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SUSTAINABILITY MANAGEMENT IN UNIVERSITY CAMPUSES: THE ROAD FROM SCATTERED GOOD PRACTICES TO SYSTEMIC TRANSFORMATIONS

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Abstract

This paper aims to contribute to the emerging dialogue about how to accelerate the progress towards an institutionalised commitment to campus environmental sustainability. It will analyse two cases of good practices made to date in the field of "green universities" management, looking into two experiences, interviewing their main stakeholders and revealing the main sustainability activators and barriers to transfer and widespread similar institutional transformation. A range of data is presented, from reports and interviews about lessons learned and approaches emerging from different environmental strategies to quantitative indicators analysis from the green metric reporters. One Italian (Politecnico di Torino) and one Mexican university (Universidad Autonoma de Tamaulipas) are taken as success cases for different sustainability perspective. The subject matter is wide ranging as it is intended as a starting point for the reader to pick and choose ideas that may warrant further investigation in their own university context. Even though many of the ideas presented need further exploration and development, in their current state they may prove of some value to the reader as a catalyst for a different level of sustainability in higher education institutions.

1_Introduction

Half of the world's inhabitants now live in cities. In the next twenty years, the number of urban dwellers will swell to an estimated five billion people. NIMBY (Not In My Backyard) and BANANA (Build Absolutely Nothing, Anywhere, Near Anybody) city users' motto (Wester-Herber, 2004) seem to be very far from the KEFA - (Knowledge Everywhere For Anybody) and B-GOT (Beyond GDP, Beyond Oil, Beyond Tangibles) goals of European policies and enlightened researchers (Arrow et al., 1995). Plus, cities still consume enormous quantities of fossil fuels and emit high levels of greenhouse gases, but our planet is rapidly running out of the carbon-based fuels that have powered urban growth for centuries, and the eco-efficiency approach found in previous European policies seem to have failed in make us curb our greenhouse gas emissions (Chapman, 2012). What we surely know is that the city is the playground for tackling this issue. The requested change must come from the cities, with its citizens and its planners, as privileged sites of knowledge production and innovation, as well as strategic management hot spots. In this work, university campuses are identified as privileged sites in the city to observe, in a delimitated border, which resilience activators, community responses and flexible governance dynamics could take place for energy reduction (Evans, Jones, Karvonen, Millard, & Wendler, 2015).

There has been tremendous growth in the sustainability movement in higher education over the past 15 years. This growth has shown the need for stronger methods to measure progress toward achieving the sustainability that many claim. The Association for the Advancement of Sustainability in Higher Education or "AASHE" has a standard method for monitoring the sustainable progress for universities mainly from the United States and Canada. Launched in 2009, STARS is a transparent self-reporting tool and analysis

available to universities. The system works by measuring the sustainable performance in academia, operations and administration using default settings. Since STARS was launched in 2009 have been more than 300 institutions evaluated by 2014 and more than 400 participants in 8 countries, the updated STARS 2.0 version allows institutions outside the United States and Canada participate and be evaluated from 2014 (Lidstone, Wright, & Sherren, 2015). The world University Ranking Green Metric was established in April 2010 in order to provide a profile that could be used to compare the commitment of universities to a greener future and to promote their sustainable operation. The Ranking expects to promote awareness of the institutions of higher education and the value of policies and systems that will have a positive impact on global warming and climate change, particularly those that help reduce carbon emissions promote energy efficiency, alternative forms of transport, campus reforestation and waste recycling. Therefore, campus sustainability has become an issue of global concern for university policymakers and urban planners, as result of the living lab model that bring at cluster scale the impacts of campuses activities and operations. The issue has also been intensified by the pressure from government environmental protection agencies, sustainability movements, university stakeholders as well as the momentum of other forces including student activism and NGOs (Caeiro, Leal Filho, Jabbour, & Azeiteiro, 2013).
A sustainable university is defined by Velazquez (Velazquez, Munguia, Platt, & Taddei, 2006) as ''a higher educational institution, as a whole or as a part, that addresses, involves and promotes, on a regional or a global level, the minimisation of negative environmental, economic, societal, and health effects generated in the use of their resources in order to fulfil its functions of teaching, research, outreach and partnership, and stewardship in ways to help society make the transition to sustainable lifestyles.'' Cole (Cole, 2003) also defines a sustainable campus community as ''the one that acts upon its local and global responsibilities to protect and enhance the health and well being of humans and ecosystems. It actively engages the knowledge of the university community to address the ecological and social challenges that we face now and in the future". A sustainable university campus also connotes a clean and enjoyable campus environment that promotes equity and social justice having a prosperous economy through energy and resource conservation, waste reduction and efficient environmental management that benefits the present and future university community.

There is a common understanding in the literature that a sustainable university campus implies a better balance between economic, social and environmental goals in policy formulation as well as a long-term perspective about the consequences of today's campus activities. As sustainability is characterised by economic growth based on social justness and efficiency in the use of natural resources, it should includes the recognition that all stake holders' co-operation and participation is required to effectively achieve sustainability goals. However, as Lang (Lang, 2015) warns, there are very limited correlations between institutional environmental performance and adoption of campus sustainability initiatives, be they targeted operational or coordination

and planning best practices, or curricular, co-curricular or research activities. Conversely, there are strong correlations between environmental performance and campus characteristics, namely, institution type and climate zone. The traditional practices and regulations of addressing environmental issues, project and ad hoc manner have become highly inefficient and cannot guarantee sustainability. Environmental issues are becoming more complex, multidimensional and interconnected and environmental sustainability by its very nature requires an integrated and systematic approach to decisions making, investments and management (Disterheft, Caeiro, Azeiteiro, & Filho, 2014) but also as a benefit to the overall paradigm change towards sustainable development and contribute towards the integration of sustainability concept into the university culture. So far, there have been comparatively few research studies on participation within sustainability implementation at university level, and a more differentiated understanding of these processes is still missing, both in the practice of conducting a participatory process and in the sustainability assessment. This paper addresses some of the failures and successes experienced within participatory approaches in campus sustainability initiatives, and deduces a set of critical success factors and emergent clusters that can help to integrate the dimensions of participation more inclusively into sustainability assessment. Following a qualitative approach and inspired by the Delphi-method, semi-structured expert interviews (N\u00a0=\u00a015. Therefore, there is need for a professional and systematic environmental management approach to reducing the consumption of resources and negative impacts of the various campus operations and promoting campus sustainability. Unfortunately, this approach is generally lacking in most universities, and achieving sustainability is not easy (Alshuwaikhat & Abubakar, 2008).

2_Methodology

The present study tries to understand the effects of some management practices in building a sustainable community within the university, by setting a fertile ground for long-term sustainability practice roots. After having explained why the sustainability concept is being embedded in today's higher education institutions, the literature shows the limits of the current scattered and spontaneous approach toward sustainability management. Then, two case studies are taken to demonstrate very different ways to achieve sustainable communities, although not included in standard key performance indicator of sustainability.

Data from the Politecnico di Torino, in Italy (par. 3), the Universidad Autonoma de Tamaulipas, in Mexico (par. 4) have been collected from the living lab via one-to-one interviews with local officers, surveys, field-work qualitative documentations and on-line websites. Ex ante and ex post energy trends after sustainability actions have been tested though historical data set of energy consumption both from smart meter data log and from bills. A relevant source of information to complement the interviews came from public and private documents (annual reports, websites, activity reports, campus assessments, internal mail, PowerPoint presentations, news media articles

and the Archibus data-base). Most of these documents were obtained on the Internet, although the interviewees provided some reports and memos, too. In the conclusions, some policy suggestions for the scalability and transferability of the good practices are outlined toward a systemic transformation of the sustainability management in contemporary universities.

3_The Politecnico di Torino and the IT support in sustainability management

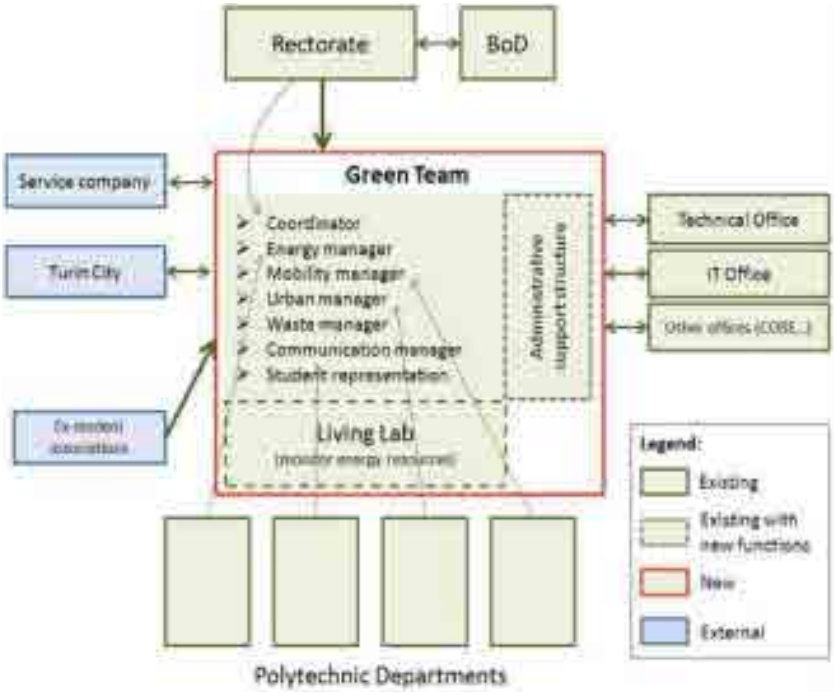
The Politecnico di Torino (POLITO) is organised on a rather wide arrangement in distinct geographical locations with very different features from the architectural, urban and functional points of view. In 2012, the Polytechnic accounted for 32000 students in 60 courses (undergraduate and postgraduate), more than 30 masters and 24 PhDs; 18 departments; 20700 m^2 of classrooms; 850000 m^2 for researchactivity; 1600 employees, including 800 teachers. The status quo sees the Politecnico in a very low position according to the national and international Green Metric Ranging, although: the 100% of the electric energy consumed in the campus comes from renewables, and a consistent part of the thermal energy comes from district heating; a new PV plant of 400 kWp has recently been approved, new double-framed and low-e windows substituted all the old windows, thermal insulation has been provided for all the most dissipative walls of the main building; Car-ride, car-pooling, electric vehicles charge stations, public transport reduced seasonal tickets and closed bike parking are some of the mobility manager recent achievements; 0-km food, green product procurement, paper-less communications, campus differentiated waste collection points, water dispensers are other tangible and visible effort in the direction of sustainability education, as well as the introduction of night open lectures, sustainability-dedicated courses and several international project on campus sustainability management. In the 2014 Green Metric Report, POLITO's total ranking was 4103 vs. 6094 (University of Bologna, ranked first in Italy) e 6057 (University of Turin, ranked second). The 2000 points that put away POLITO form the top have been lost mainly in the Waste and Transportation categories. Nevertheless, in the Energy and Environment category POLITO ranked well among the others thanks to the monitoring system and the IT large use in the Living Lab.

3.1_IT solutions for sustainability management

In 2012, the Living Lab began a fruitful collaboration with departments and faculties on various research projects and teaching initiatives with a focus on energy and sustainability, allowing to share common infrastructure acquisitions, technological resources, expertise and, most important, dataset. The Smart and Green Building Services Management provided by the Living Lab is the result of the close cooperation between different entities and divisions (energy manager office, energy department, Information Technology Area, Construction and Logistics). In the Living Lab, all data streams are collected from on-site sensors and then processed and analysed. The main aim is to provide a decision support for the energy management, but there are also regular requests for research support and various educational initiatives.

In 2015, the Politecnico di Torino, in collaboration with the Higher Institute on Territorial Systems for Innovation (SiTI), has being carrying out a project, namely "Sustainable Path", aiming at tracking down all the sustainability initiatives. The first outcome is a report compiled for the ISCN – International Sustainable Campus Network - that serves as a basis for the strategic plan further directions.

In the light of what emerged along the scouting of the different, hidden but yet virtuous sustainability actions in the energy, waste, mobility, communication and urban management fields, the report eventually proposes to set a long-term group work, a green team, which will be in charge of the overall sustainability strategy of the Athenaeum. Current internal managers of the aforementioned fields could make up the core, and be supported by the existing Living Lab. The idea is that this precious structure will be used and supported by a sustainability coordinator, in charge of in-out communication with the dean's office and the board of directors, and flanked by an administrative office for estate and infrastructures maintenance, logistic, external communications and every initiative falling into the POLITO sustainability framework. The so composed Green Team will interrelate with the National and International network of sustainable campuses, alumni, students, general public, city council and interested companies and start-ups.



Figere 1. The sustainability management scheme at the Politecnico di Torino. Source: author's data elaboration from internal documents preparation for the ISCN sustainability report.

The main points of interest that stand out from this diagram are the following:

- The Green Team is made up of members from within the department but reunited with a proper budget just for sustainability action planning, where positions have already been established/formalised; a coordinator has to be named to work close to the Rector and with the internal offices, with the role of acquisition, or new figures might be defined in the future according to actual needs

- The Green Team will collaborate with external corporations (services providers, city councils, private sponsors, etc.) leveraging on the data from Living Lab, which also acts as a centre for the monitoring and collection of data compliant with the mission.

4_The Universidad Autónoma de Tamaulipas and the 'social factor'

The Universidad Autónoma de Tamaulipas (UAT) is located in the state of Tamaulipas, an area of Mexico with warm semi-humid climate, which reaches high temperatures in summer. It is an institution with degree studies ranging from high school to doctorate. It has approximately 41,000 students and about 7,300 employees, has a length of 40 years and is the largest in the region. It's commitment with sustainability started in 2014 with the integration of its own sustainability committee and their participation with GREENMETRIC as well as AASHE. As a result of this university keen in sustainability evaluations it has obtained a place in 2014 GREENMETRICS Ranking and a bronze medal during 2015 from AASHE STARS.

The General Coordination of Sustainability emerges as cross-office inside the research department. It is responsible for coordinating the efforts of sustainability, generate strategies for the institution accreditation as well as projects to communicate and disseminate the results to the university community and society. The start of its sustainability effort was on July 2014 with the creation of the sustainability development committee. This committee responsible for the creation of a sustainable development plan, sustainability evaluations of the institution and any project related with sustainability in order to lead the University through a sustainable path. It is also in charge of assessing the president to identify and prioritize institutional efforts. It is officially integrated by: an institutional president; secretaries for Linking and extension, Research, Management, Academic, Finances; General Institutional Lawyer; Institutional Controller; Internal Assessor; Executive Secretary.
Any sustainability-related project has to be approved by the committee. The executive Secretary has its own office the Sustainability Coordination, in charge of the sustainability report and all the projects proposed to the committee.

4.1_Best Social Practices at UAT

According to STARS, the two main impact sections for social factor are the Campus engagement and Public engagement criteria. It is very important to notice that the credits with higher social impact are those with higher points achieved for UAT besides the Academics. Both of these groups of credits represent the 30% of all available points in STARS, the same points available for their highest category. However, those are the less considered, as being naturally part of the institution branding activity. One of the reasons for this, is that the University has since always a great keen on student and staff well-being, and part of all developing plans always includes the students, the staff and the community.

In order to analyse STARS social impact credits relationships an interaction mapping has been done. With this map it is possible to observe the main credit categories related to the social impact. As it is possible to observe Campus Engagement category has a relationship with all the other categories in the system. Therefore, the impact of the social factor in the campus sustainability is evident. Even though Campus Engagement and Public Engagement categories are directly working with social impact, they are related with the other categories such as investment, health, wellbeing and work, diversity and affordability, coordination, planning and governance among others.

One of the most important things to reflect on is that all strategies and programs analysed for the STARS ranking were already applied, designed and put in place well before a sustainability plan even existed. For an institution where sustainability has not been even mentioned in the strategic plan but actually been practiced throughout its recent years, a BRONZE medal by the STARS committee is a very important signal. It means that probably not all the efforts made in the management rooms are necessary or assure the good result in terms of user awareness and mentality shift, while leveraging on "physiological" and usual environmental behaviours just "celebrate" the activities realised by the staff, faculty and students by their own initiative.

For the "Outreach materials and publications" credit, UAT gained score thanks to a radio broadcast called "Universidad Sustentable" (Sustainable University) transmitted by the University Radio Station "Radio UAT". The program includes invited researchers, faculty members or staff friendly communicating all sustainable issues in our University, city, state, country and all around the world. In the "Community Partnership" credit two exemplary practices got the score. The first one is called "COMASS" (Operational Center of Multidisciplinary Attention and Social Services), and it is a center created in 2004 with the purpose to link students to vulnerable communities. Intended to impact the community in the short, medium and long term through free delegations by public institutions, it provides free services regarding health, nursing, social work, law, informatics and statistics to the community. By 2014 it has served 6 neighbourhoods and has benefited 12522 people. Another community partnership program is the "Laying Hens Program". It consists in the distribution of laying hens to families in rural communities for self-consumption and for trade. It takes place annually, but it has the constant participation of students, which are in charge of monitoring the growth process of the hens during the first weeks of the project. It is designed for families in rural area in order to get them additional income, providing better nutrition to their families and encourage roots in their communities. It is carried on in collaboration with the city council and the veterinary school. About ten thousands laying hens are distributed annually; during the first year, the 94% of the survived birds produced between 60 and 70 eggs per week. This managed to revive the economy in this sector. The "Community Service" credit acquisition in Mexico is very different compared to other universities. Since community service is an indispensable requirement to obtain a professional degree, every student must contribute in no less than 6 months and no more

than 2 years with 480 hours of community service. The result is a contribution of 4,926,720 hours in a year thank to the participation of 25,072 students.

The "Wellness Program" credit is another exemplary performance for UAT. All enrolled students have an insurance that covers health problems related with University activities. This insurance covers preventive courses in birth control, stress control, weight control, diabetes, cholesterol prevention, and many others. All the Union members of the university benefits of an annual salary increase, attend free courses and workshops in order to increase their salary or their working category, receive a 100% scholarship for their children studying at UAT, apart from free medical devices such as needed glasses, orthopaedic appliances, hearing, prosthesis, etc. Lastly, the "Affordability and Access" credit has being achieved as a result of the low cost of studying in Mexico. Being UAT a public institution, the average cost per semester is about $220 USD for any careers offered by the University. Low-income students could apply to scholarships covering the study cost as well as personal needs.

5_Discussion and Conclusions

The Politecnico di Torino adopted a centralised policy that leverages all the energy consumption upon a fine data monitoring system and centralised decisions. Its relatively low position in the UI Green Metrics world university ranking does not reflect a quite virtuous energy consumption and resources management, both compared to similar institutions and to its previous years' performance.
Conversely, the Universidad Autonoma de Tamaulipas does not collect any quantitative information regarding energy/water consumption. However, to comply with the Green Metrics report it had to scout all best practices related to sustainability via on-site surveys, interviews and the dissemination effort of the entire sustainability office. The result has been a university Most of the sustainable good practices have been carried on without any emphasis or community branding; yet, UAT's high position in international ranking demonstrates how important can be qualitative data collection and analysis even outside specific indicators accomplishment.

Perhaps most importantly, a common weakness within the two cases is the absence of a long-term follow-up of the promoted activities. All projects tend to be carried out over the short term (six months to a year) but no indicator to measure the efficacy of building renovation initiatives, sustainable farming educational activities or public lectures affluence is registered. This may not be sufficient to adequately evaluate the persistence of the energy savings benefits, social impacts or environmental education results, if the goal is to assure long-term changes in consumer behaviour and practices. It also makes difficult to assess the actual size of the direct rebound effect with a high level of confidence. Therefore, a general need is to call for appropriate indicators and mandatory track for sustainability initiatives inside each university.

Moreover, a rich web-platform could be the place where opportunities and problems will become visible and proposals will be collected and shared. Of

course, the prerequisite for the success of the initiative is the creation of a strong awareness on the topic of sustainability within the community, something that at present state is still missing. The governance of the process is fundamental for supporting and feeding a complex and long-term project like the one we are proposing, and to manage a large amount of ideas and proposals by the community.

Eventually, above all in the energy efficiency and renewable energies field, there is no % of energy to be saved in one year, from now to 2020 (reduction of fuel consumption and dispersion), or % of saved money by widespread use of renewable sources, or %reduction of waste water management, and so on). Aiming at no specific target leads to vague researches and monitoring activities with no useful outcome nor action to be suggested, and no specific request of more equipment by the living lab to become more competitive, as well as a consequent lack of results in terms of money saving and image improvement.

As good scalable example, the UAT "sustainability office" could be the solution to take care and supervise first of all four main themes or areas of interest, namely "People, Energy, Environment and Social Impact", deliberately broad in order to encourage an interdisciplinary approach.

A crucial factor to drive policies and funding schemes is certainly the adoption of a common framework to make the economic board of university dialogue with the environmental and social activist and managers. To assist in longer term strategic planning, a set of sustainability metrics has to be developed covering the full range of the university's operations. This is indeed the main barrier highlighted in the study of Lidstone (Lidstone et al., 2015) regarding facilities management directors' conceptualizations of sustainability in higher education. Since the financial barrier was the most often reported when asked what the major hurdles are to achieving institutional sustainability, and many participants also reported they do not expect this barrier to disappear in the future, much work has to be done in order to enlarge the conceptualizations of sustainable development mostly focused on environmental sustainability, specifically energy, resource management, and waste reduction. This is consistent with the findings of (Wright, 2010), where university presidents and vice-presidents also favoured the environment over social and economic factors when discussing sustainability. These thoughts are echoed by the respondents' ideas of a sustainable university, with environmental sustainability being the most popular response. This focus on the physical impacts relating to sustainability is not surprising, as the facilities management stakeholders largely deal with the physical aspects of the campus, and have the most control over the environmental factors of the institution.

An holistic metrics for social and economic assessment of environmental management practice will allow financial boards to track performance over time and make comparisons with peer institutions where comparable data are available (Sonetti, Lombardi, & Chelleri, 2016). Metrics consistent with the proposals for a new annual sustainability assurance report have to be further developed.

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