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Deployment of strategic performance indicators in Latin American public universities¹

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Introduction

Jamil Salmi wrote in *The Challenge of Establishing World Class Universities* (2009) that the University of São Paulo possessed two of the necessary three conditions to become a world class university; a concentration of talent and financial resources, the third leg of his tripod, favourable governance, was to be improved. By extension, the governance model of Latin American Flagship Universities needs institutional agility to implement a strategic vision and form the outward-looking, global view required to be considered among of the world's great universities.

This paper details a research project funded by the São Paulo Research Foundation (FAPESP) to analyse the abilities of the three São Paulo state universities to produce consistent, comparable and reliable performance indicators and build capabilities to implement them. The project first carried out an analysis of the existing capacities of the universities, as well as the wider policy framework that formed them. It then brought together decision makers within the universities and research councils, together with the staff responsible for data collection and presentation and researchers in the fields of public policy, scientometry and administration from all three universities.

Lewin's (1947) Force Field Analysis model was used to determine the opposing *driving forces* for change and *resisting forces* for institutional change, which hold organisations in quasi-equilibrium. These forces are both internal factors to the organisation, factors that promote or limit change from within, and external, environmental factors. Lewin's model was chosen principally for its emphasis on conflict resolution and stakeholder satisfaction in its approach to institutional change (Burnes, 2004). This makes it well-suited to plan institutional change in a university, where there are a number of perspectives and stakeholders, while still recognising that change of this type will be a broadly top-down approach to institutional change.

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1. São Paulo State Universities

The state government of São Paulo finances three universities; the University of São Paulo (USP), the State University of Campinas (Unicamp), and the State University of São Paulo (UNESP). Together, they represent 116,369 undergraduate students, 55,754 postgraduate students, 11,654 academic staff, 195,978 papers indexed on the Web of Science over the past ten years (around 27% of Brazil's total). Together, they form the spine of Brazil's research capacities, its largest producers of scientific research, PhDs, innovation and intellectual property.

The state of São Paulo has maintained a long-standing commitment to the development of science, technology and innovation, investing 1.63% of its GDP in research and development (FAPESP, 2015), around the level of the United Kingdom (1.68%). This figure is much higher than the national figure of 1.1%, and then in comparable emerging countries such as Russia, South Africa, Mexico or India, with the notable exception of China (OECD, 2017).

USP is the largest of the three institutions, with a strong focus on traditional and life sciences, and a high profile in social sciences and law. Unicamp is much smaller, and much more intensive in engineering, applied sciences and innovation. UNESP is spread across the state in 24 different campuses, with 900km separating its most distant campuses. It is broadly more focused on attending local needs in both research and teaching. The universities are funded by a proportion of the state sales tax fixed in law.

Each university's biggest two collaborators are the other two state universities; this is unsurprising given the high level of intra-university academic mobility. Furthermore, in world university rankings by area, such as the Shanghai Jiao Tong GRAS, no university in the state of São Paulo achieves significant position in any area without at least one of the others also achieving a high position. In short, academic integration between the three universities is extremely high, and achieving high impact research projects for all of them depends heavily on exploiting local research capacities.

Despite this, collaboration between the administrations of the universities has remained relatively modest, with universities preferring to develop their own systems of management, data collection and presentation, according to their own internal priorities. This has led to a high level of heterogeneity in data, inhibiting both the identification of institutional strengths and synergies and the formation of meaningful comparison between them.

2. Current situation

The universities' principal way of presenting indicators and public information about the university is through statistical yearbooks, begun during the 1980s. The statistical yearbook is formed of internal university data, today largely collected automatically from the universities' internal sources. As such, can be seen as a comprehensive set of internal descriptive measures of the university environment, rather than a source built towards specific strategic goals. Between the universities, there is no agreement on which indicators are presented, or in what way the data are normalised. This means that the primary sources of institutional transparency are static, historical records of past performance, relying on a similar set of indicators used in the early editions. It also means that it is mostly lacking in indicators of impact or interaction with society, as well as teaching and research outcomes. Furthermore, the lack of similar

presentations of data in federal institutions is something that limits the utility of the information for forming comparisons, as well as being a significant obstacle for improving the governance of federal institutions.

Data on research performance are broadly collected in response to CAPES federal quality assurance and postgraduate course accreditation. Like the statistical yearbooks, the CAPES evaluation was implemented at the beginning of massification of higher education in Brazil, in the late 1980s. At that time, universities had very limited data collection capabilities, and the use of external sources of information was not widespread. Around 35-40% of the evaluation is given to assessment of research output, depending on the area of knowledge.

Around 80% of this is given to the number of publications per FTE faculty, with a qualifier based on a list of journals determined largely by JCR, decided by appointed committees. This system generates a situation where large volumes of research are better rewarded than high impact research. Furthermore, because each department is accorded a specific area of knowledge, multidisciplinary research (or in a journal not listed by CAPES) is actively punished- being awarded the lowest weighting.

Around 10-15% is reserved for what is termed “Technical production, patents and other productions considered relevant”. This section is entirely qualitative, based largely on the number of projects presented, and almost entirely lacking in output or impact indicators.

3. Methodology

First, a document analysis of the public indicators used by each of the three state universities was carried out, along with an assessment of the indicators used in the evaluation processes of each university, in order to identify similarities and divergences between them. We found that, while there was a key set of indicators used by all three universities, there was a high level of heterogeneity in the presentation of a number of indicators that was determined largely by the identity of unit responsible for data gathering. At the University of São Paulo, where data collection is the responsibility of the international relations office, the quality and range of data on international publication and mobility were extremely high, while the quality of information on research publications, and especially on technology transfer and social impact were low, because responsibility for these data lie within other organisational spheres in the university (the provosts of research and innovation, respectively). At Unicamp, meanwhile, the quality and range of indicators regarding research impact and technology transfer are much better, but international indicators are much less sophisticated than those at USP. UNESP, meanwhile, presents detailed financial information, and can represent the capillarity of its campuses much more accurately, but lacks sophisticated international and technology transfer indicators.

The team then held extensive, semi-structured interviews with the university provosts and administrative staff in charge of the collection and presentation of data, with the aim of identifying their perspectives on their current capabilities, frustrations, and hopes for the future. These three sets of interviews were then analysed using a process of thematic analysis (Braun & Clark, 2006), initially as individual impressions, and subsequently together. The results of these meetings are published as notes on the project website.

The interviewees were then invited to respond to a series of questions in form of an open questionnaire. They were then asked to submit a public presentation and book chapter on their experiences (Beppu, 2018; Machado, 2018; Guimarães, 2018).

4. Internal driving forces for change

One of the main driving factors found in universities is the frustration expressed by university leaders at the lack of reliability of their own institutional data, their difficulties in comparing performance with other international universities, and therefore to form effective policies aimed at improving the impact and visibility of research in São Paulo. As such, the project was formed from a joint request from the three rectors in the Council of Rectors of the State of São Paulo (CRUESP).

Decision makers want to engage better with internationally validated research indicators for comparison to increase the visibility of the research already being carried out, which is often undervalued or missed by existing measures. These often conflate areas of relative international overperformance with those with less of an internationally competitive profile. This significantly complicates the process of forming institutional strategy. When the university management struggles to identify which parts of the university exert large influence, they in turn struggle to transfer the lessons to be learned from them to other parts of the university.

Although university rankings are far from being perfect measures of performance, subject rankings do at least offer some insight into where a university's strengths lie (dos Santos, 2015). Where the universities attain some of their highest global positions, both based on bibliometry and reputation, they are often not reflected in the grades afforded them in CAPES evaluations. In agricultural and veterinary science, for example, UNESP has a notable international presence, and regularly places in the top 50 of rankings by area. Its CAPES evaluations do not reflect this reality, gaining only moderate scores.

There is also a heightened awareness within the universities of the need to attract and retain the best faculty and researchers, something that is not achieved only by offering favourable terms of employment, but by providing an enabling environment for quality research within the university.

The technological revolution in the possibilities for employing research indicators has been a major driving factor in implementation of new research indicators. Widespread access to platforms like InCites and Scopus have led to a culture of informal analysis of potential research partners, and departmental performance in many units. However, because this happens on a de-centralised level, this supplemental information is never publicised and does not have an official strategy or set of norms.

Alongside this, the past 20 years have seen an increased demand within the utilitarian schools of the universities for interaction with the productive sector, for the promotion of technological innovation and of entrepreneurship. These activities are not measured in a formal way by the CAPES evaluation, and so are often invisible to the public because they are not properly represented.

Furthermore, despite rankings often being viewed with deep suspicion with regards to their own institutional interests and motivation, they are recognised as important sources of international visibility. They are widely used in universities to help make decisions about

potential research partners in other countries, with higher ranking universities being seen as more desirable research partners because of the resulting gains in visibility, and the expectation of higher quality researchers. This means that there is a strong desire, if not to reproduce the research indicators used in rankings, to ensure that the data captured and presented to rankings is comprehensive. All three state universities are short in presenting information properly to rankings in the past, leading to limited recognition in ranking positions, and resulting negative press coverage.

The format and presentation of institutional data has not kept pace with the technological evolution of scientific communication and monitoring, leading to a situation where sophisticated technology is being used to produce essentially the same type of document as 30 years ago, the statistical yearbooks and lists of approved journals. This means that the universities are aware that they are capable of much better presentation given the technological capacities they have developed. Combined with an excessively rigid frame of evaluation for a few types of academic behaviour means that the universities produce huge amounts of research, with little attention given to the impact it generates.

5. External Driving forces for Change

The financial crises of the last few years in Brazil have contributed to a significant need for publicly funded HEIs to increase their institutional transparency and accountability to the society that supports it. The costs of maintaining the universities to the state are well publicised, at a time when cuts to basic services have been widespread. While the inputs are well-documented, what society gains in return for this investment is less well represented by performance indicators. This leads to an information asymmetry that drives public, media and governmental narratives that the universities are burdens to the public purse, rather than a driver of the local economy by creating skilled labour, economic development and jobs.

The state universities in São Paulo are under constant pressure to increase the number of student places and to broaden access, especially at undergraduate level. This is frequently seen as being in direct tension with maintaining research excellence, as it places a consequent strain on resources (Schwartzman, 2005). Since 1989, the number of undergraduate students enrolled at USP has increased by 84%, with a 120% increase in the number of undergraduate students per FTE member of staff. The university grants 326% more postgraduate titles than in 1989, but over this period, the number of active academic staff members has grown by just 3.84%. Even with this expansion, the university does not come close to satisfying demand, with 96.1 candidates per place in medicine. By comparison, the University of Oxford has 14.2 candidates per place (University of Oxford, 2018). Similarly, while USP has 31.5 candidates per place in economics, Oxford has 14.2. Because the universities are funded by a fixed percentage of the state sales tax, there is a common perception of a zero-sum game between the two pressures. Because of this, the attraction of extra-budgetary resources has become of heightened importance, as a way of increasing the research capacity of the university without compromising the provision of education. This has given rise to a need for indicators demonstrating this interaction, and of the productivity that arises from it. There is a common perception among the Brazilian business community that the universities do not cooperate on a large scale with industry because of bureaucratic hurdles (Brito Cruz, 2018).

The increase in international mobility and academics' contact with other universities contributes to a growing perception that while the São Paulo state universities are intimately

connected with their local environments, they are also operating on a global level. These feeds demand for performance indicators reflecting this dimension, and not merely the universities' local and regional dominance.

Because of the universities' local and regional dominance, as well as their public nature, there is a commonly identified need for them to produce significant social impact. The universities are highly active in extension activities, as well as consultancy for local government, third sector as well as the productive sector. At present, these activities lack rigid indicators of impact, meaning that much of what the universities do is invisible to the general public. Furthermore, the existing indicators in international rankings, and employed within the universities themselves are incapable of representing the regional impact that campuses outside of São Paulo city have upon their local surroundings, leading to an undervaluation of the local and social missions of the universities, such as the technological and economic contribution of agricultural schools to rural communities, the improvement of healthcare policy produced in schools of public health, and inclusion of marginalised societies in the knowledge production process. These areas are all neglected by the major international assessments, and tend to be underemphasised in Brazilian assessments as well, largely due to the lack of reliable indicators.

6. Restricting forces for new performance indicators

Brazilian public universities are governed on a model of representative democracy organised around internal councils. This means that both rectors and senior administrators are directly elected, and therefore dependent on maintaining electoral support mainly from faculty but also from staff and students. External stakeholder representation is low. This means that decisions are often made to respond to the demands of internal stakeholders, rather than for the broader society. In USP, the faculties of philosophy and social sciences constitute the largest electoral base. These schools traditionally hold a liberal arts view of the university and are broadly resistant to performance indicators. Unicamp, by contrast, has a larger constituency of staff in applied sciences. Unicamp has a much more detailed set of research indicators, especially for technology transfer, than USP. To some extent this is because the university has less internal resistance to a utilitarian view of the university (Marcovitch, 2018).

The high degree of decentralisation, and of capillarity of the campuses is also a restricting factor on the introduction of new research indicators. This affects the universities both in a material sense; most of the data gathering is carried out without the central administration in mind, and on the quality of information. Schools will generally collect information they regard as relevant to their own area, and for compliance with federal assessment. In the absence of clear guidelines for collection, the process lacks uniformity, and the universities tend to rely on much less detailed information than they could otherwise depend upon.

The report *The Data Revolution in Education* (UNESCO, 2017) found that where responsibility for collection and presentation of data is not clearly delineated at institutional, national or international level, norms for data collection are either inexistent or inconsistently applied, education does not leverage the best available information technology. This in turns inhibits the pursuit of large ranging and that data literacy and ability to interpret results is not widespread among the education community.

Because the evolution of reporting in a university is formed by external requests, the three universities display extensive annual reports on their activities, their capacities for measurement at all levels are still notably limited. This also means that universities have

developed highly heterogenous structures for indicators, which in turn have an effect on the indicators presented.

In USP, the internationalisation and information technology units are responsible for collecting research information, presenting it to rankings bodies producing the statistical yearbook and the DataUSP transparency platform. As a result, the information collected on the results of international collaboration is of high quality, but for other areas they tend to be of lower representativeness, despite the sophistication of the supporting technology.

Unicamp and UNESP's efforts are concentrated in the pro-vice-rectorships of university development. As a result, their information supplied by staff through internal portals is more detailed than USP's and tied more closely to institutional development. Information about economic and social impact is much more highly developed in Unicamp.

Along the course of the research, a significant restricting factor identified was the fact that many of the research indicators and groups of indicators identified were formulated primarily with the global North in mind. Given the tension between the universities' heightened responsiveness to regional and national impact, there is significant anxiety that privileging these indicators will drive universities away from their local missions, and towards institutional decisions based on international criteria e not necessarily in the best interest of the local community.

Finally, there have been a number of institutional programs in each of the universities over the past decade that have failed to exert success. USP briefly introduced a personal incentive program for publication in high impact journals. Unicamp has an incentive program tied to budgetary distribution for research performance, while UNESP significantly changed its data reporting strategies to improve performance in the Quacquarelli Symonds ranking. However, only the Unicamp initiative is still in place, and struggles to exert much effect on institutional decision-making because its indicators are not replicated across other parts of institutional assessment.

Table 1: Primary Driving and Restricting Forces to implementing new research indicators for São Paulo State universities.

Driving Forces	Restricting Forces
<ul style="list-style-type: none"> • A general sense that the university could "do better" and desire to improve performance measures • The need to improve communication, to boost motivation and improve academic relationships • Increasing cost of inputs to ensure world class research resulting in high impact 	<ul style="list-style-type: none"> • Competing visions among areas of knowledge (liberal vs utilitarian) regarding University's mission, time scale and values • A lack of flexibility in organizational structures that hinders quality outcomes and high impact • Individuals are concerned with the implications for themselves, with routine providing an impression of both comfort and security

<p>publications and in societal and economic benefits for society</p> <ul style="list-style-type: none"> • Increased societal demands for quality higher education in all areas of teaching and extension services • Stable and predictable funding that allows for long term planning • Pressure by society for the university to demonstrate higher impact in three dimensions: scientific, societal, economic in order to justify public stable funding • A younger generation of faculty hires with international experience in research with new ideas and eager to be part of a world class university • 	<ul style="list-style-type: none"> • Misunderstanding of the need for/or purpose of performance metrics provoking a sense of insecurity. • Introducing new metrics and innovative means of collection, creates fear of the unknown and generate anxiety • Complex organizations succumb to structural inertia, partially due to power structures which resist change • Uncertain economic environment due to economic cycles and greater competition for resources • Corporatism among staff and part of the faculty that facilitates a culture of entitlement
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7. Conclusion

Lewin's model of organisational change proposes a three-step process to instigating change;

- First, an organisation must identify and unlock the driving and restraining forces that hold it in quasi-equilibrium.
- Second, an impulse is formulated to enable change.
- Third, once the change is complete the forces are brought back into quasi-equilibrium.

We discovered a remarkable agreement over strategic vision for indicators across the three universities. In our analysis, the main restricting factors are the fact that the universities act unilaterally for the most part, and without strong centralised analytical or data gathering capacities. Furthermore, they are particularly limited at articulating the nature of change to internal stakeholders, and in articulating the universities' impact to external stakeholders.

The first unlocking step for these forces is to clearly define a vision for the future of Brazilian universities, recognising especially their high levels of heterogeneity and capillarity, and the need to generate indicators that represent the social impact of universities in São Paulo. The key indicators for this vision must then be defined, and the universities' offering of public data be specifically oriented towards these goals. To this end, the findings presented in this paper are being used to orient a vision for the universities based on the social, economic and academic impact of research and teaching to 2022, Brazil's bicentenary year.

Because the lack of centralised indicator and institutional research capabilities was identified as a major restricting factor, the project proposed the instigation of university “intelligence units”, tied to the central university administration, whose role it is to dialogue with the other universities, form transferable performance indicators informed by academic research and critical analysis, rather than technological convenience or response to external evaluation. USP established such a unit at the beginning of 2018 as a result. The opening of dialogue between universities, concentrated in units of organisational similarity means that data can be collected and presented in a uniform way across the universities.

The results of the first year of research are gathered in the form of a book, public technical reports and articles distributed through the project’s website, and in the form of a distance learning course aiming to educate about the nature, structure and application of research indicators.

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