Looking for the right criteria to define projects portfolio: Multiple case study analysis*

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Abstract: This study aims to analyze the main criteria involved in the process of selection and prioritization of projects portfolio in Brazilian companies and compare them to those found in the project management literature trying to identify gaps between theory and practice. The theoretical framework adopted encompasses four aspects: characteristics of projects; motivation for projects; value of projects and business areas for companies. The field research adopts the multiple case study method that was carried out in different sectors: financial institutions, manufacturers, public companies and the government. The results show that the main criteria used by the six companies were the following: complexity, risk, technical feasibility, project performance, and stakeholder satisfaction. Furthermore, only the stakeholder satisfaction criterion was adopted by all companies.

Keywords: portfolio management, decision making support, project selection.

1. Introduction

To meet the increasing demand for projects, organizations face resource constraints and must thus make choices. Choosing among dozens and hundreds of alternatives for those which will compose the organization projects portfolio and their priority is a complex matter of multi-criteria decision making, the solution of which requires a clear criteria definition for selection and prioritization from the decision makers.

The literature on projects is vast, dealing with themes such as classification, selection and prioritization of projects, among others. However, there is a gap regarding general decision making criteria on selection and prioritization and whenever applicable. The literature also fails to mention a universal criteria recommendation for project decision making in accordance with market segment, country, type of project, organization size, public or private sector, etc.

This work aims to present a study on decision making criteria utilized by six important institutions in Brazil that apply the Analytic Hierarchy Process (AHP) method as a tool for selection and prioritization of their projects and thus they have a well defined set of criteria for selection and prioritization of projects. The study aims to identify the gaps between theory and practice, as well as to verify the existence of common projects selection and prioritization criteria regardless of the kind of institution, market segment, country and type of project under evaluation, whenever applicable. The wrong selection of decision making criteria can lead the institution to failing to achieve its strategic objectives as well as the stakeholders' ones. As a result, failure in introducing projects may turn into huge disasters for every party involved. Thus this paper focus on decision making criteria in projects and their applications, as well as the relation to critical success factors (FCSs) in the organizations.

This paper is divided into five sections. The following sections present the theoretical framework; the methodological approach proposed; the field research; and the conclusions, limitations and recommendations for future studies.

2. Literature review

Projects are developed in different sectors in the society, either in the industrial environment or in the federal and state governmental structures. They account for important examples of this sectors in which projects are developed and need to be well managed: aircraft industry, banks, information technology business, civil construction, state defense departments, energy sector, government, pharmaceutical, chemical and petrochemical industry, among others. The duration of projects may vary from a

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few hours, such as solving a power failure problem, to many years, such as developing and testing a new pharmaceutical product. Besides, for concerning project management, a clash of interests enters the game. In any project, prior to anything else, it is necessary to set up a solid basis of valid and trustful decision criteria (WIDEMAN, 1995).

McFarlan (1981) ratifies this point of view and states that different projects require different management approaches. However, he warns that organizations exhaustively study the financial benefits, the quality of projects, the costs of implementation, datelines and necessary competences, but they are rarely concerned about keeping records on the risks of projects. Such risks are described as delay in implementation, budget overrun, technical failure and problems of performance after the implementation. Thus, it is necessary to classify the projects in a way that makes possible to differentiate them and compare them with other similar projects. According to McFarlan (1981), a project can be classified in 3 dimensions: project size, experience with the utilized technology and project structure.

Wit (1988), in turn, states that the most appropriate success factors are clearly established project objectives. Regarding the degree of clearness for defining those projects, this leads to success or failure. For Wit (1988), the FCSs in projects management are strictly related to cost, time and quality/performance, whereas the stakeholders' interests should also be considered over the lifecycle time of the projects in the whole organization hierarchical level. In this context, the author cites the following as possible project selection and prioritization criteria: project characteristics in technical and financial terms, as well as project management issues such as budget, dateline, technical specification and short and long term quality service. The client, suppliers and team satisfaction with the project are also highlighted in FCSs in projects.

Jolly (2003) presents a list of 32 criteria available in the literature to group technology projects; 16 are used for depicting technological competitiveness and 16 are used for describing technological attractiveness. The list is shown in Table 1. Due to the difficulty in working with every criterion to select the projects, the author proposes a scale of weight worked out from the poll results conducted among a group of executives of important organizations in the world. The research most important criteria which impacts technological attractiveness found by Jolly (2003) are: technology impact on competitive issues, market volume provided by technology, span of applications provided by technology, performance gap vis-à-vis alternative technologies and competitive intensity. And the 6 most important criteria which impact competitiveness are: team competences development, distance between technology and the company core business, timetable related to competition, financing capacity, applied research, team competencies and market reaction to the design proposed by the company.

Table 1. List of criteria grouped by families (JOLLY, 2003).

Technological attractiveness	Technological competetiveness
Market factors	**Technological resources**
Market volume opened by technology	Origin of the assets
Span of applications opened by technology	Relatedness to the core business
Market sensitivity to technical factors	Experience accumulated in the field
Competitions factors	Registered patents
Number of stake-holders	Value of laboratories and equipment
Competitors' level of involvement	Fundamental research team competencies
Competitive intensity	Applied research team competencies
Impact of technology on competitive issues	Development team competencies
Barriers to copy or imitation	Diffusion in the enterprise
Dominant design	
Technical factors	**Complementary resources**
Position of the technology in its own life-cycle	Capability to keep up with fundamental scientific and technical knowledge
Potential for progress	Financing capacity
Performance gap *vis-á-vis* alternative technologies	Quality of relationships between R&D and Production
Threat of substitution technologies	Quality of relationships between R&D and Marketing
Ability to transfer the technology from one unit to another	Capacity to protect against imitation
Other criteria	Market reaction to the company's design
Societal stakes	Timetable relative to competition
Public support for development	

Hamilton (2002) argues that in a global economy it is difficult to compete or to make projects feasible if the organizations do not have high functional products of low cost, or quality services to be offered. In this context, the author proposes the use of value engineering in the P&D selection of projects and the use of brainstorming with the organization major clients to create value in their projects and products. In his study, the following decision criteria were identified : product profitability in terms of design for manufacture, design for wide market, low labour, capital and material cost and short time to market; client's satisfaction in terms of product flexibility, meet or excel technical specifications, competitively priced, value added and safe product and ease of installation and operation; develop a product range examining market and competitors' products and ensure political acceptability such as environmentally friendly and aesthetically pleasing product.

On analyzing what the literature covers concerning selection of information technology projects, it is confirmed that there are many studies on software classification and selection criteria; nothing specifically applied to the area of civil construction, though (ARDITI; SINGH, 1991). These authors point out as criteria for selection and prioritization of software projects the price, the financial soundness of software houses, available functions, simultaneous access to sites and users, hardware characteristics to define the necessary infra-structure, availability of web version, guarantee condition, availability of releases, technical assistance, training programs, support team location and available software idiom.

As far as FCSs in projects are concerned, Jha and Iyer (2007) state that there are not universally accepted criteria to measure projects success and that, traditionally, performance is evaluated by using the performance criteria in dateline, cost, quality, also known as iron triangle. The authors cited some performance criteria that may be used to evaluate success: perceived performance, client's satisfaction, service provider/ supplier's satisfaction, project team's satisfaction, technical performance, technical innovation level, efficacy on carrying out the project, managerial and organizational expectancy, professional growth, project conclusion level, function, manufacturing facility and business performance. According to the authors' proposal, such criteria can be divided into 2 categories: objective, which are achievable and measurable such as cost, quality, safety and subjective, which are not achievable and include client's, provider's, supplier's and project team's satisfaction. Jha and Iyer (2007) confirm in their work that competence, commitment and coordination are the key to projects success and if they are not well managed, the performance desired will not be achieved regardless of the type of project at stake.

Mahdi and Alreshaid (2005) in their research used the AHP (analytical hierarchy process) method for selecting the proper project delivery method according to the type of project and characteristic of the organization's contractors/ owners. According to the authors, the delivery methods can be of DBB (design, bid and built), CMR (construction management at risk) and DB (design and built) types. To get the most proper project delivery, the authors propose the following decision criteria: owner's characteristics in terms of control over design, benefits from cost saving, involvement in project details and applicability; project characteristics in terms of precise cost estimate before contract signing, time reduction, tight project milestone, cost, saving, project budget, ability to define the project scope and project size and complexity; design characteristics such as potential for design changes during construction, design quality, flexibility to redesign after construction cost commitment and effectiveness and constructability of the design; regulatory in terms of allowance for competitive bidding, desired contractual relationship, regulatory and statutory requirements, decision-making complexity, reduction in administrative staff, enough experience to carry out the delivery option and funding cycle; contractor characteristics referring to availability of experience for carrying out the delivery option; familiarity and establishment; contractor input design; experience needed for a particular delivery option; construction quality; coordination, communication and clarity of defined rules; risks about management improvement, allocation and claims between design and builder; and conflict of interests.

Bertolini et al. (2006), as Mahdi and Alreshaid (2005), proposed the application of AHP method in their work. They use this method for selecting service providers in the public sector and present 31 decision criteria, the most important of which are: cost; public work contract type involving penalties, price and changes during work; risk about place, type of work, accomplishment of work and environment; availability of material and taskforce and conflict of interests between owner and contractor.

Chow and Thomas Ng (2007), in their article in which a survey was carried out with the participation of Hong Kong organizations, define a set of criteria for selecting consulting services and quality indicators for such services. This work presents as decision criteria the compliance and understandings of client's specifications, compliance to law requirements, identification of client's requirements and project objectives, quality of design, availability of innovative and alternative solutions, approach to overall cost effectiveness, quality of documents, adequacy of cost estimate and minimization of risks.

Finally, El-Sawalhi et al. (2007) proposed a contractor pre-qualification model in which they used the following selection criteria: financial stability; management and technical ability; experience in terms of type, size, number, location and business duration of projects; historical non-

performance in terms of company image, skilled manpower, client satisfaction, record of failure and claims; availability of manpower and equipment; quality referring to policies, control and assurance and indicators of health and safety about performance, illness and hazard at work.

3. Methodological aspects

The adopted methodological approach was case studies, carried out in six Brazilian Companies. The data collection was based on meetings and interviews with project managers and researchers. In the meetings, the profile of each institution was defined and their projects portfolio, the adopted decision making criteria, the main problems in the portfolio management and solutions proposed were outlined to find the best set of projects portfolio. In the interviews, the results were tabled and validated.

The multiple case approach allows the comparative analysis among projects selection and prioritization criteria, identifying similarities, differences, benefits and tries to relate the implementation to the critical success factors.

The choice of the cases was made so that it could get a representative sampling of the outstanding Brazilian institutions in the national and international scenario of the private and public sectors, with projects portfolio of different area and numbers, and for those reasons the institutions need to adopt a selection and prioritization method that guarantees a better utilization of available resources, making the best choice of projects for each.

4. Field Research results

Next, a presentation is made on the AHP method applied in 6 cases as a tool for selection and prioritization of projects portfolio in the studied organizations. Each case had at least one of the authors of the present assignment working as a consultant, counseling the institution representatives on how to make use of the referred method. The selection and prioritization criteria adopted by those institutions were obtained as an indirect result of this work; it is the object of this article. Case 1 unfolded into 4 cases, one for each type of project: R&D; Engineering; Maintenance and Information Technology, having in its content the richest records of the adopted criteria.

4.1. Case 1 – Chemical company

This concerns a private chemical and petrochemical national organization, with headquarters in São Paulo city, counting on 4 plants in Brazil and 2 plants overseas. They serve over 30 segments, standing out: agrochemical, detergent, packing, polyester thread and filament, break fluid, cosmetic, paint and varnish. Its total number of employees in Brazil is 900 and its annual income is US$1.2 million.

In the last 2 years, the organization increased the investments from US$ 30 million to US$ 400 million. Such investments account for approximately 150 projects aiming at eliminating bottlenecks in the existing plants, building new plants, acquisition and increase of stockholding in companies, maintenance of the existing facilities, R&D infra-structure projects, information and technology (IT) projects and approximately 460 projects for new products to support the operations in Brazil and overseas. Facing the increasing demand for projects, the studied organization was led to develop a model for its projects portfolio. The chosen tool to support such a model was the AHP method proposed by Thomas Saaty in the 1970s.

The proposed model tried to relate the decision criteria for selection and prioritization of projects to the organization strategy on operational excellence and growth. Thus a hierarchy relating the 4 types of the organization projects, R&D infrastructure, engineering, information technology and maintenance were worked out along with their strategies. The R&D projects had a separate decision structure as they did not require investments in their study phases. To create the decision structure for each type of project, brainstorming meetings were held so that the decision criteria could be defined. As results of the projects for developing new products, the following criteria were obtained: risks at legal and environmental matters, misfocused estimate of market size and related to implementation; technological competitiveness regarding patents, scientific knowledge preservation capacity, core business relation, market knowledge, application and technology, organization x competition, competitive existing barriers, competitive costs, product performance and logistics competitive advantages; business attractiveness in the market response to technique and price, introduction barriers, market growth ratio, product lifecycle, organization synergy areas, financing capacity besides manpower and infra-structure availability to carry out the projects. About the R&D infra-structure projects, the following decision criteria were found: type of project, if replacement or buy and install equipments, adequacy to regulatory rules on health, safety and environment; market segment; priority in solving problems related to product performance, client assistance or development of new products; personnel capacitance and relation of the project with the organization strategy. About the engineering projects, 3 decision criteria were found: business impact, referring to the synergy of the projects with the organization affairs; return on investments; business sustainability; the organization image impact and % of execution of projects already started; risks related to existence of financing and partnership, market floating perspectives, implementation problems and losses due to non- implementation, legal and environmental aspects, country in which the organization operates, technological factors and investment amount and

complexity about the type of project, skilled manpower availability, infra-structure availability and outsourcing in the project. Regarding the maintenance projects 3 decision criteria were found: non-accomplishment risks involving losses due to the unplanned halt of the plant, premises safety aspects, legal and environmental matters; complexity in equipment/installation, availability of manpower, level of personnel and infra-structure outsourced to carry out the project and potential earnings through productivity improvement, premises lifetime increase, waste reduction and equipment liability growth. Finally, about the information technology projects, the following decision criteria were obtained: risks in terms of changes resistance, losses due to the non-implementation decision and post-implementation technical problems occurrence; complexity regarding skilled personnel and infra-structure availability for the project and project characteristic, either operational or strategic and of which type, acquisition or development of software or suitability of information technology infra-structure.

4.2. Case 2 – Government

This concerns the most populated state in Brazil, sheltering the largest industrial park and economic output over a 31% gross domestic product (GDP) in Brazil, but appears in third place in the human development rate (HDR) in Brazil. It accounts for a diversified population descending mainly from Italian and Portuguese immigrants, as well as natives and Africans and other origins such as Arab, German, Spanish, Chinese and Japanese. The annual budget of São Paulo State was US$ 21 billion in 1999, when the AHP method was implemented. The project was contracted by the government so that it could prioritize the portfolio of 80 projects that would compose the govern plan. The meetings to assign weights for the different types of projects were held by 23 secretaries of state and 9 government advisors. The projects portfolio was composed by a set of initial major projects, pre-selected by the governor, supported by the secretaries, in accordance with the administrative and managerial priorities, preference about source of capital and visibility/popularity. Such projects belonged to each of the 23 secretaries whose important issues were education, public safety, energy, planning and economy, sports and tourism, strategy, housing, justice, environment, treasury, transport and communication. The decisions decision hierarchy and decision criteria obtained after the meetings were validated before the weights for the projects were voted. In a one-day meeting, all the projects had their 7 criteria voted by the secretaries and advisors. The result obtained with the application of the AHP method met the group expectation and was approved. The 7 decision criteria applied were: project degree acceptance, project contribution to the state competitiveness, project social impact, employment generation, contribution degree to the govern target achievement, project feasibility and the state safety improvement.

4.3. Case 3 – Water and sewage system

This concerns an organization in the public sector operating in 368 cities, responsible for planning, construction and operation of water system (impoundment, treatment and distribution), sewage (control, collection and treatment), industrial effluents and sources preservation. It produces 100 thousand liters of water per second to supply 25 million clients. In 1988, when the project for applying the AHP method was contracted, the annual investment in the project portfolio was worth US$960 million. The objective of using that multi-criteria method was to select which projects, in a portfolio of 88 ongoing projects, should be stopped due to budget reduction. The complexity of the analysis refers to the nature of most of the projects committed to supplying water and to collecting sewage for the population in different high priority regions. The projects were of the following types: accomplishment of civil work; research and development; supply, modernization, waste reduction and services improvement. The projects should guarantee the water supply or sewage collection. It was necessary to create a representative scale of the project accomplishment from the bidding to upper 90% of the accomplishment. Another truly important aspect was the evaluation of the population served by each project and the quality of service meant by the project to that population. Finally, it was necessary to create a scale along with political entities involved in order to evaluate the political impact due to the stoppage of each project. For voting the criteria, an organization technical committee responsible for the operation, financing and strategy was created. They voted the criteria, prioritized the projects and defined the ones which could be stopped. The decision criteria selected in the case were: the nature of account which could be of study and project, work, water supply, R&D, modernization, waste due to leakage, services and purchase of assets; water supply system and sewage treatment; origin of resources that could be their own, from financing or from partnership; % of execution of the projects varying from 0 to 100%; level of service to the population – bad, medium or good -; benefited population – strategic, belonging to the government, municipalities or town councils -; political factor including spring management, public prosecutor's office, residents and the environment.

4.4. Case 4 – Aircraft company

This concerns a large organization operating in Brazil and overseas, with over 36-year experience in project, manufacturing, trading commercial and military aircrafts, spread over 65 countries in the 5 continents. The largest Brazilian exporter from 1999 to 2001 and the second biggest

in 2002, 2003 and 2004, it nowadays employs 17 thousand people directly and 5 thousand indirectly. Its net income is US$ 315 million. To meet the information technology (IT) need for a methodology to evaluate 50 projects, prioritizing human and financial resources through the use of clear decision criteria, it applied the AHP method, through which the hierarchy of multi-criteria decisions was structured. The types of projects composing the organization's portfolio were about maintenance, software development and help desk. The criteria adopted were: resources, the types needed by the project; infrastructure, the level of technology required for the project accomplishment; human resources, the skills demanded in the project participation; endomarketing, IT area image impact aspects due to the project implementation; when the main contractor is strategic and has influence on the organization and on the IT area; risks related to non-execution of the projects; of implementation, which are the ones occurred in the project accomplishment and towards corporate, market and political variations throughout the accomplishment of the project; technical aspects towards complexity and achievement of the project; alignment of IT directives referring to project final product x corporate strategy and IT area; costs; demand profile; applicable solution and the range of the proposed solution by the project; demand priority towards project results; the critical importance of the projects and type of need that is the main reason for the project accomplishment.

4.5. Case 5 – Bank

This concerns the biggest Latin American Financial Institution, established to provide financing and to promote national industry development. In 2005, its net profit was US$ 2 billion with a 37.4 % growth. Its profitability rate was 24.65% with a 14.97% growth. At present, the Bank holds 55.5% of national rural credit system accounting for 3894 branches and 10910 service centers throughout Brazil. The IT area has been vital to the financial institution, mainly in the inflation period and for Brazil huge dimension. Therefore, the IT projects demand reaches thousands of projects a year, grouped and evaluated according to categories such as systems maintenance, infrastructure, system development, compulsory demands of short-run accomplishment, ruled by regulations etc. The analysis of this case was motivated by the fact that the institution running 1600 IT projects, lacked automation, therefore demanding a huge analysts hour-load; the project analysis assured little evaluation homogeneity; the software was slow and unstable, affecting the conduction of the analysis and prioritization tasks, harming the quality of the result of the portfolio management, while new projects were required without the accomplishment of the existing ones. A process of analysis and hierarchy of the projects based on AHP method was then porposed. The decision hierarchy was structured based on the established criteria, starting from the organization strategy to ensure allocation of resources through IT. Such criteria are described as: percentage of project accomplished; operational charges resulting from the lack of suitability of infrastructure; specification level; user's need of competence; project complexity; charges resulting from the internal interference into the project and technical difficulties for technology acquisition.

4.6. Case 6 – Electronic sector organization

This concerns one of the biggest electronic Latin American Companies with national and international sales around 44 million appliances. Holding approximately 40% of the domestic market, it is among the hundred most important exporters in the country. Due to increase in costs, price reduction caused by oligopolies and consumer's shifting demands, the organization decided for the AHP method to improve its portfolio aiming at production cost reduction and pressure relief. The decision of improving the prioritization of projects was fundamental for the effective allocation of resources, as well as for the identification of the synergy in projects of the same nature. The work aimed at the prioritizations of the 60 projects resulting from Lean Manufacturing initiative. The criteria were: product and service quality; manufacturing cost; assistance level of product mix; production scheduling; product stock and purchasing volume; environmental and legal motivation and employees' safety.

4.7. Cross cases analysis

The six case studies show the existence of projects selection and prioritization criteria regardless of the type of institution – public or private-, the sector in which the institution acts, its income and location. However, the denomination varies according to each corporate culture.

Thus, the criterion complexity meaning availability of skilled human resources, availability of infrastructure, critique of the project and characteristics of the project regarding size and type are identified in cases 1, 2, 3 and 4. The same criterion complexity is also described in the literature by Mahdi and Alreshaid (2005); Bertolini et al. (2006); El-Sawalhi et al. (2007) in their assignments on civil construction projects, outsourcing for public sector and pre-qualification of contractors.

The criterion risk of project, whose meaning can be broad, covering environmental, legal, of accidents, overrun dateline, due to the nature of resources – on its own or from loans/partnership, budget, market size, projects accomplishment and non-accomplishment and clash of interests – were identified in cases 1, 2, 3 and 4. Risk is also a criterion cited in the literature by McFarlan (1981); Mahdi and Alreshaid (2005); Bertolini et al. (2006) and Chow and Thomas Ng (2007). However, McFarlan (1981) states in his

paper that the organizations do not give relevant importance to the risks in projects, whereas Mahdi and Alreshaid (2005) point out the risks involving management and allocation of human resources in projects. Bertolini et al. (2006) stress the existence of environmental risks in projects. Chow and Thomas Ng (2007) discuss the importance of having knowledge of legislation and objectives of project in a pro-active way, in order to minimize the risks involved in the accomplishment of projects. That divergence may be related to the period when McFarlan (1981) wrote about this theme, probably a precursor of this matter.

The technical feasibility of the project was a criterion identified in cases 1, 2 and 4. Jolly (2003) and Wit (1998) treat this theme observing that it is a FCSs in the development project of a product or service.

The concern about the factors of project performance such as: cost, dateline, quality, flexibility and impact due to the project in terms of return on investment (ROI), job creation, safety improvement, human development rate, elimination waste that can be joined into a single criterion of decision named expected earnings or benefits of the project. Such a criterion was found in cases 1, 2, 3, 4 and 6. On average, every literature consulted approaches that criterion. McFarlan (1981) discusses financial benefits, costs, datelines and quality as decisions making criteria; Wit (1988) points out that most of the literature is restricted to citing costs, dateline and quality as decision criteria that lead to success of projects, failing cite the importance of achieving the organization and the stakeholders' strategic objectives; Hamilton (2002) cites the same criteria as a way to guarantee the competitiveness of organizations; Jha and Iyer (2007) cite the iron triangle composed by quality, cost and dateline, which is universally accepted as FCSs in projects, but there are intangible factors which should be considered; Bertolini et al. (2006), Chow and Thomas Ng (2007) and El-Sawalhi et al. (2007) also cite this decision criterion.

Another criterion used by the studied organizations, repeatedly shown, is about client's, supplier's and project team's satisfaction or the stakeholder interests. That was found in cases 1, 2, 3, 4, 5 and 6. That criterion is cited by Jha and Iyer (2007), Wideman (1995), Mahdi and Alreshaid (2005) and Bertolini et al. (2006). The percentage of accomplishment of the project is a criterion not stated in the literature, but it was found in cases 1, 3 and 5.

Other criteria cited in the literature, such as guarantee, financial health of the contracted firms and characteristics of the contractor and owner, do not appear in the studied cases although there are traces of being related with the projects risk criterion.

Table 2 summarizes the main results of the cross cases analysis through cases 1 to 6.

Table 2. Cross cases analysis.

Cases	Criteria
Case 1 – Chemical company	Complexity Risk Technical feasibility Project performance Stakeholder satisfaction
Case 2 – Government	Complexity Risk Technical feasibility Project performance Stakeholder satisfaction
Case 3 – Water and sewage system	Complexity Risk Project performance Stakeholder satisfaction
Case 4 – Aircraft company	Complexity Risk Technical feasibility Project performance Stakeholder satisfaction
Case 5 – Bank	Stakeholder satisfaction
Case 6 – Electronic sector organization	Project performance Stakeholder satisfaction

5. Conclusion

The present research allows us to conclude that there are universal decision criteria for the selection and prioritization of the projects of a portfolio such as complexity, risks, expected earnings meeting the stakeholders' interests and technical viability of the project. Other criteria presented in the literature or found in the analysis of the cases can be the criteria for individual management of projects; in case they are not noticed, they jeopardize the accomplishment of the project. The fact that the percentage of accomplishment appears in different Brazilian organizations shows a slight risk of sunk cost, as described in the literature about principles of decision-making analysis, not stated in this work.

As suggestion for future works is the repetition of the study presented in this one for a larger number of organizations so that it can give a statistic treatment to the information found, allowing its validation and generalization to the conditions studied.

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