

# Key performance indicators in Portuguese public universities

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## Abstract

The Principle mission of the Portuguese State Universities is to organise Higher Education and Research. A quicker response and a more efficient operation is required. New strategies are essential. The Management indicators can be used by state universities in exercising economic efficient and efficacious management control.

New types of management that will improve motivation, productivity and obtain results that are real benefits for society, have to be introduced. This paper shows a group of management indicators, to support the university management process.

Keywords: performance indicator, Portuguese university, higher education, education management



## **Introduction**

The Portuguese state universities are legal entities, with assets, with autonomy: statute, scientific, pedagogical, disciplinary, administrative and financial. Their principal mission is the organisation of higher education and research. They are centres of creativity, transmission and propagation of culture, science and technology, who, through study, teaching and research, become part of the life of the society (Torgal, L. Reis, 2002). The University performs a set of activities to reach the strategic goals. It is essential for these institutions to respond quickly and perform more efficiently. This makes the implementation of new strategies necessary.

Reduction in public expenditure requires finding other sources of financing and a better management of these. The management tools used must be more dynamic and suited to the situation.

The state universities must become more customer orientated, more competitive and making its leaders more accountable (Clark, 1998). Management indicators are tools used by state universities to exercise control of the management, based on economic, efficient, and efficacious criterion.

The process of strategic management should be shared, to assure a better quality of the decisions taken. The planning process in universities on a strategic level should involve the decision about the goals of the organisation as a whole and their strategy regarding the products and the markets; which are the necessary resources to achieve such goals and the allocation to the different areas.

Universities should develop a strategic view, continually assessing the context, taking advantage of the opportunities and protecting themselves against the threats, by choosing a strategy that becomes a competitive advantage over the competitors.

State universities require an adequate information system and a management control. Their challenge is to show the existing differences between public and private management (Prieto Jano, 2001:84).

Education, training and research as qualitative experiences, cannot be changed totally or even partially into a business, functioning as a unique standard of reference for the management practices of education organisations.

Universities put special emphasis in the identification, analysis and working procedures, to improve the performance and provide a service of excellence. Very often the faculties or departments and those in charge of these are worlds apart from other managers, both regards the management as well as their duties. As a result of this departmentalization, departmental leaders are only concerned with their Faculty/Department, steering away from the goals of the institution.

New forms of management are essential, leading to greater motivation, productivity and getting the results, which can change into real benefits for the society.

In such a process, it is important to explain the goals, how to and who should measure the efficiency of the function. A systematic study will show which steps can be reduced or eliminated, procedures that can be suspended, additional training required to improve the efficiency of staff and the technology required to speed the procedures, etc. (Prieto Jano, 2001:86).

Finding an analysis generally results in an improvement of the processes

– The procedures are more efficient, and effective closer to the needs of the organisation and the parties involved. The procedure analysis and the general improvement of the organisation, is especially important in higher education (Clark, 1998; Ginés Mora, 2000).

### **1. Characteristics of the management indicators**

Indicators are necessary for improvement. What cannot be measured cannot be controlled, and what cannot be controlled cannot be managed. Universities are required to provide a faster response and function more efficiently. This is only possible if strategies and mechanisms, such as the use of indicators, are implemented (Ariza e López, 2000).

Improving university management requires trustworthy information, to base decisions on. The lack of it is a very serious problem. A clear definition is needed for far too many of the basic elements of the productive system of the institutions. Basic concepts such as the “student”, the “professor”, “whole time”, are not unequivocally defined (Lausin, 2004 ).

Aiming to get information on some of the relevant variables of the productive system of the universities, such as for example, the average time of permanence or drop out rates, is analysed but these are not available. The output measures, with the exception of the number of graduates, are either partial or do not exist, including economic values, although easier to measure, also have definition problems. Some universities may have their internal situation resolved, but there is no standard for all the universities. A possible comparison is impossible and this makes decision making difficult.

Political leaders want information available to assess the universities on their competence, if the expected goals were met, and at what cost. In the same way, the governing bodies of the universities need to know the performance of their institution in relation to others, and the potential students have a right to know which institutions have a better record in passing knowledge and in the placement record of their graduates in the professional market.

The university system must respond to the needs of the productive sector and of society in general, be less dependant on government funding, guarantee accessibility to a wider range of the population, and be more efficient. This last demand requires careful monitoring and evaluation of the performance of the universities, and the definition of income indicators.

Considering the significance given to the concepts of economy, efficiency and efficacy, it is important to point out that the attribution of amounts to each of the three indicators, requires the availability of measurable data. In the case of the efficacy, this is expressed in the goals expected and met; efficiency, is measured by the results achieved and the costs incurred; and lastly the quantity, quality, price and moment in time when the acquisition of goods and services were effected, for the effects of quantification of the indicators of the economy.

According to Galera *et al* (2000:36), the state universities must have a typology of indicators available, whose main objective is the collection and measuring information necessary for the attribution of numerical values to the corresponding indicators of efficacy, efficiency and economy.

The same authors (2000:36) suggest a typification of the indicators used in the referred collection of information by the university institutions, whose details are shown below:

<b>ENTRY INDICATORS</b>	Indicators of acquisition prices Indicators of physical quantity acquired Indicators of the technical quality of the investments
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	Temporal Indicators of the investments
<b>PROCESS INDICATORS</b>	Consumption indicators
	Output indicators
<b>IMPACT INDICATORS</b>	Impact indicators
	Search Indicators
<b>OTHER INDICATORS</b>	Quality Indicators
	Usefulness Indicators
	Surroundings Indicators

Source: Navarro Galera *et al* (2000: 36).

*Entry Indicators* are those that provide the necessary information about the investments, both the current factors as well as the capital factors, carried out by the university, the control object, during a set period of time.

*Procedure Indicators* are those that show two fronts of action clearly restricted to: a) measuring the productive consumption factors that were applied in the production procedure of the university; b) measurement of quantity of goods and services that, being generated by the mentioned productive process, were handed to the users of the university output.

*Impact Indicators*, their scope of measurement has to do with certain phenomenon happening outside the assessed university. They aim to inform the degree of coverage of the social needs covered by their action. Therefore, measuring the oscillation in the quality of life and of the social benefits experienced by the members of the society in general and the university community in particular, as a result of the activities performed by the university, make up the basic goal.

The total of all the *other indicators*, are included in the group of management indicators that although not susceptible, fit in the framework of the previous typologies, and can also be useful in the control of efficacy, efficiency and economy.

According to Pereira and Tavares (2002:84), the budget restrictions and the demand for a more rational management and efficiency of the higher education, favour the search for new performance indicators that can be used as a tool for decision making regarding funding and distribution of resources. In the 80's an intensive study of the performance indicators was done. In 1985, the Education and Innovation Research Centre carried out a research, on the use of performance indicators in higher education in 15 member states of the OCDE.

According to (Hüfner, 1991), quoted by Pereira and Tavares (2002:84) the OCDE study identified four categories of indicators:

- *Internal performance indicators* – are indicators based on the internal information produced by the institution, such as the pass rate, the graduate rate, the number of dissertations accepted, the average duration of the course, and the assessment of the professors by the students, amongst others.
- *Indicators of operational performance* – are those that refer to the internal activities of the departments and are related with the internal activity of the university. Quoting for example, student/professor ratio, student/staff ratio, and the unit costs, size of the classes, ratio of employees, and student/computer ratio.
- *External performance Indicators* – referring to information external to the university, such as, employability of the graduates and reputation of the university in the work market.
- *Research Performance Indicators* – aims at assessing the research activities of the university. They are for example, the number of publications, percentages in

the research contracts, the number of dissertations accepted, consultations provided, inventions and/or patents, invitations to relevant scientific conferences, awards and distinctions.

A work group advised that the performance indicators in higher education should have the following characteristics (Hüfner, 1991), quoted by Pereira and Tavares (2002:84): complying with the mission of the university, that is, they should reflect the main activities of the universities, which are education and research; b) specific, quantifiable and standardized, in order to be able to compare the different universities or even make internal comparisons between departments; c) simple and consistent with the activities for which they will be a reference for a decision; d) acceptable and true, for all those involved in the assessment; e) bring information about the activities and operation of the universities, information that should result in more questions.

The work group proposed a set of twenty four indicators, sixteen of which should be adopted immediately (Hüfner 1991), quoted by Pereira and Tavares (2002:85).

The construction of these indicators have a set of practical and methodological problems, which have to be resolved. Firstly, its construction depends on the available information. Secondly, these indicators are made for the whole organisation and very often it may be necessary to apply indicators to the “cost Centres”. In the *third place*, the institutions should not limit themselves to the use of a single approach to measure the performance, because it maybe useful to compare the results produced by the different approaches. *Fourth*, the research on performance indicators should not be merely centred in one activity of the organisation, because the existence of indicators for all activities could facilitate decisions. *Fifth* and last Johnes and Taylor (1990), referred by Pereira and Tavares (2002:86), are in favour that it is necessary to have credible information on the careers of the teaching and non teaching staff. This has been an area where the performance indicators have had great difficulty in the collection of data.

Pereira and Tavares (2002:86) refer that the performance indicators are a valuable work tool when properly constructed and well founded, but may never substitute the decision maker.

## **2. Preparation Techniques and implementation methodology**

The implementation of a battery of management indicators in the university, requires that two fundamental conditions are checked beforehand: a) *institutionalization*: high degree of acceptance and generalized consensus, by those involved in the process of management control, regarding the competence of the indicators previously chosen; b) *standardization*: permanence in time of the same panel of indicators, as well as the use by different universities, which will be subject to a comparative analysis.

Regarding these requirements, the previous experiences should be considered in the various scopes of other public entities, of the institutional leaders, employees and other workers, on the implementation of a new management or control systems. Thus, the methodology to be used in the implementation of systems of management indicators in the university, should have the direct participation of the managers, considering two basic commitments:

- The managers should assess the improvements resulting from the use of the indicators in their activities. When implementing the indicators, their users must see in them a useful tool.
- The reality of the universities may show important limitations, regarding the available information media. It is only considering the limitations, so as not to run the risk of

designing a series indicators that cannot be measured due to the difficulty or cost of collecting the necessary data.

Navarro Galera *et al* (2000: 37), suggest the following stages should be followed in the implementation of management indicators in the universities. It will therefore be necessary to follow the following stages:

### **Stage I – Approximation**

At this stage, the goals of the project of implementation, are explained to the various managers, so that they can voice their opinion and make suggestions, including them right from the start. At the same time, a real management situation, action methods and available information can be observed.

### **Stage II – Open proposal of the indicators**

Based on the data and observation acquired, a set of management indicators are proposed. The proposal should be open so that the managers can make their suggestions, corrections, expansions and the estimates that they find necessary. At this stage the university managers must participate actively to make use of their professional experience.

At this stage the managers will assess each proposed indicator, its representativeness, its relevance, calculation viability, by awarding points, that will oscillate between 0 (zero) and 10 (ten), with the possibility that they will propose new indicators.

### **Stage III – Selection of the proposals with the highest degree of acceptance.**

The selection continues, for each kind of service, those indicators that, according to the points awarded in the previous stage, had the highest value. The development of this stage allows us to work out the percentage of the whole, that the managers consider as a necessary minimum for an indicator to reach the level of “general consensus”, as well as the minimum value required for an indicator to be considered acceptable.

## Stage IV – Drawing the standardized indicator Panel

At this stage the key issue is in the selection of the optimal number of indicators which should be used. This decision should be adopted from the data collected considering the economic workability of each indicator and in any case, without losing sight of the requirements of all the economic information, particularly the clearness, relevance and reasonability. In any case, the possibility of exploring the university systems of indicators, is subject to the joint usage of the same batteries by the greatest possible number of universities.

Once the frameworks of the management indicators are established, according to the procedures previously described, the allocation of the quantitative data to the selected indicators should proceed. The mentioned authors propose the use of three techniques: documental techniques, techniques based on empirical observations and live techniques.

The *documental techniques* consists in taking the information previously obtained by the university. The person that will be in charge of awarding values to the indicators should examine and inspect all the registers and documents, of an accounting nature or extra accounting from which the relevant data is obtained, to prove and contrast their veracity before making the validation for the use.

The *techniques based on the empirical observations*, are used especially in the collection of data connected with the facts or phenomenon that can hardly be assessed without the physical presence of the person in charge and his measurements, on site. In any case, the personal observation in loco can perform in certain cases a precious function in supporting the documental techniques, mainly because they contribute to verification of the value of the data.

Regarding the *live techniques*, based in opinion surveys and interviews carried out on the public receptor of the services provided and to be provided. Its use in measuring the needs of the university community is unquestionable. Obtaining information about changes experienced by them, and the consequent action taken by the university. To get the results of the use of these techniques to represent very closely the university reality, certain precautions in their use should be taken, these are: adequate professional training of the interviewers, ensure the objectivity of questionnaires to be answered by the public, and the selection of the best size of the population sample. Even though this technique has certain inconveniences, difficult to surpass, in certain occasions is doubtful if it is possible to prove that the answers given by the enquired, do not include factors that have nothing to do with the aim of the measurements.

### 3. Examples of indicators

To produce this information aimed at satisfying all these demands, some claim the need of an indicator system that clearly reflects the situation of the universities, to make the analysis of the functioning of each institution viable, assess their performance, establish comparisons between them and support the decision taking (Ginés Mora, 1999:19).

However, the indicators can appear to be a limited tool (Ginés Mora, 1999:19; Aibar Guzmán, 2003b:15). When included in procedures of quality, as those that a great part of the universities are implementing, can become a valuable tool for improvement, besides supplying information to society and, as already referred support the decision making process.

Ginés Mora (1999:25) argues that the universities should establish the indicators aimed at making easier the relationship between society and the public administration, and at the same time, make an internal analysis and implement the improvement programmes.

### **Indicators for decisions about procedures of institutional improvement.**

In the procedures of internal improvements, true statistical information is essential, to help understand the functioning of the institutions. It is essential to develop two types of indicators. On the one hand the ones that are essential to take management decisions in the institutions. They are especially important due to their economic superiority the indicators of costs and staff. Besides these input indicators should be developed, academic procedures and results of teaching and research, assisting in the assessment of the efficacy of university production.

It is of great use to establish common criterions between the institutions for the definition of the indicators, so that the comparison between them is possible.

### **Indicators for administration decision making**

The high volume of resources of the universities, requires them to report on their utilization, using transparent systems of information. The statement of accounts is compulsory for public institutions, and cannot be seen merely as a statement of accounting data. It is important to inform how the resources were used and the results of their use. The indicators are a valuable tool for this end. Here the main function of the indicators is to support the new mechanisms of allocating resources that are being applied in the majority of the countries around us. From amongst those formulas, there are the contracts programme, the funding by turnover that requires true countable information about the reality of the institutions.

Besides this, it is necessary that the institutions reach an agreement about the definition and utilization of the indicators, so that they are used to share resources under homogeneous criterions. The input and the results indicators are the most relevant for decision making by the administrations. Ginés Mora (1999:26) suggests the use of socioeconomic impact indicators of the university products, such as indicators concerning the employability of the university graduates, graduate satisfaction or of the employees who received training, or the scientific or socioeconomic impact of the research production.

### **Indicators of student decision making**

When the students have to choose their university studies, they need basic information about the institutions and about the field of study to choose. The information available in Portugal, is an entrance mark. Those courses of limited offer and great demand are synonym of quality, individual and social usefulness of the study field for the majority of the young people. This situation can generate distorted effects that are not sustainable for much longer.

In a system of university quality, where the competition between the institutions has increased in response to the social demand, the students should have information available that is trustworthy and that will put them in a position to make decisions based on reasonable criteria. The students have the right to know basic characteristics of the courses, such as for example the average duration of the course, the employment prospects, or the degree of satisfaction of older graduates.

### **Indicators of decision making by the enterprises**

The decisions of the enterprises about the universities, can cover two aspects: the employment of graduates and the co-operation in scientific and technological projects. Both

aspects need much more detailed information than is available presently. The employers need the best information about the qualifications of the university graduates, so that they can select those that appear more competent for their needs. On the other hand, more detailed information about what the universities are doing, or their research groups, is essential to create a climate of trust in the possibilities of the universities to co-operate in the technological development of their businesses.

All these aspects require the immediate definition and implementation of a system of indicators that is commonly acceptable, that is an internal and external information tool, favouring improvement, and may be used to take strategic decisions about the individual institutions and about the system as a whole.

According to Ginés Mora (1999: 27), in order to reach a consensus about the indicators of the universities, the process can be planned in two successive stages. In the first place, the preparation of a proposal of statistical indicators, where a group of specialists (managers and academics) should propose definitions and test them in experiments. Then, they should prepare a global proposal for the whole university system. In the next stage, the previous process could be repeated methodologically, to define a system of turnover indicators for the universities.

Once the consensus agreement on this system is established, this process becomes a duty and a necessity which must to be implemented in Portuguese universities.

Vidal (1999:13), following Bottrill (1994), shows some examples of indicators used by the universities including the following.

The *percentage of students admitted for their first option*, also the so called *vocational rate*, to show the degree of motivation of the students in the course they are in. The higher this rate, the higher the number of motivated and happy students for being in the study field they chose.

The *percentage of students, who complete their degree in the set period*, is considered an indicator of the efficiency of the institution. If the students complete their degree in the period set, the institution is meeting its goals for the established programme. There are however, students that for the most varied reasons, do not complete their degrees in the period set. This type of student can vary in the different institutions, therefore it is necessary to complete this indicator with others.

The *Scientific publications* are the main results of the research activity, but its use as the indicator of the activity or quality is very controversial (Maltrás, 1998), as referred by Vidal (1999: 13). The main issue lies in the fact that there are only homogenous and consensual criteria about the quality of the publications or the media where they are published (magazines and articles) in a few areas of knowledge (experimental sciences, health.....). In areas such as Chemistry, Physics, etc., followed by the impact factor published in the *Journal Citation Report* of the *Institute for Scientific Information*, being of little use in other areas

The *funding allocated to the academic activity per student*, is an indicator that gives an idea of the resources available for the activity of each Tutor. The bigger funding allocated, the greater resources available for the education of the student and, therefore the higher the quality of the education. It is however necessary to have an accounting management system available to make specific allocations according to the activities.

Wallace (2000:2) also suggests some examples of indicators of the performance of the university, such as, the number of degrees awarded, the average time the degrees were completed in, the performance of the graduates in authorised external exams, the success of

the faculty in attracting funding for competitive research, and the reputation of the faculty amongst other identical ones. Additionally the indicators of performance also include measures such as employability of the graduates, the index of the omission of student loans, the student and society satisfaction measured by surveys, cost per student or programme, and the creation of income through licence or patents.

Navarro Galera *et al* (2000:41), show examples of the management indicators in specific university areas:

**Table - Examples of management indicators in specific areas of the universities**

<ul style="list-style-type: none"> <li>○ Number of doctors' theses with a favourable award / total number of doctorate candidates (per academic course or degree)</li> <li>○ Number of students enrolled in doctorate courses / Number of graduates (per academic course and degrees)</li> <li>○ Number of articles in magazines such as <i>referee</i> / Total number of researchers (per knowledge area).</li> <li>○ Number of books published / total number of researchers (per knowledge area).</li> <li>○ Number of papers presented at seminars and scientific meetings / Total number of researchers (by areas of knowledge).</li> <li>○ Number of projects and research contracts sponsored / Total number of researchers (by areas of knowledge).</li> <li>○ Number of registered patents / Number research projects (by areas of knowledge).</li> <li>○ Number of research groups subsidized / Total number of researchers (by areas of knowledge).</li> <li>○ Budget resources used in research activities / Total number of researchers (by areas of knowledge).</li> <li>○ Number of students enrolled / Total number of teaching staff (per graduate and academic courses).</li> <li>○ Number of students enrolled / Square metres for the teaching activity and their complementary services (per degree).</li> <li>○ Number students enrolled / Total number of administrative staff and services (per degree).</li> <li>○ Number of hours for practical training in enterprises and institutions / Total number of students enrolled (per degree)</li> <li>○ Number of students who failed / Total number of students enrolled (per degree).</li> <li>○ Number of students that complete their courses in the period set / Total number of students enrolled (per degree)</li> <li>○ Number of Masters and Post-graduate courses / Number of graduates (per academic course and degrees).</li> <li>○ Average time spent in the acquisition of investments:</li> <li>○ Number of hours spent in enrolments / Total number of students enrolled (per degree).</li> <li>○ Number of complaints made by the students.</li> <li>○ Average time spent in the management of an expense process.</li> <li>○ Number of expense processes handled / Total number of staff in administration and services in administration management services.</li> <li>○ Number of hours for professional training of staff / Total number of staff in</li> </ul>
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administration and services

- Number of seminars carried out, outside of the university scope / Total number of teach and research staff.

It should however be noted that there are technical difficulties in the use of indicators in universities, that can increase, if the selection and analysis is done in a manner without considering the needs. (Vidal, 1999:13).

Grao and Winter (1999: 84) formulated the following questions: do the indicators measure what they should? Are they comprehensive? Do they measure the mission, the vision or merely part of the organisation? Are the results used? And refers: the answer is clearly no. He continues by saying that in order to guarantee the quality of the university a more comprehensive tool should be used. The European Model (EFQM – European Foundation for Quality Management) which can be adopted by the university system.

## Conclusions

The state universities should have tools available that allow them to manage their activities to give client satisfaction, search for competence in the market, encourage and motivate for improvement and encourage an increased responsibility on the part of its directors.

The management indicators are useful tools for the state universities, since their application will permit the exercise of control of university management with economic, efficient and efficacy criteria. Its use makes understanding the university system as a whole and each institution and their relationship with each other easier. It is also a tool for strategic information.

The state universities need to have a typology of indicators, whose main goal is the capturing and measuring of the necessary information to allocate numerical values corresponding to the indicators of efficacy, efficiency and economy.

The high volume of resources allocated to the universities, requires information of how these are used by using transparent systems of information. For this effect they need powerful tools capable of providing that information. The management indicators have in this scope a very relevant role.

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