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## Leaning an University Department: a life experiment

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### Abstract

The European Quality Assurance methodology is pushing hard Portuguese Universities so that they should improve their overall performance.

Working at a Portuguese University more than a decade ago, one of the authors experienced several life cycles in different Departments and the experience acquired in foreign Universities (USA) taught him a couple of simple things in order to positively participate in this kind of processes. However, he found it quite difficult to apply his knowledge without other's contribution, due to several endogenous and exogenous reasons, including age and generation viewpoints. Together with the second author we started to apply some theoretical new insights we were discussing together during her PhD research.

The purpose of this paper is to describe the experiment we are in now, following a social network methodology used in my Economics PhD together with three theoretical influences we think are inter twinkled like the lean thinking, the value focus thinking and the complication in innovation diffusion processes.

After a brief literature review we describe the basic pillars we used to achieve the main goal of improving performance in a young university department. Using some coaching and economic tools and knowledge, we were able to gather a group of different people – students, staff and teachers - deeply involved in our proposal methodology.

Preliminary results are briefly identified, as much as further research challenges.

*Keywords:* Lean thinking; quality improvement; social networks analysis; decision making; Portuguese Universities

## 1. Motivation

Portuguese Universities are crossing new challenges during a troubled political period where national public deficit opened a new hallway for foreign ideological influence on “how should universities compete in the global learning and research markets”.

In the name of increasing student mobility, the pressure to homogenise public University procedures and the core curricula in every major undergraduate course has been huge. At the same time, financial constraints are freezing conventional university careers and teaching is very much connected with researching and publishing. However, publishing at a high quality level requires different organizational frameworks in the Portuguese context, which most of the University Departments were not used to follow; so, a new strategy was also required to achieve this three fold objective function.

Excellent laboratories or research centres do not exist all over the Universities or regions in the country and we can state they are restricted to a very narrow set of scientific disciplinary fields, which are not spread over the whole country. We may admit that Lisbon and Porto are considered at the top of the main research fields although they need higher scale to network and compete at the international level. On the top of this, the conventional research culture in the country is mostly individualistic and highly dependant on few group of researchers that achieved organizational skills abroad, during their PhD or post doc periods as visiting scholars.

The majority of the Portuguese young PhD researchers will spend their time in a huge amount of administrative and teaching activities after their thesis exam; only a very short percentage will have the opportunity to continue in a full time research time concerning the core field of his PhD. They will become “lost in translation” as we can say. Sometimes, considering they learned how to perform better in foreign research environments, they are tried to change the way things are done; however they most likely will face the ‘big wall’ of the ancestral institution procedures, publicly dependant on a vast law net setting, departments, ministries and so forth.

Furthermore there is no labour mobility between different universities or even inter departmental mobility in the same University. There are a number of professors that never visited other similar departments in the country but when they are invited for exam committees, usually coming from friends or peers they somewhere met before.

This is called the inbreeding process, which Athans (2001:17) said “much be stopped because it reached dangerous levels”.

In the same article, the above quoted author left four specific suggestions:

- a) Increase the productive time through changes in the academic calendar
- b) Strengthen the incentives and rewards for superior researchers
- c) Create a university administrative environment fostering educational and research excellence and
- d) Improve university-industry collaboration

Summing up, Portuguese Universities and their professors are overworking feeling they reach very few tangible results; this outcome is reflected on the

(low) social image they show when common people consider Universities just as places where society should not invest because 90% of their expenses would be absorbed by teacher and staff salaries.

Something should be done in order to alleviate the huge and unproductive work and, therefore, this is the kind of situation where Lean Thinking can be worthily applied.

A Portuguese case study<sup>1</sup>

## 2. University organisational framework

For several decades the hierarchical model of university institutions intended to train social elites, self sufficient and self centred mainly supported by the public budget. Generally speaking, the Portuguese university was out of the European debate and extremely defensive about considering other countries experience. Locked-in, they will perpetuate the kind of corporative institution where people defend themselves hiding their 'knowledge' and exhibiting a perverse effect upon the knowledge society and the knowledge economy we live in today. Persisting on this inbreeding process we will achieve nothing but inefficiency.

Portuguese public Universities still work within a hierarchical model where the rector plays both administrative and political roles and the Scientific Commission, composed by the full professors, faculty presidents and department's heads deal with the scientific work, career building, research projects, exam committees, course evaluation and so forth. Although these two roles are independent, there is a very high a causality degree of dependence once public expenditure constraints play the key role upon the whole process.

The three main University activities are researching, teaching and providing community services; the weekly professor work time should be devoted to these three activities; nevertheless, only very few of them achieve to link and manage them efficiently, feeding all those activities in a systemic way. Teachers have to teach in order to attract students (the main financial resource); but they need to do research in order to build knowledge and compete in the global markets; furthermore they need to transform scientific knowledge in applied knowledge enabling productivity increase in the whole society through community services. This is the crucial issue for teachers and professors: "how should they balance their activities in order to achieve these threefold university goals?"

The answer to this intricate question is not being addressed properly, as far as I understand it, because we did not map national knowledge yet and we did not understand the role that regional/young universities should play in the whole socioeconomic development of the country.

As a consequence we face a complicated problem, which is harder to solve than a complex problem.<sup>2</sup>

## 3. Complication versus complexity and the different utility functions

The complication means the transfer from complex towards much more complex structures in the evolution of complex systems. The simplification means the clearing place for further complication by exclusion, reconstruction and destruction of less efficient substructures. The theoretical rationale of

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<sup>1</sup> We decided not to publish names or identifications, while the process is still under analysis.

<sup>2</sup> Sonis (1991) and Sonis and Carvalho (2007) refer to as the superposition principle.

complication studies includes the study of the spread and partial adoption of new information and partial destruction of deepness of memory that is characterized by a path-dependent process of self-organization within spatial socio-spatial complex systems. The paradigm of complication is pointing out on the deficiency of purely economic considerations of socio-economic systems and stresses the necessity to widen the concept of "*Homo Oeconomicus*" to the concept of "*Homo Socialis*". Such a widening is radical in the study of complex socio-economic and behavioural processes because of the important difference between the economic and socio-economic rationality: the traditional identification of economic rationality of "*Homo Oeconomicus*" as optimization is complimentary to socio-economic rationality of "*Homo Socialis*" as parsimony. So the concept of complication stresses the necessity to transfer from optimization by considering the superposition of different optimization tendencies and analysis of concrete (or realizable) states of socio-economic systems.

In this experimental research we comprehend the quintessential role of innovation diffusion as a part of the process of complication of a university (department) development. Here we should stress that the innovation diffusion is generated by the choice of competitive innovations: the innovation is the subject of individual choice within the collectives. Properties of innovation diffusion processes include (i) empirical regularities of the choice process – the S-shaped change in the portion of adopters of alternative competitive innovations; (ii) the first principles of parsimonious human behaviour as collective beings, (iii) the Schumpeterian gales of creative destruction and the competitive behaviour of social elites in the mathematical form of variation principles and (iv) the "lock in" captivity phenomenon in the behaviour of social elites. These different approaches reflect the behaviour of actors involved in the innovation diffusion process, spreading the information within society in space-time.

In the process of the university (department) development we are working with several objective functions and their action can not be presented in a complete form without the help of the Superposition Principle. That means that in reality each alternative is realized/represented partially with some weights and this weight will represent the partial materialization of the objective, being  $\sum W_i = 1$ ; therefore the collection of weights represents competition and complementarity of the alternatives. We do not live in a totalitarian society, where someone will choose for all the others.

Self-organization is the process that will fix the weights ( $W_i$ ) in order to know exactly which part will be satisfied, that's to say "to live and give; to live to/with the others".

The mathematical foundation of Superposition analysis is the Theory of Convex Polyhedra (Minkovski-Caratheodory Theorem on Centre of Gravity of convex polyhedron) and the ideas of Combinatorial Topology in the form of the Atkin hierarchical Q-analysis (see Sonis, 1982).

Which are then the several utility/objective functions?

University administration want to raise the number of students coming to the university courses, because doing so, they proxy the university appeal and will raise funds from the State; at the same time they want to raise their researcher

visibility in the main specialised journals (particularly those ranked by ISI classification) and to raise funding through project's consultancy and other services provided to its neighbour community.

Considering that all these tasks are played by different people, with different profiles, the difficult task is to achieve all the goals within a democratic path.

Let's have a look on the simultaneous path of very different people working in the Portuguese universities:

- Senior researchers need time and funds to do research and to change their knowledge with similar experts all over the world in congresses, visits, seminars and consultant/expertise meetings; at the same time they build network groups to publish and mark the international research agenda in each one field;
- Junior researchers want to follow the path where they learned (namely those that went abroad) and will skip teaching activities as much as they can, lowering the learning processes productivity and efficiency;
- Other scholars, young or older, used to spend more time preparing their teaching activities with minutiae, present some inertia to start building the research bridges they need to achieve the other goals established by the University;
- Other, are still committed to the extension activities, doing projects demanded by the community, where they also work, applying scientific knowledge to improve local and regional development and getting funds to finance other university activities.

As a matter of fact, each one of these universities has a different historical path, some of them are secular while others are very recent (just twenty or thirty years old); but the Ministry of Science and Technology is applying the same financing rules to all of them, at the same time in all the regional contexts.

Therefore we face a complicated socio-spatial-time problem that we need to solve with a completely different strategy than the rationale used in the past.

As said before, the paradigm of complication is pointing out on the deficiency of purely economic considerations of socio-economic systems and stresses the necessity to widen the concept of "*Homo Oeconomicus*" to the concept of "*Homo Socialis*" together with the Leaning Thinking framework

### 3. The strategy we propose

The aim of our presentation/paper is to show that there is an interesting connection between these two types of approaches: the lean thinking methodology and the social innovation diffusion process based upon the superposition principle.

In Portugal, besides Lisbon, Coimbra and Porto, we have several High Education Schools and new Universities, since the 20<sup>th</sup> century's 80's and these were born within as a regional policy instrument to support and provide new labor pool to the surrounding regions. Submitted to a depopulation cycle across several decades, the idea to build new universities in the internal part of the country was to stop the emigration process and, at a certain level, the youth mobility to the coast, flagging the original regions from its main human resources to the future.

Now, we face the same challenge than those universities born centuries ago in the main cities and we want them to compete at the same level although with lagged infrastructure (not physical but human).

This will become a competitive process full of market failures; economic theory would say public intervention is needed. However, that needed intervention should not be similar to the one used in the past. We deeply need a modern approach enabling these universities to overcome their lag in a quick but steadily path.

Most of our national problems are a consequence of the fragile social innovative processes; concerning the innovation processes we stayed put for decades and, all of a sudden we want to be the best in all the economic sectors, in all the country and with every social and job cohorts. This can be called the impossible task!!!

#### 4. The contribution of *Homo Socialis* rationale

The learning process of *Homo Socialis*, e.g., the construction of his individual choice utility function, can therefore happen in a great variety of forms/types.

The types of learning for the utility function construction could be divided in four main types:

a) Imitation of other's members of the collective choice behaviours, the essential of the choice within uncertain environment (e.g., some mayors joined the starting consortium because they look at others doing it);

b) Converting each person with partial information, in an expert for the collective (e.g., someone that visited Asian or European mountains can bring relevant information about what he saw there – good and bad);

c) Learning by using the innovation (e.g. municipalities technicians became more performing the more they use GIS software the university consultants were using);

d) Learning by spreading the innovation (e.g. whenever we scheduled workshops with the employees in the field and tried to convince them about what they should do to innovate and raise their service quality, we always learned something new to add for future reflection and research).

Regarding all we have said before, the collective utility function is constructed by a stepwise process, repeating steps, learning and redoing it again and this should always be changed with the dialogue with other “disciplinary experts”.

Utility function will then represent a discrete and highly individual choice but never a global utility function (for the collective). Although representing the collective it will still be individualistic, which means it will be dependent on the way each one of the members will perceive it (what one says can be differently perceived by others).

The big difference between the utility function for the *Homo Oeconomicus* and for the *Homo Socialis* is that the last one does not “know everything” (priori information) and does not ignore all the other's alternatives of choice. Therefore he needs to construct his own individual utility function and his individualistic set of choice alternatives with the others; deeply interacting, he will stop his learning process when his individual list is closed, excluding all the other alternatives. Then, he will decide.

Within this collective process of choice, innovators will be those agents trying to convert preferable alternatives into the captive alternative; in itself this is an active/asset that can be either positive or negative: positive if it is used to create motivation and a stimulus to organize innovation spread and it can be considered as supplying knowledge about human collective values once motivation includes human values (s.a. sustainability, reciprocity, respect, saving, autonomy, self esteem); negative if it is used to manipulate other's viewpoint leading them to the radical and inhuman decisions (s.a., manipulation, opportunistic behaviour, massive destruction, chaos, terrorism, killings, overthrow).

#### 5. The role of the elites of innovators in a self-organizing process

When the coordinators of a project construct and gather people together in a collective action, they are considered as the elite, which should have clear objectives organizing the collective for innovation and organizing the spread of the innovative processes where leaders, adopters and so forth will play other adequate roles.

They will not organize the alternatives of choice but they will collect all the useful information to construct the preferable alternative, avoiding the interference of all the personified questions and tittle-tattle intrigues.

In the experiment we are implementing it was easy to make the first steps but it still is being difficult to end up well, because institutional leadership (at higher levels) is still strong enough to overcome the department elite leadership. But again, if the transparency of the informational process involving the main actors is performant, then administrative power will face some problems to deal with it and a huge amount of new initiatives will emerge from very different participants in the whole group.

Nowadays this is fortunately happening and we can collect a number of opinion contradictions comparing to what they thought during and after the plan was promoted. Moreover, if it happens that the department elites are invited by the intermediate level of the public administration, to discuss and propose innovative measures for a new strategy in de Bologna process and to advice the whole changing plan of the university, the team prestige will socially increase.

#### 6. The contribution of the Leaning Thinking rationale

As we learn from the main concepts and the lean thinking principles, there is a waste of time that can easily reach the 95% of the available time for all the university workers, lost in a paramount set of dispensable tasks.

In the university, the most qualified firm in a region, we should care about:

- the value, identifying what do the students need to succeed in their future job market;
- the value chain, which is composed by teaching/learning activities that will empower them to have doing competences;
- the learning flows, from information to organisation and wasted time;
- the pulling action, focusing on the exact amount and schedules required by all the needed and organised activities and



- the total quality, which requires a permanent state of unsatisfied people always looking forward to overcome anytime their real performance, predicting the future problems they will be required to act and decide.

The experiment we are living started with a strategic model to approach a young department in a young university in a Portuguese lagged region. Since almost 10 years we have been working there but, fortunately we crossed several schools (5), different regions (north, south, and centre) and we knew different country education systems (USA, Italy, UK and Spain).

We were one of the elements that migrate from one to another department within the same university; and we did it during a bad teacher's evaluation system period.

We had been working focused on teaching and community services and never invested in how to publish. Coming into a new department, where the major part of the teachers is younger and less qualified, we suddenly saw ourselves promoted as dean committed with a new department strategy at the same time we prepared the new period to the Bologna process.

We had to prepare a plan for studying, discussing and constructing a new project, centred upon a more learning than teaching activities, perfectly adapted to improve the lean thinking principles, while we could alleviate teacher administrative tasks. There were different levels of complexity: on one side the new curricula and new strategy level; on the other side, teacher and student different utility functions.

We knew this was not an easy job, but we tried to apply all the principles we have been writing about above, starting with a social network methodology for the diagnosis and discovering the strategic agents within each group (students, teachers and staff) able to apply the lean thinking within an innovative social diffusion stepwise process.

We also acknowledge for some resistance points against changes, which should be clearly understood by all the staff, teachers and students. How to show that changes would not worst them off when people were used to do things in a certain way and were mostly distrusted about higher levels of the administration?

We knew we have to define a focus together: where would we like to go?

First step – to elaborate a participated project within the department and, explaining it to the administration so they would trust we were following a new path for change. As the department had caused some troubles in the past, we needed a very careful and detailed process so they understood we were solving (and not causing) additional problems; we needed to rebuild a positive image.

Second step – students should know that changes would make them better off; but then we faced the simultaneous attitude of new and older students, some of them with low success rates that would raise a number of problems if they perceived the changes would rather better off the newcomers than their own situation to finish the old curricula; at the same time we had strategic goals and immediate objectives for the transitional period, assessed differently by both groups.

Third step – be aware and predict the problems that could be raised by all the groups and individuals in the process; here we didn't completely succeed while there were different cohorts within teachers, staff and students and the diagnostic was not perfectly fitted.

Fourth step – always facing the problems as new opportunities to do things better; in the case, we discussed a lot the results we could see and never let the minor problems and contradictions to overpass people's patience and commitment. Sometimes we had to schedule small meetings on a daily or weekly basis in order to clarify and give people a trustable image of the new leadership.

Fifth step – Always looking further, aiming the vision we built and avoiding losing the value focus thinking (Keeney, 1992:129-154). Building the "roman road" is an interesting example of this idea; the Romans spent a long time building a road, but they always knew where to go and how could each community participate in the construction process.

Sixth step – be aware of the problem's hierarchy and never treat them as if they presented the same complexity level; this also implies we do not forget to use stepwise facts and winning results so people can be stimulated by facts and not merely by opinions.

Seventh step – do not allow people to guilt others with the responsibility of the bad results or foreign constraints; this is a training process to achieve total quality and reinforce individual and collective assertiveness.

Eighth step – to identify the process bias, we have to treat people with fierce equity in order to be trustable and gain the group through each person main qualities in order to reach the complete process goals; in so doing, we got people involved, increasing their self confidence and autonomy, stimulating the best part of their creativity to the whole group rather than just each individual benefit.

## 7. Concluding remarks and further development

What we have learned during the processes we have been involved is that Social Network Analysis is a good instrument for diagnosis, and that mixing the Value Focus Thinking (Keeney, 1992) with the Lean Thinking (Womack et. al., 1990, 1996) and the Social Innovation Diffusion (Sonis, 1991, 1992, 2000, 2001) are the main theoretical basis to improve quality and full performance in a number of institutions other than firms.

The second consideration we want to state is that regional economists, besides the importance of the city and high-tech sector chain value are also focusing on traditional industries and rural spaces, considering the chain value in the vertical but also in the horizontal axis. To promote socioeconomic development we need territorial approaches, which require people needs and people learning processes in order they can internalize good innovative rationale and practices.

This process could be named as the social innovation diffusion because it needs new leadership and elites to speed social followers and performance makers.

Finally we can say this is going to be an explosive future research agenda.

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