evaluated is used in strategic planning.	12 <b>41.38%</b>	7 <b>24.14%</b>	3 10.34%	6 20.69%	1 3.45%

The majority of the organizations — 15 respondents or 78.9%, evaluate projects every semester or even annually. On 16 companies (78.9%), the committee which participates on these discussions is composed of directors or functional managers. The methods

more often used in these meetings **are models** (15 respondents or 78.9%) and financial methods (14 respondents or 73.7%).

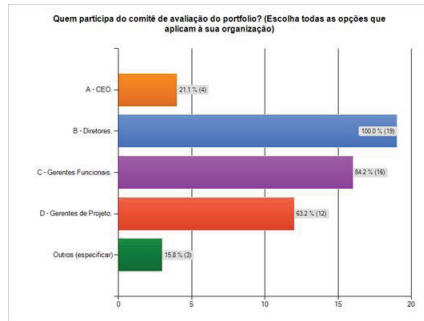


Figure 11 – frequency of portfolio evaluation meetings

Figure 13 – Tools that support decisions of portfolio management

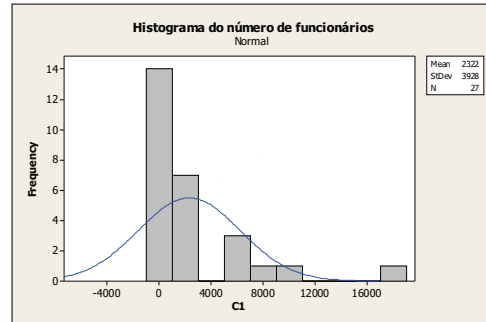


Figure 14 – Number of employees in the companies we surveyed.

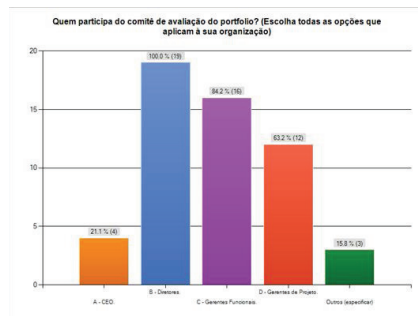
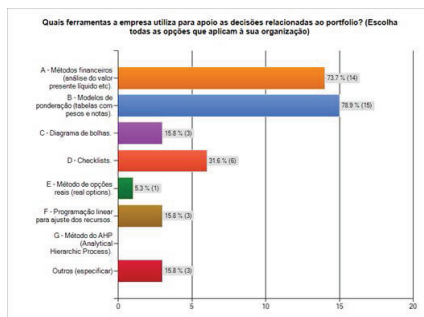


Figure 12 – Composition of the portfolio evaluation committee



Most companies express a low occurrence of problems in the portfolio management (table 3). Amongst the ones reported more often, we have the lack of focus related to the lack of resources (14 respondents or 50%) and the political choice of projects (11 respondents or 39.3%).

	<b>Recurring (happens more than 75% of times)</b>	<b>Very frequent (happens 50 to 75% of times).</b>	<b>Frequent (happens 25% to 50% of times).</b>	<b>Little frequent (Happens less than 25% of times).</b>
Lack of connection between the strategy and selection of projects: the priorities defined in the strategic plan are not always present in the selected projects, and it is entirely possible that there are investments in themes that are not prioritized.	3  10.3%	4  13.8%	11  37.9%	11  37.9%
Poor portfolio: weak projects, with little chance of success, are not properly separated from projects with greater potential.	2  7.1%	6  21.4%	10  35.7%	10  35.7%
Reluctance in killing projects: changes	5	4	8	11

in the internal or external environment of the company that no longer justify a project, or projects whose development is far less than expected will be carried out to the end, even if their existence is questionable.	17.9%	14.3%	<b>28.6%</b>	<b>39.3%</b>
Lack of focus versus few resources: an exaggerated number of projects as opposed to few resources available, which leads to delays and loss of quality.	4 14.3%	<b>10</b> <b>35.7%</b>	<b>10</b> <b>35.7%</b>	4 14.3%
Exclusively Prioritizing quick and easy projects: selection of projects that does not take into account the best opportunities for the company, but only the simplest, causing a loss on important advantage creation.	1 3.6%	5 17.9%	<b>8</b> <b>28.6%</b>	<b>14</b> <b>50.0%</b>
Excess of information and information devoid of quality: managers are overloaded with information on potentials projects, and much of this data is questionable, making the	1 3.6%	<b>9</b> <b>32.1%</b>	5 17.9%	<b>13</b> <b>46.4%</b>

decision process more complex and uncertain.				
Choice of projects based on power: when there is no reliable information for the selection of themes, decisions are interdependent and there is discord.	4	7	6	11
It is possible that the process of selection of projects is dominated by political decisions, undermining the characteristics of the portfolio.	14.3%	25.0%	21.4%	39.3%

Table 3 – Frequency of the main challenges faced in portfolio management

With the inclusion of the other variables, it is noticed that the presence of the CEO, the use of financial tools and bubble graphs reduce the occurrence of problems in portfolio management.

On the other hand, there seems to be a difference in performance in the portfolio management when the projects are related to the changes in operation or production (with smaller occurrence of problems) and projects related to the development of technologies and information systems (with larger occurrence of problems).

## 5 Discussion

Results demonstrate that most of the surveyed organizations count with some sort of structure as far as portfolio management goes, which in turn reflected with generally good results when related to the problems and challenges found.

The problems the organizations reported more frequently were the matter of the exaggerated number of projects when compared to the available resources; the overload of information for the managers and the predominance of political decisions in the selection of projects.

The statistical results bring to our attention the fact that, for both the main issues reported in the survey and the other output variables, the most frequent responses are related to the allocation of resources in accordance to the established priorities. It seems clear that there is a relationship of this variable with the matter of political decisions in the selection, evaluation and prioritizing of projects.

Another peculiar characteristic is the difference found on the variables related to the separation of projects in criteria. The frequencies obtained for these variables indicate that companies will have greater difficulties working their portfolios when these are grouped together according to categories rather than when they have a unified portfolio management.

Another important criticism found in the data is the feedback to strategic planning of the data regarding the ongoing portfolio. It can be inferred that this gap in the use of project information at the strategic levels allows for a distortion between the original intent of the project and its results, which in turn allows for political usage during the activities of portfolio management.

The use of multiple tools, especially financial methods together with bubble graphs have a significant effect on the wealth of the portfolio being developed and discourage political disputes.

The analysis also brought to light the specific difficulty of the portfolio managements of IT projects, whose performance was systematically smaller than the ones of the other

categories; even areas with of great uncertainty such as research and development and new product development.

## **6 Conclusion**

The study brought information regarding the current state of portfolio management in Brazil, demonstrating that there is a good level of adhesion of companies to these activities, which implies an improvement of the performance of the managed portfolios. Among the most frequent issues, the most significant are the occurrence of political choices of projects and of conflicts for resources due to the lack of focus. The data on this research shows these difficulties can be reduced with actions that facilitate the correct allocation of resources according to the priorities set, with the participation of senior executives in the decision committees and with the support of multiple tools as that aid the treatment of the information used in the selection, evaluation and prioritizing of projects that compose the portfolio, not only in the first stages, but also returning such information for the strategic decision making of the company.

In our next study, we suggest to evaluate reason why the performance of portfolio management which makes use of use of categories for different projects seem to bring difficulties in contrast to some theoretical constructs, as well as the causes for these difficulties.

## **7 Limitation**

The answers of the survey reflect the perception of the respondents, which can introduce disturbances to the answers.

The inherent fear managers have of mentioning the flaws or difficulties in the work, detected by Montoya-Weiss and Cantalone (1994) can also cause the answers to be predominantly positively biased.

Another possible limitation to the results is geographical; the study was limited to the structures of project portfolio management in companies in Brazil.

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