TECHNO REVIEW | Vol. 10, No. 2, 2021 | **ISSN:** 2695-9933
International Technology Science and Society Review / Revista Internacional de Tecnología Ciencia y Sociedad
https://doi.org/10.37467/gka-revtechno.v10.2813

ALIGNMENT OF THE PORTFOLIO OF IT PROJECTS WITH THE IT GOVERNANCE IN SPANISH UNIVERSITIES

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KEYWORDS

Information technology
IT Governance
Portfolio of IT Projects
Best practices
Strategic Portfolio
ISO/IEC 38500

ABSTRACT

This research considers a rubric to assess the portfolio implemented in universities and its alignment with the IT governance principles established by ISO/IEC 38500. The rubric considers 16 elements. It estimates the relationship with 21 possible advantages of implementing the portfolio with some of the elements present. And it compares and establishes the level of coincidence with the real benefits perceived by the universities. This rubric has been applied to the public universities of the Spanish university system. It is concluded that a high percentage of the portfolios implemented have a clear strategic focus and are aligned with IT governance.

Received: 12/ 01 / 2021
Accepted: 04/ 08 / 2021

GLOBAL KNOWLEDGE ACADEMICS

1. Introduction

We are currently experiencing rapid global change, and information technology (IT) is playing an important role in that process (Rubio, 2012). IT services are increasingly integrated into organizational operations, and the IT approach has changed from cost efficiency to operational effectiveness and improved business processes (Cameron, 2005). IT service provider organizations need both IT service management and IT service governance to ensure successful service provision for their stakeholders (Jäntti and Hotti, 2016). According to Peterson (2004), IT governance is less about who is vertically positioned to be in control, and more about the complementary competencies an organization possesses, and how it can integrate these to develop the strategic flexibility required for realizing and sustaining business value from IT in a complex and dynamic environment. "Higher education institutions are a special type of organization where technological infrastructure consists of a variety of applications, different platforms, academic systems, cloud applications and heterogeneous technologies" (Bianchi, 2016). According to Williamson (2018), "Universities are increasingly organized and managed through digital data. The collection, processing, and dissemination of Higher Education data is enabled by complex new data infrastructures that include both human and nonhuman actors". To develop a strategic role the IT area needs to go from being a service provider to becoming a business partner, integrated with the rest of the company's activities, thus becoming a set of tangible and intangible elements, to become a strategic ally. For this evolution the IT area must know the business and, at the same time, the business must be aware of the benefits that IT brings. The IT area must explain to the business the services that the IT unit provides (in terms of costs, quality, time to market, value, and risks involved), constantly managing and maintaining a balanced portfolio of assets and projects that support the business.

1.1. IT Governance and Portfolio of IT Projects

According to Laita and Belaissaoui (2017), IT governance aims to ensure that IT expectations and achievements are aligned with organizational objectives and that the risks associated with IT are controlled. There must be a strategic alignment between the use of IT and the achievement of organizational goals, whether public or private. In this sense, one of the most difficult questions to answer as indicated by De Haes and Van Grembergen (2004) is how can an organization implement in a practical way a culture of IT Governance? This government must know that it is exposed to a variety of frequently conflicting internal and external aspects. For example, Tiwana, Konsynski & Venkatraman (2013), such show how IT governance differs across traditional software applications and those delivered as a service. Determining the correct combination of mechanisms is therefore a complex effort and also considering that what works for one organization does not necessarily work for another (Rahimi, Moller, and Hvam, 2016).

IT governance is an integral part of the company's governance and consists of leadership, organizational structures, and processes that ensure that IT management can sustain and expand pre-established strategies and objectives (Ghorfi, Ouadou, Aboutajdine and Aroussi, 2014). "In recent years, boards of directors have also increased their involvement in IT matters, and various theoretical lenses suggest that this oversight too has the potential to influence organizational performance" (Turel & Bart, 2014). According to Tallon (2013), information governance practices can unlock value from the ever-expanding mountains of data currently held within organizations. Governance is primarily a matter of making decisions under uncertainty and its resulting actions are guaranteed by a decision-maker committed to moving towards the objective assigned to the project or its portfolio (Delgado, Marcilla, Calvo-Manzano and Vicente, 2014; Jairak and Praneetpolgrang, 2013).

A governance process on project solicitation, evaluation, and monitoring is thus essential to

ensure the resulting portfolio creates tangible values, balances across priorities, and supports organizational objectives (Chiang and Nunez, 2013). According to Fernández, Llorens, Juiz, Maciá and Aparicio (2018), "the portfolio of IT projects is a grouping of projects, present, and future, selected and prioritized, among the candidates that have requested certain interested parties of the organization or business". If the portfolio of IT projects is used as a tool that supports IT governance, then it can be said that IT projects are being governed. To do this, the following questions must be answered: Who proposes and who decides the projects to be included in the portfolio? How must IT projects in the portfolio be prioritized? And how is the selection and prioritization of projects publicized?

The portfolio of IT projects is a powerful tool for IT governance, which requires close connections between principles, processes, people, and performance (Laita and Belaissaoui, 2017). According to Medellín (2006), the portfolio of IT projects is the result of the company's technological planning process, and its management allows a good execution of the strategy. In other words, it is the management capacity and skills to choose the right technological projects and make the appropriate investments in IT. According to Cubeles (2007), through the creation of the portfolio of IT projects, a shared vision is established among all the participants regarding the governance of the projects.

In essence, the portfolio of IT projects is a list of executable IT projects over a period of time that will form the basis for establishing the IT expenditure and investment portfolio. It is necessary that the IT projects are written in a way that makes clear what their objectives are, their cost, their benefits, and the metrics that are used to track and evaluate their success (PMI. 2017; Fernández, 2009).

The management of the portfolio of IT projects is the combination of tools and methods used to measure, control and increase the performance of individual IT investments and that meet the organizational objectives (Tu, Shaw, and Subramanyam, 2015). In addition, without exceeding available resources or breaking other limitations. The management of the portfolio of IT projects deals with the combination of people, processes, and technology that is used to achieve a balance between investments and assets (Wee and Theodorou, 2009). This is accomplished by taking a detailed inventory of projects and used to support the decision-making process (Oh, Ng and Teo, 2007; Thiadens and Steenbackers, 2010; ISACA, 2012; ISACA, 2013; Gleisberg, Zondag and Chaudron, 2008).

Finally, the responsibility of managing the portfolio of IT projects should fall to senior management, who are responsible for prioritizing and selecting the most appropriate IT projects for the organization. This work should be carried out under the support of the CIO, who acts as an interlocutor between the IT department and senior management (Fernández et al., 2018).

1.2. Portfolio of IT Projects in Universities

Although everything said in the previous section is useful for any type of organization, in this section we will focus on higher education institutions. There are different experiences of implementing the portfolio of IT projects in universities. In Valverde-Alulema and Llorens-Largo (2019a) a systematic review of the literature related to the portfolio of IT projects in universities can be found. According to the analysis of the selected final documents, the portfolio of IT projects is a good practice for IT governance and in the period taken for the search (from 2000 to 2017), an increasing trend in the number of publications has been found. The scientific community has a real and progressive interest in the research topic, where there is still a long path for multidisciplinary research, from the technological and business areas.

The model proposed by Abadía and Benavides (2013, 2016) called CPTI4Uv2, is based on the model of an adapted portfolio of IT projects for universities (CPTI4U) presented in Fernández and Llorens (2010). This model has as a reference several methodologies for the implementation and operation of the portfolio of IT projects, but it is characterized by its alignment with ISO 38500, it is adapted to

universities and it uses both a technical and a managerial language. The CPTI4Uv2 model adds activities not contemplated in the CPTI4U model, but which are included in other methodologies that are considered important. The operation procedure of the CPTI4Uv2 consists of 5 processes and 15 threads. Another operating model of the existing portfolio of IT projects for universities is the one used by the University of Alicante. The University of Alicante publishes annually from 2014 the call to participate in the portfolio of IT projects (Universidad de Alicante, 2021). A third model of operation of the portfolio of IT projects for universities, which implies a generalization of the previous two, is described in Fernández et al. (2018). This model proposes 5 phases of the portfolio of IT projects for universities: configuration, project proposal, prioritization, execution, and evaluation of success.

Regarding the status of the portfolios of IT projects in universities, studies have been found that provide us with data on experiences in different countries. We are going to focus on the implementation of the portfolio of IT projects in Latin American universities. At the Latin American level, we have the reports *UNIVERSITIC LATAM: Descripción, Gestión y Gobierno de las TI en las Universidades Latinoamericanas* (Fernández and Llorens, 2013, 2014) and the most recent *Madurez de Gobernanza de las TIC en las Instituciones de Educación Superior de Latinoamérica* published by RedCLARA (Gutiérrez, Cadenas and Casasús, 2019). There are also country reports, which collect information from the different university systems. In the report *Estado actual de las tecnologías de la información y las comunicaciones en las instituciones de educación superior en México* published by ANUIES-TIC, the situation in Mexican universities is analyzed annually (Ponce, 2016, 2017, 2018, 2019, 2020). Information regarding the universities of Ecuador has also been found in its annual report *UETIC - Estado de las Tecnologías de la Información y Comunicación en las Universidades Ecuatorianas* published by CEDIA (Padilla, Cadena, Enríquez, Córdoba and Llorens, 2017, 2018; Cadena, Córdoba, Enríquez, and Padilla, 2019). Finally, for the case under consideration, that of the Spanish universities, the *UNIVERSITIC. Análisis de la madurez digital de las Universidades Españolas* annual reports have been found, published by Crue-TIC, with thirteen editions at this time (Gómez, 2021).

It is also interesting to find out what the state of the portfolio of IT projects is in Latin American universities. Based on the latest editions of these reports we can determine that the portfolio of IT projects is a good practice implemented in a general way in most universities, although not all with the same strategic value. The 30% of the Latin American universities participating in the RedCLARA study maintain a project office where they manage and govern the programs and portfolios of IT projects. The 76% of Mexican higher education institutions participating in the ANUIES-TIC study have a portfolio of IT projects prioritized and aligned with the objectives of the institution, although only in 64% of these the portfolio is prioritized by the top management. According to the CEDIA Network report, 33% of institutions that participated in the Ecuadorian study have a portfolio of IT projects, formally approved and aligned with the objectives of the university, while 31% are in process and 36% do not have a portfolio. Finally, in Spanish universities, the object of study of this research, according to the latest UNIVERSITIC report (Gómez, 2021), half of the institutions have a portfolio of IT projects prioritized and approved by the government team, while only one in three have a Project Management Office dedicated to design, implement, monitor execution and establish the final success of IT projects.

1.3 Evaluation rubric for the portfolio of IT projects

The evaluation rubric of the portfolio of IT projects (CEPTIU – *Cartera Estratégica de Proyectos de TI para Universidades*) allows to determine the current situational status of the portfolio of IT projects implemented in the university and its alignment with the IT governance (Valverde-Alulema, 2019). It is a basic instrument that can be used both before the design and implementation of a portfolio of IT projects and by universities that already have a portfolio of IT projects in place and need to consider elements that make it strategic and ensure its alignment with IT governance. This rubric consists of three components: elements (tangible part of the portfolio of IT projects),

advantages (perception of favorable conditions for institutions), and principles of IT governance (according to ISO 38500). The application of the rubric begins with a template that contains the enumeration of 16 elements to be considered in a portfolio of IT projects implemented in the university (table 1). Subsequently, it is related to the estimated advantages based on the elements considered (table 2) and their alignment with the principles of IT governance.

Table 1. Rubric CEPTIU - Elements

E01	It includes criteria that are public and known before the call.
E02	It considers the strategic objectives of the university.
E03	It considers the needs related to the process map of the university and the critical success factors.
E04	It considers whether the projects comply with both internal and external laws and regulations (social responsibility, transparency of information, codes of ethics, and relationship with society).
E05	It has a procedure that relates the interdependencies between projects.
E06	It has indicators to measure the strategic impact or value that the projects bring to the university once they have been completed.
E07	It measures the risks posed by projects for the university.
E08	It considers the full cost (budget and own resources) required to address the projects.
E09	It includes objective criteria to help the governance team to select and prioritize projects.
E10	It has a defined procedure or flow of decision-making where the roles and responsibilities of all who participate are clear and well defined.
E11	It has a procedure to involve IT and business managers from the beginning of the project.
E12	It has a communication procedure with the stakeholders involved in the projects.
E13	It has an office (group of experts) to support the management of the portfolio (both the CIO and the project applicants).
E14	It tracks the projects to establish their performance and final success.
E15	It has a dynamic re-planning procedure to adjust to new circumstances.
E16	It considers the people involved in a project and determines how they should contribute to its success.

Source(s): Own elaboration

Table 2. Rubric CEPTIU - Advantages

V01	Contribute to the projects aligned with the strategic objectives of the university.
V02	Contribute to establish the strategic impact or value that the projects contribute to the university.
V03	Contribute to the governance team being involved in the selection and prioritization of projects.
V04	Contribute to manage and minimize the risks posed by projects for the university.
V05	Facilitate the transition between government teams, in terms of IT projects.
V06	Promote communication with the stakeholders involved in the projects.
V07	Promote the monitoring of projects to establish their performance and final success.
V08	Contribute to establish the strategic importance of IT for the university.
V09	Allow to balance the investments of the university.
V10	Allow to define the responsibilities and the flow of decisions to be able to incorporate projects into the portfolio.
V11	Help identify synergies between IT projects.
V12	Contribute to democratize the application of IT projects by opening them to the university community.
V13	Facilitate project planning in the medium and long term.
V14	Contribute to identify all the needs related to university processes.
V15	Contribute to the project's compliance with both internal and external laws and regulations (social responsibility, transparency of information, codes of ethics, and relationship with society).
V16	Contribute to involve IT and business managers from the beginning of the project.
V17	Ensure that strategic planning is implemented, maintained, and can be carried out successfully.
V18	Encourage the governance team to decide on the continuity, modification or cancellation of a project.
V19	Facilitate the efficient management of the human and financial resources assigned to the projects (avoiding overloads).
V20	Allow to avoid the appearance of IT infrastructures or isolated information systems.
V21	Promote centralized control and facilitate the preparation of the budget in the short and medium-term.

Source(s): Own elaboration

The relationship between the three components of the rubric (the 16 elements, the 21 advantages, and the 6 principles) can be seen in Table 3 and is the result of research developed and published in Valverde-Alulema and Llorens-Largo (2019b). This relationship between elements, advantages, and principles will allow university managers to improve the design of their portfolio of IT projects by selecting those elements that give them the advantages they want to obtain, trying to cover all the principles of IT governance.

Table 3. Related components of the CEPTIU rubric

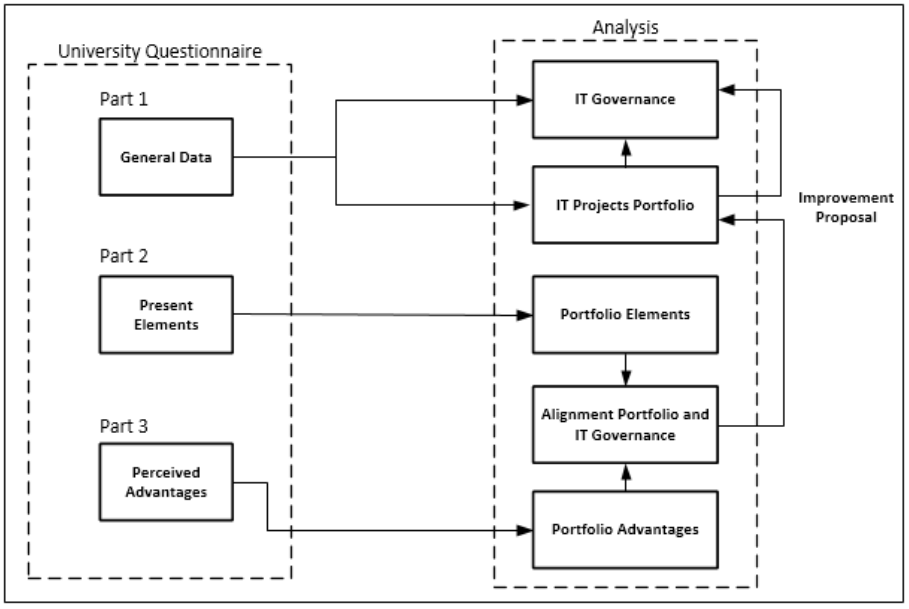
Elements	Advantages	Principles
E01	V06, V12	Human behavior
E02	V01, V02, V13, V14, V17	Responsibility, strategy
E03	V13, V14, V19	Responsibility, strategy, performance, human behavior
E04	V01, V08, V15	Responsibility, strategy, conformance
E05	V19	Performance, human behavior
E06	V01, V02, V05, V07, V08	Responsibility, strategy, performance
E07	V04, V13, V18	Responsibility, strategy
E08	V09, V13, V19, V21	Strategy, acquisition, performance, human behavior
E09	V03, V09	Responsibility, acquisition
E10	V05, V06, V10, V13, V16, V19	Responsibility, strategy, performance, human behavior
E11	V05, V08, V10, V16	Responsibility, strategy
E12	V06	Human behavior
E13	V06, V08, V10 V15	Responsibility, strategy, conformance, human behavior
E14	V04, V06, V07, V17, V19	Responsibility, strategy, performance, human behavior
E15	V04, V18, V21	Responsibility, strategy
E16	V10, V19, V21	Responsibility, strategy, performance, human behavior

Source(s): Own elaboration

2. Methodology

The objective of the research is to establish the situational status of the portfolios of IT projects of Spanish public universities and evaluate their level of alignment with IT governance. To do so, we will apply the rubric CEPTIU designed for this purpose and described in the previous section. The methodology used can be seen in figure 1.

Figure 1. Investigation methodology



Source(s): Own elaboration

The population under study are the public universities of the Spanish University System (SUE – *Sistema Universitario Español*), in general, but especially those that have implemented a portfolio of IT projects. An online questionnaire consisting of three parts has been prepared. The first part asks a series of questions about good practices and the actions that universities are taking to adopt a culture of IT governance. The second part consists of filling in the evaluation template of the elements of the rubric of the portfolio of IT projects of the surveyed university. The response options are dichotomous (yes/no) and follow a quantitative approach. The third part has 21 questions about the advantages that are perceived in the university to have a portfolio of IT projects. The response options are also dichotomous (yes/no) and follow the quantitative approach. The survey was sent by email to the IT managers of the Spanish public universities. The second and third parties were only answered in the case of having a portfolio of IT projects implemented in their university.

The population under investigation are the 47 public universities of the SUE (MECD, 2016). The questionnaire was answered by 36 IT managers, which makes a participation in the study of 77% of the population. Of the 47 universities, the ones that contribute to the research are those that have a portfolio of IT projects implemented. According to the UNIVERSITIC 2017 report (Gómez, J., Jimenez, T., Gumbau, J., and Llorens, F., 2017), the report that was current at the time of this research, 48% of the institutions have a portfolio of IT projects, so that we can estimate that 22 public universities can answer the second and third parts of the questionnaire. There are 18 universities that have responded to the survey that has implemented a portfolio of IT projects, representing 82% of the estimated universities that may have the portfolio implemented.

With the information collected in the questionnaire, five analyzes have been carried out, which can be seen in the following section. In a first block, the state of IT governance in universities has been analyzed. A second block that analyzes the strategic value of the portfolio and its relationship with IT governance. The third block establishes the elements present in the portfolios of IT projects of Spanish public universities. Likewise, the advantages derived from the portfolio are analyzed. And finally, based on the existing elements and the perceived advantages, the portfolio is aligned with the principles of IT governance.

This research shows the aggregate values of the Spanish public universities that have participated. This allows us to determine the direct relationship of the IT project portfolio with the implementation of IT governance forms.

But the real value of the rubric is to analyze individually in each university its portfolio of IT projects and plan improvement actions to make it strategic.

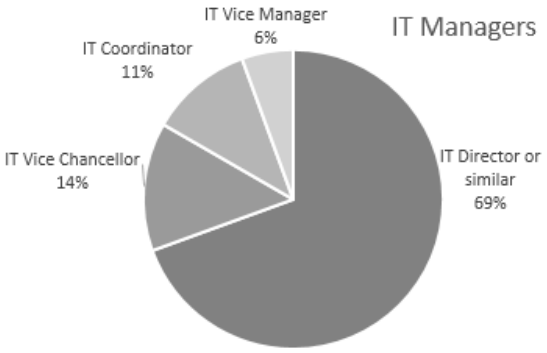
3. Case Study: Spanish Public Universities

Following the proposed research methodology, this section first summarizes the current state of Spanish public universities regarding the involvement of good practices that are allowing these universities to adopt a culture of IT governance. Subsequently, an analysis is carried out regarding the current status of the portfolios of IT projects implemented. An analysis is also made regarding the existence of elements of the portfolio of IT projects implemented and the advantages currently perceived in the real environment of these universities. Finally, with this information, it is verified whether or not the portfolio is strategic and if it is aligned transversely to the principles of IT governance.

3.1. IT Governance in Spanish Public Universities

The questionnaire has been answered by 36 IT managers from Spanish public universities. The first part of the questionnaire corresponds to questions related to the situational status of its institutions regarding the management and governance of IT. First, we will analyze the profile of the respondents. Of the 36 IT managers who have completed the survey, 25 hold positions related to IT management, 5 are IT vice-chancellors, 4 are IT coordinators and 2 serve as IT vice managers (figure 2). But beyond the title of the position they hold, we are interested in their presence in the highest body of university governance. In this sense, only 16.67% are members of the board of directors of their university.

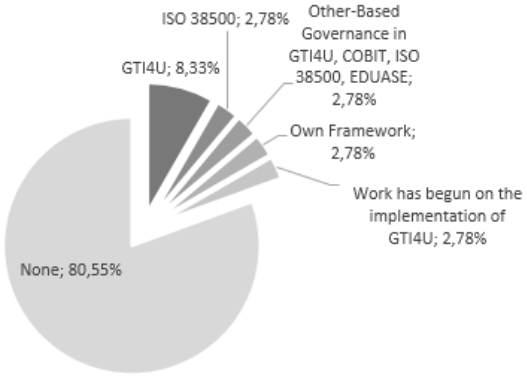
Figure 2. IT managers by type of occupation



Source(s): Own elaboration

If we analyze the strategic nature of IT in the university, we have 77.78% consider that IT is a strategic organizational element. But only 33.33% have a strategic IT committee in their university. And 30.56% of the IT managers surveyed belong to this strategic committee. It is also contradictory that if IT is considered strategic, it is not governed. Thus, 80.55% have not implemented or are in the process of implementing an IT governance framework (figure 3).

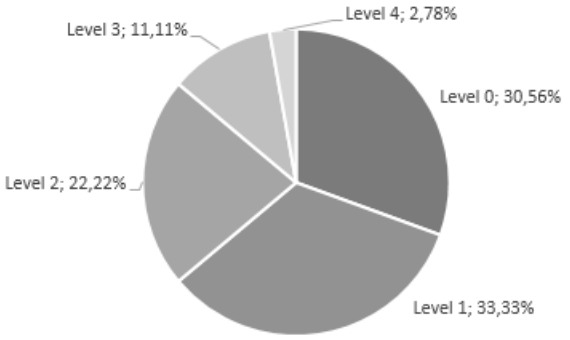
Figure 3. Implanted Governance Framework



Source(s): Own elaboration

Concerning maturity levels, 30.56% consider that they have a non-existent maturity level of IT governance (level 0), 33.33% consider that they are at an initial maturity level (level 1), 22.22% are at a repeatable level of maturity (level 2), and only 13.89% claim to be at the highest maturity levels (levels 3 and 4) (figure 4).

Figure 4. Maturity level in IT Governance



Source(s): Own elaboration

Regarding the attitude of the university towards IT, 27.78% consider setting the pace and establishing good practices, 47.22% consider that their university follows best practices and the rest have no knowledge of the subject.

3.2. Portfolio of IT Project in Spanish Public Universities

Of the 36 public universities that have answered the questionnaire, 19 universities claim to have implemented a portfolio of IT projects (52.78%). Although the objective of the research is the portfolio of IT projects, let's analyze first the reasons why universities say not to invest in it. The 17 universities that do not have a portfolio of IT projects state that some of the causes are:

- Senior management for unknown reasons does not consider it convenient.
- Lack of a strategic IT plan.
- Responsibility for IT projects has been delegated to IT departments, having only a technical and non-strategic approach.
- IT is seen only as a necessary operating element, but not of high importance.
- IT is considered a constant expense and not an investment.
- Senior management does not want to take responsibility for deciding on IT.
- Lack of maturity to implement an IT governance framework.
- Some projects are local, assumed by each departmental unit that requires them on demand and without requesting support from IT managers.

Of the 19 universities that claim to have a portfolio of IT projects implemented, 18 answers the remaining questions. Of these 18 universities, 14 consider it strategic since:

- There is a tangible connection between the goals of senior management and those of IT.
- The portfolio is promoted and directed by senior management, intervening in all phases of the project.
- IT is transversal to all decisions and processes of the university itself.
- The portfolio responds to the needs of the different services of the community.
- The portfolio pursues alignment with the institutional strategy.
- The portfolio marks the initiatives to be carried out periodically following the guidelines of the board of directors.
- The portfolio is an open call to the entire university community.

The universities that do not consider their portfolio of IT projects to be strategic argue the following reasons:

- The project portfolio must be an instrument to align IT with the objectives of the management, prior analysis, and global prioritization.
- Most projects are not the result of an established IT governance process.
- There is no general call, but continuous dripping.
- There are no clear mechanisms for prioritization and allocation of resources.
- Requests for new projects come more from administrative units than from the governance team.
- The portfolio of IT projects has no strategic alignment.
- The portfolio only serves to justify the work done by the IT department.
- The portfolio is not a line of action aimed at complying with a university IT strategy.

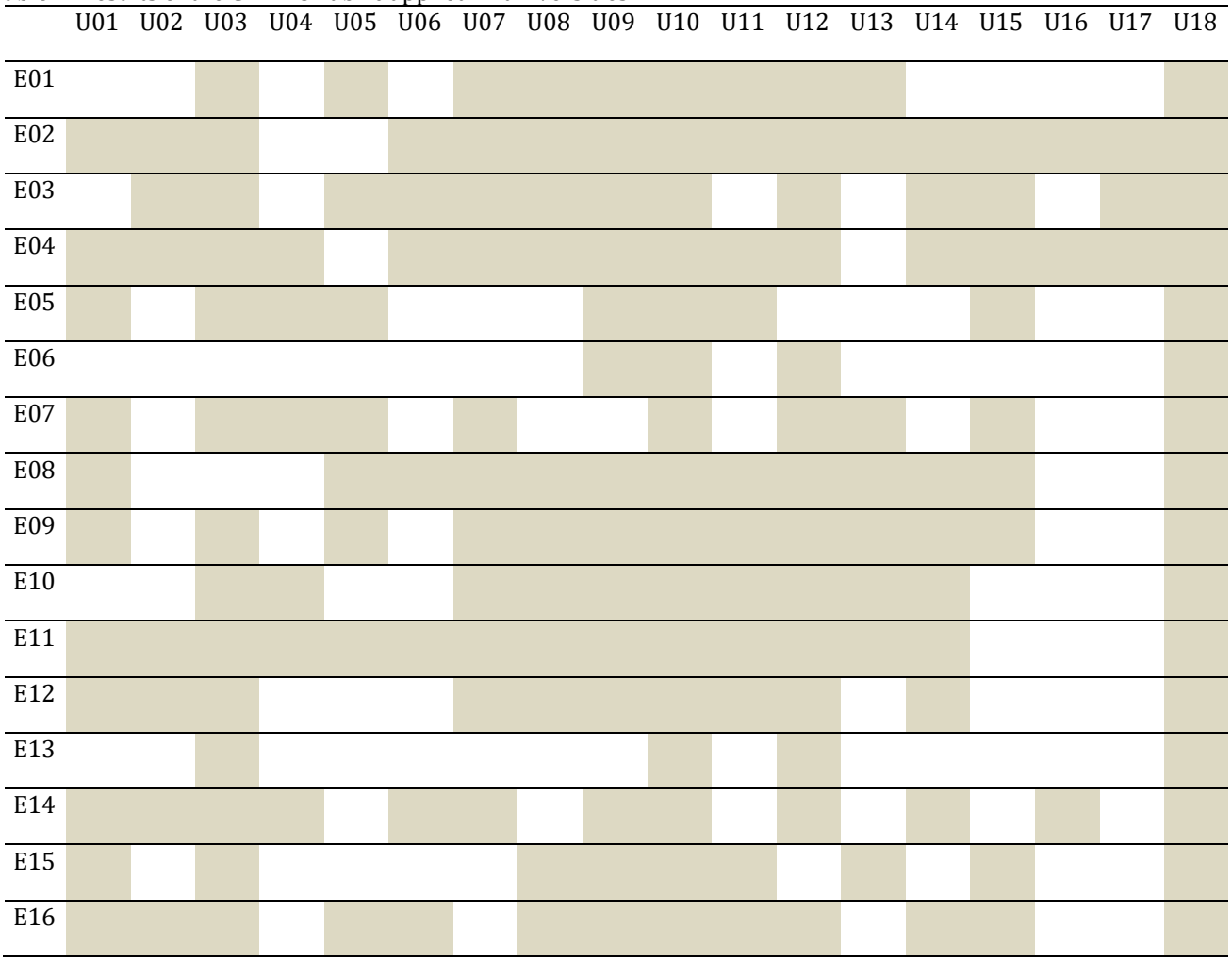
Finally, practically all of the surveyed universities that have a portfolio consider that the portfolio of IT projects is a good practice related to IT governance, because:

- The portfolio allows the alignment of IT projects to the university's strategy.
- In a context of limited human and economic resources, it is necessary to prioritize projects in line with the strategic objectives of the university.
- The portfolio allows the prioritization of all actions of the government team based on global performance parameters.
- The portfolio sets the IT priorities of the university community.
- The portfolio is an instrument that reflects the degree of maturity of IT governance.
- The portfolio has clear mechanisms in call, analysis, prioritization, and transparency of results for alignment with the university's strategy.
- The portfolio takes into account the needs related to the organization's processes.
- The portfolio is a way to apply the strategy principle of ISO 38500 and the activities: direct, monitor, and evaluate.
- The portfolio contributes to several principles of IT governance.
- The portfolio increases the value contributed by IT as it works on the most priority projects and that responds to the strategic objectives.
- The portfolio optimizes cost by improving planning and reducing all work effort on poorly defined projects.
- The portfolio provides planning, prioritization, and allocation of resources in an orderly manner.

3.3. Portfolio elements in Spanish Public Universities

As can be seen from the analysis in the previous section, not all portfolios of IT projects are the same, nor are they conceived for the same purpose. It is therefore necessary to go beyond the existence of this and perform a detailed analysis of its components. The Spanish public universities that have implemented a portfolio of IT projects have been asked about the elements of the portfolio considered in the evaluation rubric in Table 1. Table 4 collects the answers, where the cell (x,y) is shaded if the university Uy does have the element Ex. It can be observed that only universities U10 and U18 have all the elements proposed by the rubric.

Table 4. Results of the CEPTIU rubric applied in universities



Source(s): Own elaboration

In table 5 we have the results summarized. The following aspects are of interest: the elements *It takes into account the strategic objectives of the university* (E02) and *It takes into account whether the projects comply with both internal and external laws and regulations (social responsibility, transparency of information, codes of ethics and relationship with society)* (E04) are the elements that most universities (88.90%) have in their portfolio of IT projects. *It has a procedure to involve IT and business managers from the beginning of the project* (E11) is present in 83.33% of universities that have a portfolio of IT projects.

Table 5. Existence of elements of CEPTIU in Spanish public universities

Elements of CEPTIU (Spanish public universities)				
Elements	yes		not	
E01	10	55.55%	8	44.45%
E02	16	88.90%	2	11.10%
E03	13	72.22%	5	27.78%
E04	16	88.90%	2	11.10%
E05	9	50.00%	9	50.00%
E06	4	22.22%	14	77.78%
E07	10	55.55%	8	44.45%
E08	13	72.22%	5	27.78%
E09	13	72.22%	5	27.78%
E10	11	61.11%	7	38.89%
E11	15	83.33%	3	16.67%
E12	11	61.11%	7	38.89%
E13	4	22.22%	14	77.78%
E14	12	66.67%	6	33.33%
E15	9	50.00%	9	50.00%
E16	13	72.22%	5	27.78%

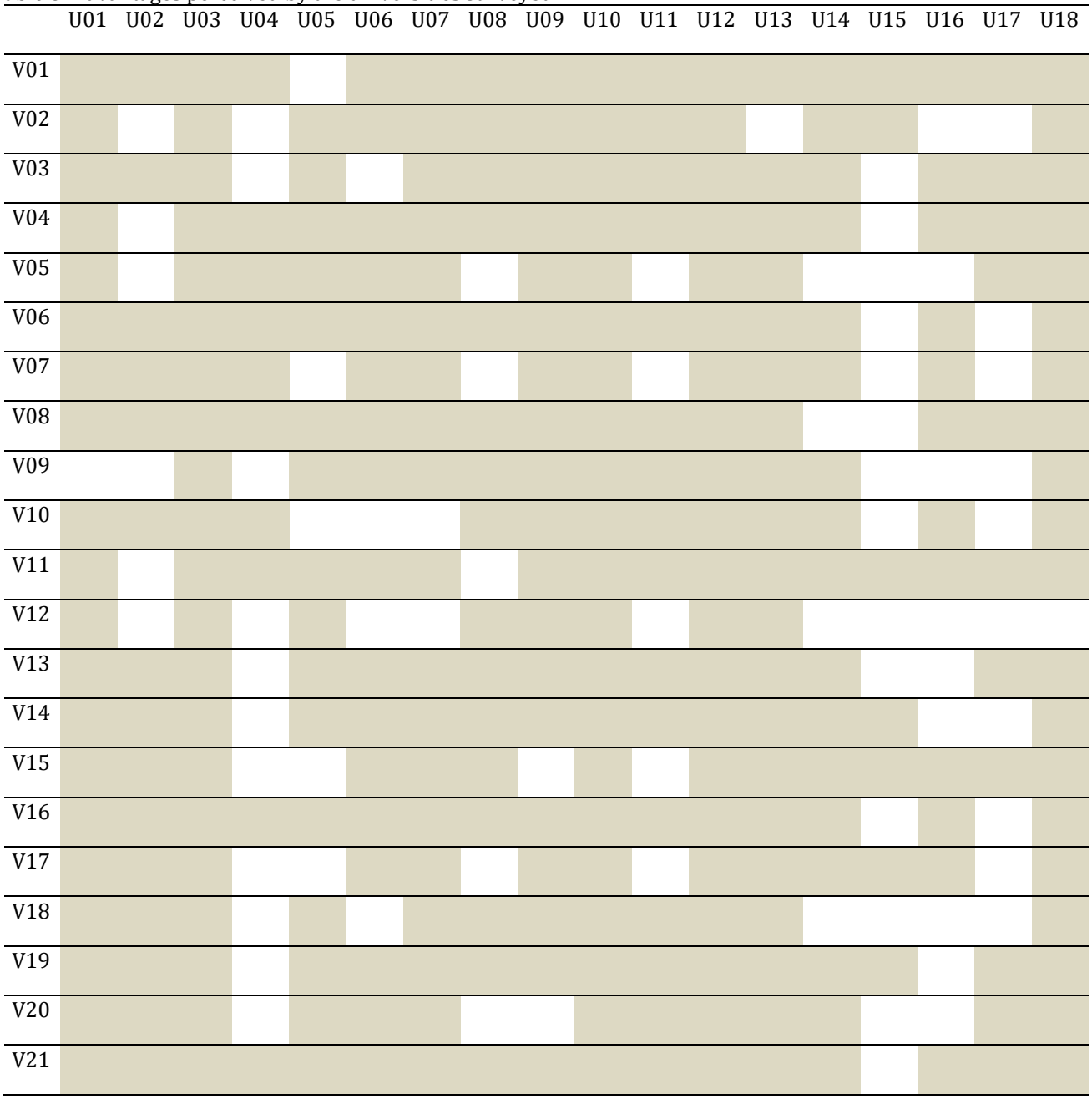
Source(s): Own elaboration

On the contrary, the elements *It has indicators to measure the strategic impact or value that the projects bring to the university once they have been completed* (E06) and *It has an office (group of experts) to support the management of the portfolio (both the CIO and the project applicants)* (E13) are the least existing. A detailed analysis of the elements can provide us with aspects of improvement. Thus, for example, having a technical structure, such as the portfolio management support office, can be an important element to achieve success in the implementation of the portfolio, but mainly to achieve its continuity over time, even overcoming the changes of rectors and management teams. Similarly, in addition to measuring the success of an IT project by monitoring that it ends within the planned deadline and within the planned budget, we have to determine if the project is being exploited efficiently and if it offers the expected strategic results.

3.3. Perceived advantages in Spanish Public Universities

These 18 IT managers have also been asked about the advantages derived from the implementation of the portfolio of IT projects in their university. Specifically on whether they perceive the existence of the 21 advantages estimated by the CEPTIU rubric (Table 2). Tables 6 and 7 show the results obtained. The advantages *Contribute to the projects aligned with the strategic objectives of the university* (V01) and *Promote centralized control and facilitate the preparation of the budget in the short and medium-term* (V21) are perceived in almost all universities. On the contrary, the advantage *Contribute to democratize the application of IT projects by opening them to the university community* (V12) is the least perceived.

Table 6. Advantages perceived by the universities surveyed



Source(s): Own elaboration

Table 7. Existence of CEPTIU advantages in Spanish public universities

CEPTIU advantages (Spanish public universities)				
Advantages	yes		not	
V01	17	94.45%	1	5.55%
V02	13	72.22%	5	27.78%
V03	15	83.33%	3	16.67%
V04	16	88.90%	2	11.10%
V05	12	66.67%	6	33.33%
V06	16	88.80%	2	11.10%
V07	13	72.22%	5	27.78%
V08	16	88.80%	2	11.10%
V09	12	66.67%	6	33.33%
V10	13	72.22%	5	27.78%
V11	16	88.90%	2	11.10%
V12	8	44.45%	10	55.55%
V13	15	83.33%	3	16.67%
V14	16	88.90%	2	11.10%
V15	14	77.78%	4	22.22%
V16	16	88.80%	2	11.10%
V17	13	72.22%	5	27.78%
V18	12	66.67%	6	33.33%
V19	16	88.90%	2	11.10%
V20	13	72.22%	5	27.78%
V21	17	94.45%	1	5.55%

Source(s): Own elaboration

3.4. Alignment of the Portfolio with IT Governance

With the information collected from existing elements in the portfolios of IT projects of Spanish public universities, the objective is now to analyze their alignment with IT governance by applying the CEPTIU rubric (Table 8). As can be seen, 12 of the 18 universities that answered the survey have a transversal alignment with the six principles of IT governance of the ISO / IEC 38500 standard. This means that it can be affirmed that in two-thirds of Spanish public universities which have implemented a portfolio of IT projects, these are strategic and aligned to IT governance. If we take into account that only half of the universities have a portfolio of IT projects implemented, we can conclude that half of the Spanish public universities do not have a portfolio of projects, one-sixth has a portfolio of IT projects and two-sixths have a portfolio fully aligned with the principles of IT governance.

Table 8. Alignment of portfolios with the principles of IT governance

	PRINCIPLES OF IT GOVERNANCE					
University	Responsibility	Strategy	Acquisition	Performance	Conformance	Human Behavior
U01						
U02						
U03						
U04						
U05						
U06						
U07						
U08						
U09						
U10						
U11						
U12						
U13						
U14						
U15						
U16						
U17						
U18						

Source(s): Own elaboration

5. Conclusions

The objective of this research is to establish the current status of the portfolio of IT projects in Spanish public universities and analyze their level of alignment with the IT government, applying the CEPTIU rubric to the data obtained through a survey. Five studies have been carried out: the state of IT governance, the strategic value of the portfolio of IT projects, the elements present in the portfolios of IT projects, the derived advantages of implementing a portfolio of IT projects, and the alignment of the portfolio with the principles of IT governance.

Regarding IT governance, only 33.33% of universities have a strategic IT committee despite the fact that 77.78% consider IT as a strategic asset. In addition, 80.56% have not implemented or are in the process of implementing an IT governance framework. Just over half of universities claim to have a portfolio of IT projects. These data indicate that, although a formal IT governance framework has not been established, good practices are being developed

that allow such governance to be adopted not explicitly.

Regarding the elements of the portfolio considered in the investigation, it was possible to demonstrate the existence of a large part of them. Ordered from highest to lowest presence we have:

- Strategic objectives are taken into account in the selection of IT projects (89%).
- They are considered for the selection of the portfolio if the projects comply with internal and external laws and regulations (social responsibility, transparency of information, codes of ethics, and relationship with society) (89%).
- There is a procedure to involve IT and business managers from the beginning of the project (83%).
- The needs related to the university process map and the critical success factors in the selection of IT projects are considered (72%).
- The full cost (budget and own resources) required to address the projects is considered (72%).
- Objective criteria are included to help the governance team to select and prioritize projects (72%).
- The people involved in a project are taken into account and determine how they should contribute to their success (72%).
- Projects are monitored to establish their performance and final success (67%).
- A procedure or decision-making flow is defined where the roles and responsibilities of all who participate are clear and well defined (61%).
- A communication procedure is available with the stakeholders involved in the projects (61%).
- Criteria that are public and known before the call for IT projects to form the portfolio are included (56%).
- The risks of projects for the university are measured (56%).
- There is a procedure that relates interdependencies between projects (50%).
- A dynamic replanning procedure is available to adjust to new circumstances (50%).
- Indicators are available to measure the strategic impact or value that projects contribute to the university once they have been completed (22%).
- An office (group of experts) is available to support portfolio management (both the CIO and project applicants) (22%).

Regarding the perception of the existence of advantages derived from the implementation of a portfolio of IT projects, although it depends on the elements they have, they are shared in a general way. Sorted from highest to lowest are:

- Contribute to the projects align with the strategic objectives of the university (94%).
- Promote centralized control and facilitates the preparation of the budget in the short and medium-term (94%).
- Contribute to manage and minimize the risks posed by projects for the university (89%).
- Promote communication with the stakeholders involved in the projects (89%).
- Contribute to establishing the strategic importance of IT for the university (89%).
- Help identify synergies between IT projects (89%).
- Contribute to identify all the needs related to university processes (89%).
- Contribute to involving IT and business managers from the beginning of the project (89%).
- Facilitate the efficient management of the human and financial resources assigned to the projects (avoiding overloads) (89%).
- Contribute to the governance team being involved in the selection and prioritization of projects (83%).

- Facilitate the planning of medium and long-term projects (83%).
- Contribute to the projects complying with internal and external laws and regulations (social responsibility, transparency of information, codes of ethics, and relationship with society) (78%).
- To establish the strategic impact or value that the projects bring to the university (72%).
- Promote the monitoring of projects to establish their performance and final success (72%).
- Allow to define the responsibilities and the flow of decisions to be able to incorporate projects into the portfolio (72%).
- Help strategic planning to be implemented, maintained, and successfully carried out (72%).
- Allow to avoid the appearance of IT infrastructures or isolated information systems (72%).
- Facilitate the transition between governance teams, in terms of IT projects (67%).
- Allow to balance the investments of the university (67%).
- Encourage the governance team to decide on the continuity, modification or cancellation of a project (67%).
- Contribute to democratize the request for IT projects by opening them to the university community (44%).

In conclusion, we have determined that there is a clear alignment between the portfolios of IT projects of Spanish public universities and the principles of IT governance. This research will be continued in three different directions. Firstly, after a reasonable period of time, the questionnaire will be passed again to find out the state of the portfolios of IT projects in Spanish public universities. The aim is to analyze the evolution of the portfolios, determining if the improvements have been implemented if the IT governance is being promoted and if the portfolio of IT projects is contributing to governance. Another research line is provided by the study in other higher education systems, mainly in Latin America, due to the relations that researchers have with these systems. Finally, we plan to study if the CEPTIU rubric can be valid to evaluate the IT project portfolio in other types of organizations, and if necessary, to adapt it to their specific features.

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