Sustainability performance measurement inside academia:
the case of a North Italian University

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Abstract

Purpose: The paper aims at analyzing the process of implementation of a sustainability performance measurement system by a North Italian university, that was constructed basing on a participatory multi-stakeholders' approach. In addition, it provides evidence on the use of outcome indicators.

Methodology: The methodology is based on a single exploratory case study research.

Findings: The process of implementation of the new sustainability performance measurement system started with the intervention of an academic in accounting who acted as a propeller. The adoption of the framework required a shared meaning of sustainability among different stakeholders and indicators to track the shift towards sustainable development. Despite the authors could not prove the stable adoption of the framework for the future, as new governing bodies were appointed in Beta, that framework could be considered a valid attempt to move from a single projects' evaluation on sustainability performance to a systemic approach, and to introduce outcome indicators in performance appraisal. The framework supported university's decision-making related to sustainable development actions.

Research limitations/implications: Difficulties in the measurement process were linked to the information system which was not designed to allow the collection of some of the newly introduced sustainability data. However, an attempt to introduce a personalized assessment tool fostered the improvement of planning activities for 2015.

Originality/value: The originality of the paper is twofold: first, it represents an attempt to discuss the process of implementation of a sustainability performance measurement system that was designed by a participatory multi-stakeholders' approach. Second, the framework was designed to consider also outcomes' indicators as urged by scholars calling universities to promote the shift towards a sustainable society.

Keywords: sustainability assessment, universities, performance measurement, participatory approach, outcome indicators, stakeholders

Article classification: case study

Abbreviations: sustainable development, SD; higher education institutions, HEIs; sustainability performance measurement, SPM; sustainability performance measurement systems, SPMS; triple bottom line, TBL-

1. Introduction

Higher education institutions (HEIs) play a leading role in the creation of a sustainable world; universities are responsible for education of future leaders and citizens in the transition through a sustainable society (Cortese, 2003, Amaral et al. 2015), and through research they could act as a propeller for regional and global development (Hoover and Harder, 2015) generating knowledge that can help solving real-world unsustainability problems (Godemann et al., 2014). Universities' commitment to sustainable development (SD) traditionally concerned curricula, research, community outreach and campus operations (Clugston and Calder, 1999; Cortese, 2003). Nevertheless, SD initiatives undertaken by HEIs in the field of sustainability often remained at the project level and mainly concerned the environmental sphere, with the social dimension totally left unexplored (Arroyo, 2015). As a consequence, sustainability performance

measurement (SPM) within these organizations has been mainly used to track the progress on their operations (Godemann et al, 2014; Yarime and Tanaka, 2012) and governance (Yarime and Tanaka, 2012), while aspects of social responsibility where scarcely addressed in accounting for SD (Godemann et al, 2014). In addition, the lack of systematic links among the universities' activities (training, research, facilities' management) (Arroyo, 2015) as well as the lack of long term vision (Stephens and Graham, 2010) represented major problems, especially considering the possible transition from a niche position to a mainstream level in which sustainability could be seen as a *regime* for HEIs. Adams (2013) also argued that sustainability plans in universities tend to overestimate operations' impact, whilst they do not focus enough on the activities mainly representing their mission within society, such as education, research and community involvement. As argued by the author, the lack of attention to strategic planning makes the management of sustainability very poor (Adams, 2013). Furthermore, in some cases, sustainability initiatives are put in place as fragmentary goals and not necessarily interconnected with university's strategy (Vagnoni and Cavicchi, 2015). Focusing on sustainability performance measurement practices for HEIs, Global Reporting Initiative and rankings' assessment tools were the main frameworks adopted to evaluate the performance of universities in the field of SD, but the use of sustainability assessment and reporting was not connected to strategy (Adams, 2013). However, appraisal of sustainability initiatives undertaken by HEIs was considered by literature as fundamental to optimize performance in these strategic areas. From the evaluation point of view, Velazquez et al. (2006) suggested its incorporation in the Plan-Do-Check-Act Framework for effective implementation of sustainable strategies. Amaral et al. (2015) emphasized the need for assessment and cited the work of Lozano-Ros (2003) which addressed a five dimension for the integration of SD in HEIs, the assessment and reporting of results. Urquiza Gomez et al. (2015) identified assessment and reporting as a component of the administration activity, that precedes the introduction of the SD in the institutional framework of the universities. Despite this increased focus on sustainability performance appraisal, the progress made with reference to sustainability performance measurement systems (SPMS) in the higher education sector is minimal and the tools used for evaluation present relevant limits. Indeed, inconsistent target weights as well as "subjective" indicators missing real link to sustainability issues were depicted as the main problems (Bouckaert, 2015). This could be partially explained by the disagreements on the meaning of sustainable development as sustainability was defined as a *"collective outcome of [...] personal value judgments"* (Gray, 2010; p.57). Despite the growing number of tools to assess sustainability performance in HEIs, the reasons lying behind the sustainability performance' evaluation vary from one university to another (Laroche, 2009) leading to a variety of frameworks implemented (Fonseca et al., 2011). In this regard, assessment models as the one developed by Cole (2003) provided example of personalization of the concept of sustainability in universities operations. However, explications of indicators adopted in development of accounting practices for academia were often absent (Laroche, 2009), and most of the attention was posed on eco-efficiency goals (Fonseca et al., 2011). Trying to overcome those limitations, scholars called for universities to adopt a whole sustainability approach in assessing their performance, emphasizing the need for indicators that could measure the impact of education and applied research in terms of outcomes, such as the development of competences required in the workforce market and research that could change current unsustainable practices (Adams, 2013; Fadeeva and Mochizuki, 2010). In practice, learning outcomes should be fixed in order to transform universities in change agents, given the responsibility they have in educating the potential rulers of the society (Swanström et al., 2008). Based on the above premise, the contributions of the paper are multiple. First, it discusses how the university under analysis shifted from a logic of single projects implementation, based on the Triple Bottom Line by Elkington (1999), to a systemic-thinking involving stakeholders (although mainly internal ones) in the design and application of a SPMS to support monitoring and planning phases of SD within the organization. This is in line with scholars urging for the adoption of the participatory approach to construct sustainability assessment practices that can facilitate higher education institutions' effective shift towards sustainability (Godemann et al., 2014; Disterheft et al., 2015). Second, the paper discusses a case study about a university that overcome the traditional focus on management of operations' environmental impact, extending the SD

appraisal to social responsibility (such as educational equality and diversity performance), and introducing outcome indicators of applied research for sustainability, as called by scholars (Yarime and Tanaka, 2012; Disterheft et al., 2013; Adams, 2013; Godemann et al., 2014). Indeed, scholars urge to unlock the potential of universities in the transition of the society towards SD. The implementation of the SPMS and how it accorded with universities' traditional information systems was also examined; benefits and criticalities related to the process of change were underlined. Finally, the paper aims at encouraging the discourse on possible development of sustainability evaluation for Italian universities (as urged by the CRUI, the *Conference of Italian Universities' Rectors* (Conferenza dei Rettori delle Università Italiane) during the Italian EXPO event of 2015, September 22nd). The article is structured as follows: section 2 introduces a literature review on sustainability performance measurement in private and public sector, and emphasizes the gap with regard to SPMS developed in the academic context. Section 3 focuses on the used methodology, while section 4 presents the results from the case-study's analysis. In this latter section the story of Beta's initial commitment and operationalization of SD is discussed, as well as the design of the SPMS and its linkage with the university's decision-making process. For clarity, the SPMS was organized based on the identified areas of sustainability that were *education, research, operations, community engagement* and *strategy, structures and investments,* and they represented the strategic dimensions of sustainability related to Beta's personalized deployment of TBL. Section 6 provides a critical discussion of results, while in section 7 some conclusions are presented.

2. Literature review

The literature on private sector has emphasized the role SPMS play to support sustainability and business planning within the organization. To translate sustainability strategies into actions, firms need management systems such as performance appraisal to compare the results with the fixed targets (Epstein and Roy, 2001) and draw on improvements. Performance measurement can indeed help organizations to detect social and environmental impacts of their activities and to determine the extent to what they affect relations with stakeholders (Epstein and Roy, 2001) that in turns impact on firms' capacity to survive over time. SPMS such as the Balanced Scorecard can help managers to integrate sustainability into management systems (Figge et al., 2002; Shaltegger and Wagner, 2006) and, on the same time, the integration of SPMS with reporting practices can help the organization to be respond to stakeholders' concerns (Shaltegger and Wagner, 2006). In addition, related to firms, Adams and Frost (2008) provided evidence of how social and environmental data collection led by a desire to report to stakeholders, improved decision-making. Despite studies pertaining to SPMS are little and research is urged to address how SPMS are integrated into business practices and how they can support decision-making (Searcy, 2012), scholars have increasingly made the efforts to develop integrative models in which SPMS are linked to performance management and reporting. The potential related to integrated frameworks is twofold: they both help organizations to focus on social and environmental issues that are under stakeholders' scrutiny, and affect business' success (Shaltegger and Wagner, 2006; Maas et al., 2016). Instead, literature hardly exists discussing SPMS' development in the public sector and its link with performance management. Indeed, studies such as Lozano et al. (2006), Ferrer-Balas et al. (2009), de Andrade Guerra et al. (2016) that link sustainability with performance measurement are pioneering; Ferrer-Balas et al. (2009) developed a model to *a priori* evaluate the transition from a sustainability strategy to a new one, Lozano et al. (2006) developed a performance appraisal system for universities based on a modification of Global Reporting Standards in order to help universities' managers introduce sustainability inside their activities; de Andrade Guerra et al. (2016) proposed a conceptual Balanced Scorecard to monitor the effectiveness of environmental education programs. Ball and Bebbington (2008) argue that public organizations could contribute significantly to the development of new models for the evaluation of sustainable development strategies: given the geographically defined link they have with their ecosystem, they could be not only assessed as individual organizations but also as a part of the country performance, leaving space for better definition of sustainability policies at a national level (Ball

and Bebbington, 2008). Despite this, the SPMS used to assess sustainability performance of public organizations are limited in number and often borrowed from the private sector. In facts, the firms' sector witnessed a period of greater development of sustainability accounting tools compared to the public one, focusing on full cost accounting techniques such as the Sustainability Assessment Modeling by Bebbington et al. (2007), which also found application in the public urban context (Fraser, 2012). A part from these attempts, it is opinion of the authors of the present paper that in higher education institutions, SPMS should be designed considering the role universities play for society's transition towards SD. Universities' knowledge generation can help to understand current unsustainability issues and avoid or find solutions for them (Godemann et al., 2014). In addition, universities have major responsibilities in educating students to apply SD knowledge to decision-making and behaviors (Godemann et al., 2014). Current universities' practices on SPM seem to have forgotten those HEIs' peculiarities and the adopted performance appraisal techniques are often based on the use of environmental management systems that track the progress on university operations' impact. On the contrary, issues such as diversity performance or educational equity, although part of the universities' social mission, have been traditionally under-looked bringing to a scarce development of SD accounting and accountability practices within universities (Godemann et al. 2014). Although HEIs are providers of public services delivered to the community (Ball et al., 2014), case-studies on sustainability assessment practices in these organizations have scarcely discussed the involvement of different stakeholders in sustainability decision-making (Godemann et al., 2014). The majority of sustainability initiatives undertaken by universities are not generally starting from senior management, while leadership and a whole-of-institution approach are essential to propel the shift toward SD (Adams, 2013). Moreover, SD requires integration across different functional areas, (such as technical services and academics), and a collaborative approach to sustain the change (Adams, 2013) overcoming traditional disciplines' divide (Disterheft et al., 2013). In this sense, to study stakeholders' involvement process in order to look at how it shapes organizations' transition to SD is highly recommended by scholars, given the limited literature in the field (Godemann et al., 2014). Furthermore, focusing on literature on how the current SPMS are used by universities to account for SD performance, high heterogeneity (Fonseca et al., 2011), subjectivity of measures (Bouckaert, 2015), the only attention to eco-efficiency (Fonseca et al., 2011), and the lack of sustainability outcomes (Adams, 2013) were considered as the main limitations of performance appraisal (Fonseca et al., 2011). Theorizing ideal features of sustainability performance measurement tools for HEIs, Shriberg (2002) emphasized the need to look for processes and motivations that lead sustainable strategies, as well as for greater comprehensibility of the framework for stakeholders. However, Stephens and Graham (2010) pointed out the lack of reflexivity of the process of evaluation currently implemented by some HEIs: indeed, examples of case studies on assessment of sustainability in universities did not focus on criticalities or stress key decisions points faced to introduce sustainability in their way of planning. Therefore, the missing link between implementation of SD and the performance measurement system could be identified as a probable cause for the non-development of sustainability management (Amaral et al., 2015).

Other gaps related to literature on universities' SMPS currently concern: a) the process of integration of sustainability in performance measurement systems and b) the development of a SPMS that can support decision-making. With reference to the first point, Arroyo (2015) pointed out the scarcity of study investigating the roles of sustainable performance measurement (SPM) in helping the transition to sustainability and proposed the taxonomy to help interpret these changes. She recently developed a new taxonomy to define the main roles SPM can take on in the transition to a sustainable university: these are respectively reflecting, planning and monitoring, comparing and legitimizing roles. *Reflecting* concerns discussion about the introduction and improvement of sustainability practices and how SPM could advance or not sustainability strategies; while *monitoring and planning* involve the use of SPM to manage future actions; *comparing* deals with benchmarking and the detection of best practices; *legitimizing* refers to reporting and ranking for stakeholders. For what concerns the second point, literature also urges to consider

the connection of SD performance appraisal with strategy (Adams, 2013). Given the above-cited calls made by scholars, the paper aims: a) at investigating the role different stakeholders had for sustainability management within the university under-study (Godemann et al., 2014) from operationalization of SD to construction of the SPMS driving strategy; b) to provide evidence of the use of a performance appraisal framework that started to include outcome indicators in line with the role universities should play to promote society' shift towards sustainability (Godemann et al., 2014; Disterheft et al., 2013;Yarime and Tanaka, 2012). In order to analyze these major aspects the taxonomy developed by Arroyo (2015) for universities was used to look at how SPM assumed a reflecting, monitoring and planning role, and were integrated with traditional accounting systems.

3. Methodology

The study was an attempt to discuss the process of adoption of a new sustainability performance measurement framework in an Italian university. Thus, authors defined a set of preliminary themes to deepen by the case-study's analysis; first, the paper aimed at discussing how the SPMS was introduced thanks to a participative approach and perceived by the members of the organization during its process of implementation; second, the paper aimed also to explore the relation among the adopted SPM and the shift of the organization to sustainability systemic thinking. More in depth, benefits and limitations of SPMS' adoption were discussed focusing on: a) results achieved in predetermined sustainability related performance areas especially considering outcome indicators, b) the planning process. To this end, authors discussed how SPMS was useful to support sustainability decision-making within the university. The authors of the paper supported the operationalization of the designed framework in order to verify the commitment to sustainability over the timeline 2011–2014, in line with Ball et al. (2014). The case study is an exploratory one (Benbasat et al., 1987; Scapens, 2004), and it is discussed through the analysis of the content of planning and reporting documents, university's official website, interviews collected and the researchers' participation to specific focus groups. The complete list of sources used for case study's analysis is represented in table 1.

<Please insert table 1>

Eight interviews were taken with staff involved in the implementation of the new SPM systems; among the interviewees, it can be counted both the previous and the current Delegates of the Rector for Sustainability Planning, the Head of Health and Safety Office, the Head of the Training Programs' Planning, the Head of the Procurement Office, one member of the University's sustainability Committee, the President of Equal Opportunity Committee, the Professor of Accounting proposing the introduction of the SD performance measurement system. Interviews' total duration was of about 325 minutes. Each interview was conducted mainly at the interviewees' workplace. The protocol of interviews aimed at investigating the birth of the SD project within the university, the main projects undertaken in the field of SD, the motivations to introduce a SPMS, the construction of the tool and data collection process; moreover, interviewees' perceptions on criticalities and benefits related to the introduction of the appraisal tool were deepened. Interviews were recorded and transcribed, previous permission of the interviewees. Personal diaries were useful to record changes over time. Other university's offices, such as the Right to Study and Disability Office, although not directly involved in the interview process, participated to the gathering and elaboration of data on SPMS. Furthermore, two focus groups were conducted to enrich case study's results. The first one was conducted with the Head of the Technical Services and three of its employees working in the technical area (consumption management and servicing); the second focus group was conducted with the Head of the Planning and Control Office and two of its employees, for a total duration of 1 hour and 40 minutes. Direct observation included participation to conferences organized by the University, and open to the public, in which the results achieved with reference to university's sustainability were presented (e.g. the Researchers' Night, Seminars' cycles organized by the Institute for Higher Studies of the University and open to high schools and local community). While other sources considered, included University's resolution on

sustainability programming and strategic plans, University's formal declarations of commitment, social reports, archival documents related to implemented sustainability projects, web site's disclosure. The multiple sources were used for triangulation coherently with the case study's methodology that requires within and cross cases' analysis to identify themes to be discussed, to construct theory comparing results from cases, and supporting/contrasting results with relevant literature (Eisenhardt, 1989; Eisenhardt and Graebner, 2007). The collection of data for the case study's analysis took a period of approximately 3 years, and involved a coding process that allowed at identifying emerging common patterns to discuss. With reference to the construction and application of the university' SPMS the coding process was facilitated by the presence of Arroyo' framework (2015) that calls researchers to investigate reflecting, monitoring and planning role of SPMS[1].

4. Results

Considering the research process, major relevant themes were detected, starting from the preliminary list and progressing with the coding process. Those themes were: the introduction of the sustainability project within the university; the operationalization of sustainable development during the years 2010-2014; the development of the sustainability assessment tool; and its application to track university's performance, considering benefits and limits connected to its use. With regard to university' sustainability project, the authors identified other aspects to be deepened in the discussion process and mainly referring to: "SD championing" and "university governance' support". For the operationalization of SD, three sub-themes have been identified "university's vision and policy on SD", "the translation of SD vision in effective goals (projects)", "criticalities about SD projects' implementation". For the development of the sustainability assessment tool, authors considered the "process of construction", "indicators' role to track performance", and "data collection" as the main issues to discuss. Finally, for what concerned the application of the framework, the issue related to "monitoring of results" was investigated looking at different university's activities: education, research, operations, community engagement and strategy, structures, and investments.

The above-mentioned topics are discussed in details in next sub-sections especially focusing on stakeholders' contribution to the process of operationalization of SD and sustainability performance measurement system's construction within the university.

4.1. The sustainability project at University Beta: the starting point

When looking at the literature on sustainability in universities, as Broadbent et al.(2010) argued for UK's academic system, regulations and the provision of funds have steered universities to implement sustainable development projects; such conditions, when present, enforce the engagement of HEIs to sustainability. In the Italian education system, government's line on education to sustainable development was mainly oriented to compulsory training with the introduction of specific guidelines to create green curricula. On the contrary, with reference to universities, interventions were not so specific; the Law Decree no. 208 of 2008 introduced at the Art. No. 7-quinquies the need to insert projects in universities to increase the sensitiveness of new generations on sustainable development. However, the decree indicated that all initiatives to be fixed by law must come without additional debt for the country. In this sense, the decision to implement sustainability initiatives as well as the management of such projects in Italian universities remain voluntary, planning for sustainability result to be almost fragmentary and, a part from few exceptions, refer to single projects (Vagnoni and Cavicchi, 2015). Among the universities implementing sustainability initiatives, University Beta was chosen given the changes this organization implemented with reference to sustainability planning and performance measurement. This university is a medium-size public university located in the region Emilia Romagna in the north east of Italy; it has 12 departments, a medical and a pharmaceutical

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[1] Comparing and legitimizing phases of the framework of Arroyo (2015) were not examined in the present paper as the case study focuses on the early stage construction of the SPMS within the university.

school, and approximately 18,000 students from different countries. The story of sustainability started when the university first engage with stakeholders in 2006, when the top management decided to introduce a social report as a way to inform them of the activities done for the community. An environmental management section was included in the report to outline projects aimed at reducing the environmental impact of the university's facilities, but the major engagement with sustainability topics became consolidated only with the adoption of a formalized sustainable strategy.

The sustainability initiative in University Beta was born thanks to an academic professor acting as a *sustainability champion*. He took part as a chemist at the Workshop called "Science, Culture and Ethics for a Human Future" (March 1–4, 2006) in the International Meeting Centre of St. Marienthal, Germany, attended by professionals from various sectors (e.g. sociology, environment, economics, theology and ethics). The conference stressed the importance of comparing different experiences to promote best practices in sustainability, and the need to consider the interdisciplinary nature of "sustainability" to implement common lines of action. After that experience, he promoted the Forum on Ethics and Science for the Environment (September 23–25, 2007, organized by the local university and the University of Bayreuth) and, after an encounter with the current rector of the University Beta, he proposed the introduction of a university project on sustainability. He stated:

> *From here, comes the resolution of the Academic Senate of 2011 on sustainability commitments undertaken by the University Beta, a document that serves as a Policy Statement,*

and

> *the creation of the web portal Beta University sustainable with a special function to communicate the actions undertaken in the field of sustainability by the university.*

An organizational structure in the service of sustainability was successively appointed with the aim to manage sustainability in the university; the governance structure was composed of:

1. A sustainability committee which includes the rector and his delegate for sustainability policies, it is a collegial body that has the task of overseeing the implementation of the sustainability project of the university.

2. A drafting committee with operational tasks for the evaluation of sustainability projects; in particular to identify which projects according to economic, environmental and social responsibilities (the triple bottom line, TBL, framework of Elkington, 1999) can be identified as sustainable and so implemented.

4.2 Operationalizing sustainability: 2010–2014

The primary objective of the sustainability vision and policy established by University Beta was the spread of the cultural change needed to address sustainability. In Lozano's words, the implementation of sustainability in universities represents radical innovation and needs to overcome traditional features of their organization, such as specialization and teaching methods based "*on societal depletion of natural and human resources*" (Lozano, 2006). In addition, as Wals and Jickling (2002) argue, sustainability requires teachers to consider themselves learners and involves a change in mental models. To promote cultural change in University Beta, training was considered essential in order to make known the value of SD and diffuse specific knowledge. In particular, the development of Project TESSI (Teaching Sustainability across Slovenia and Italy), developed in collaboration with an Italian and a Slovenian universities, included the involvement of high schools to provide students and teachers with the competences to face SD implementation. Project TESSI also involved the creation of manuals that could be adopted by schools to spread correct practices through practical applications; University Beta was responsible for drafting the manuals on the smart use of water, adding historical case studies that allow students to be aware of real-life

scenarios, and to make their own styles of sustainable living. At the university level, the project had an important reverb and participation, especially for what concerned a specific action related to the introduction of the sustainability award for master dissertations related to the sustainability topics: this event was opened to the public, and represented an opportunity to involve and sensitize the local community. The ultimate outcome of the project was an exhibition in the ancient castle of the city realized with the collaboration of municipalities to raise awareness of sustainability initiatives carried out. Another action related to the education mission was the creation of a new Master degree program called "MaSTeM" (Master of Science, Technology and Management), which specifically addressed sustainability through a TBL approach (Elkington, 1999) and included a platform of active learning for students. A number of projects were promoted by University Beta concerning sustainability, and the economic, social and environmental perspectives of the TBL: for example, projects to help underdeveloped countries increasing their social and health condition thorough the collection of still usable drugs (the project was named "Still useful") and materials; energy efficiency and environmental upgrading of some of the university's and Province's facilities; research projects to foster the sustainable use of natural resources and territories. Action' degree of dissemination was both internal and external to the university. From the perspective of campus sustainability, the university achieved a low energy impact: it was powered by geothermal power and photovoltaic cells, and had zero CO_2 emissions. The measures taken to incentivize sustainability inside the university's facilities included: a switch from fossil fuel to renewable (geothermal) fuel; disposal tanks of diesel no longer used; energy saving, centralized air conditioning; automated systems; thermal insulation measures; reduction of water consumption (replacing taps and toilet cassettes); collection of separated waste (agreement with Hera); rationalization of materials consumption and voice system through the network (VOIP); the introduction and improvement of students' online careers system. Sustainable management of the university was one of the key objectives pursued from 2011 onwards: among the initiatives, as well as a reduction in water and energy consumption, were: a) the 2011 project for sustainable mobility which secured the signing of an agreement with the local public transport company to provide employees with subscriptions at discounted rates for the use of public transport; b) the inclusion of environmental criteria in calls for allocation of supplies; and c) the application of International Organization for Standardization (ISO) environmental certification as a requirement for the waste disposal service.

The route toward SD implementation was initially difficult, especially until 2012, mainly because of a lack of cooperation from students. A collaborator of the delegate said:

> *We discussed with the three representatives of students about a school project I had worked on, and the possibility to export sustainable initiatives on the idea of American campuses was presented.*

> *I was told that the lack of a culture of sustainability in our university would not allow the initiative to take flight.*

> *At this point we spent time make it feasible, complete with a business plan and with the involvement of some teachers, but when it came to proceed, representatives have pulled it back.*

And yet the delegate argued:

> *the only way to engage students in initiatives of this kind may be through a dedicated call or in the form of services you can offer them.*

Meanwhile, representatives of the students changed, and a constructive dialogue with the students started by trying to engage them with initiatives such as prizes and the project TESSI, which had positive effects in terms of participation.

Finally, one last problem encountered in the implementation of sustainability in University Beta was initially connected to time; the delegate of that period affirmed:

It is hard to find time to devote to the activities of sustainability

but at that time the implementation of the sustainability project was still at the design level and therefore there was no routine mechanism for such a strategy.

4.3 The need for assessment: developing a sustainability assessment framework for University Beta

The idea of performance assessment came after 4 years of strategy during which sustainability projects and initiatives were undertaken without a focus on assessment needs, thus, without any vision of systemic thinking[2]. From 2014, the university decided to take part in the GreenMetric World University Ranking[3] initiative to compare its performance at an international universities' level. Benchmarking can be considered very useful to identify best practices; however, the risk of not being able to compare universities worldwide due to differences in their structure and operations was considered. In addition, after 5 years of sustainability strategy, the need to assess the results of such a strategy emerged to improve the decision-making process, but at the same time the performance measurement tool adopted in university were perceived as inadequate to account for sustainability performance. The lack of an ad hoc monitoring information system, as well as the fragmentation of sustainability goals very often left to the management of groups with different backgrounds and responsibilities were identified as the major problems for the development of a future sustainability strategy. The working group thought that a new framework for the monitoring of sustainability activities would allow a better reading of the results through the three pillars of sustainability as declined by the university. At that time, a member of the Sustainability network with specialized competences on accounting proposed a project to the rector related to the assessment of the sustainable performance of the university. First she met the rector and the delegate on sustainability issues to test the feasibility of the project, and after she organized workshop meetings with employees to define the content of the new SPM. To this end, the progressive involvement of employees was twofold: their engagement improved the definition of the new SPM indicators thanks to the diverse technical competences which were present in the working groups; second, it contributed to create a common meaning of the new SPM rendering its introduction and adoption legitimated. The possibility of developing a new SPM system was discussed by the sustainability research teams, before defining its content, in order to favor the sharing of ideas and meaning on sustainability, and two main approaches from the literature on sustainability assessment inside universities were first analyzed. Despite the criticisms revealed in the literature (Shirberg, 2002; Kamal and Asmuss, 2013; Bouckaert, 2015) on current sustainability assessment methodologies for HEIs, the Sustainability Assessment Questionnaire by University Leaders for a Sustainable Future (ULSF, 2010) and the Sustainability Tracking, Assessment & Rating System (STARS, 2010) of the Association for the Advancement of Sustainability in Higher Education (AASHE; 2010) were selected because of their discussed ability to address the meaning of sustainability for the organization (Kamal and Asmuss, 2013). The Sustainability Assessment Questionnaire was presented *"as a good tool for generating discussion and reporting progress for campus sustainability scholars and practitioners"* (Kamal and Asmuss, 2013; p. 455). It is composed of 25 questions on curriculum, research and scholarship, operations, faculty and staff development, engagement and service, student opportunities and administration, mission and planning; the tool was previously used in a survey study despite the criticisms evidenced by the literature, to evaluate the level of implementation of sustainability practices inside Canadian universities (Beringer et al., 2008), and even if it isn't comparable to the presented case study, it provides evidence of SAQ application. STARS is a self-reporting framework used to evaluate progress through SD (Kamal and Asmuss, 2013); it is composed of 84 indicators in four main categories: education, research operations, planning administration and engagement, and innovation. STARS as a rating system can be a useful benchmarking tool for results'

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[2] Systemic thinking in the paper is interpreted as the capability to look at the university's sustainability activities as a whole, not as single projects.

[3] The GreenMetric World University Ranking was promoted in 2010 by Universitas Indonesia to assess sustainability conditions of universities all around the world.

optimization and can promote the spread of transparent criteria for the evaluation of campus performance (Wigmore and Ruiz, 2010). In addition, as argued by Urquiza Gomez et al. (2014), it works as a road map in which the experiences of the most advanced universities in the field of sustainability implementation are shared. Both tools have a good capacity to evaluate the critical dimensions of sustainability implementation as defined by numerous authors such as Clugston and Calder (1999), Cortese (2003) and Filho (2011).

<Please insert table 2>

The approaches to sustainability evaluation taken by other universities using the two methodologies were scrutinized. The frameworks were partly useful in the university's approach to evaluation because it had previous experience in the field of social reporting, in which SD was mainly addressed from an environmental perspective, but it had never worked on creating ad hoc sustainability reporting. In addition, there was a quite diffused belief that:

social reporting was mainly used as a communication tool to prove accountability to stakeholders,

leaving its use for planning activities quite unexplored. To this end:

it is needed to use such tools (the reporting ones) developing a planning orientation, defining goals to be achieved, monitoring the actions and programming further improvements. Social reporting was static, too many indicators (...) it did not help to take decisions.

Hence, the project group faced the depth and complexity that an evaluation of that type required and, in particular, acknowledged the need to develop a personalized paradigm of sustainability that can help Beta to focus on tangible results and improve decision-making for sustainability. When discussing the possible shape of the model of assessment, the project group found the need to create a framework that could take account of the specificities of the context in which the university operated; during the discussion, some employees criticized the chosen campus sustainability assessment tools because University Beta did not have the same operative context. To this end, a member of the project group emphasized the *"inadequacy of those existing models for our university, which was not organized as a newly built campus, lacking part of activities that a campus do"* (like university's canteen facilities, dormitory, etc.). Therefore, the limitations of the already existing STARS were connected to the context in which it was developed (USA, in which sustainability on campuses is widespread), and to the complex need for a consolidated participatory approach to gather information (Urquiza Gomez et al., 2014). During the meetings, another member also urged to consider the possibility to adopt indicators that can support the sustainability strategy as a whole. In fact, the use of indicators developed for the university's reports had been mainly addressed to represent single projects performance instead of giving an overall picture of the sustainability strategy of the organization.

Consequently, the desire for a customized framework was born according to a shared idea of sustainability evaluation that emerged through discussion as well as according to the need of improvement of planning activities. With reference to this latter, Beta wanted to explore some new issues such as the ability to attract resources from National Research Policy for sustainable development projects, that were a new topic to be monitored and potentially improved, and number of publications on SD as a new outcome indicator (Yarime and Tanaka, 2012). Thus, the personalized variables and Key Performance Indicators for University Beta were progressively designed according to the goals of the organization as well as considering the potential obstacles in evaluating certain aspects (Table 2).

<Insert table 2>

According to Filho (2011), universities' declaration or sustainability plans lose their importance if they are not followed by "concrete action". Thus, university's first intent was to identify key dimensions in which sustainability could be operationalized. That goal had been essential to the implementation of the SPMS, as

the meaning of sustainability evaluation was translated in a common language comprehending five major areas of performance: that were recognized as interrelate to foster SD: *education, research, operations, commitment to stakeholders* and *strategy, structures and investments*. According to the *education* and *research* as primary goals of the university missions were stressed and concerned not only the use of typical indicators to test sustainability introduction in curricula and research, but also to identify the university's capacity to fund applied research in order to contribute to the transition to a sustainable society as a major goal to achieve. *Operations'* focus was to capture the consumption performance of the facilities to introduce strategies for optimization, as well as the performance on renewable resources generation and the promotion of sustainable consumption patterns inside the university to foster good citizenship behaviors. *Commitment to stakeholders* was identified as the social sphere of the TBL the university addressed to: social engagement inside and outside the university was the major challenge for Beta and was declined through concepts of equity and social cohesion, facilitating the partnerships with public and private actors. The capacity to involve with academic community as well as the external broader community was one of the main action lines already proposed by the UN Inspirational Guide for the implementation of Principles of Responsible Management Education (2012) that provides examples higher education institutions that have promoted social initiatives. Beta tried to deploy such theme looking at the emergent needs of its local community, promoting an inclusive and holistic view of sustainable development. The capability for students to assert their personality and professionalism is often hampered by cultural, social, familial, economic and architectural barriers. That concept led Beta to create support paths for students, from the choice of university's course up to the labor, and working on the possibility to furnish tutoring, psychological help and disability services to accompany traditional monetary funding through scholarships. Indicators was thus fixed to detect the performance of each in terms of students accessing the services. In addition, gender equality initiatives were undertaken to train students and staff and help women which had heavy family commitments to access training or find a job thanks to telework projects. Gender equality was one of the topic that was already developed and discussed in the social report of the university, but given the relevance of the issues related to social inclusion of women, starting from 2011 the phase of project planning was assigned to a multi-stakeholders' working committee with the aim to develop more effective actions. Those attempts were to be ascribed to the need to stress university' social responsibility as a part of SD by fixing outcome indicators, in line with Godemann et al. (2014). One of the Beta's primary mission in the social context in which it operated was to realize the integration with the territory through establishing partnerships with firms, local authorities and public companies being responsive to the need of external stakeholders. Sustainability was deployed through two main paradigms; the first had an environmental focus and was based on cooperation for the realization of environmental training initiatives, projects for environmental security and sustainable use of the territory. The latter was about the possibility to orient teaching to greater professional practice to respond more effectively to the demand of the labor market. Finally, *strategy, structures and investments* was set to identify the degree of formalization of strategic planning inside the university and of economic commitment to sustainability initiatives thanks to the capability to attract and support investments for sustainability projects. Sustainability committee believed that trends on the detected strategic areas could help to increase awareness of past performance, to detect criticalities related to the initiatives that were developed in the past and to plan adjustments to the adopted sustainability strategy.

The implementation of the framework however required high efforts on gathering data, being sustainability a quite new topic to monitor, and being the present information system only in part devoted to capture social and environmental aspects of the university's activities. Despite an interviewee from the planning and control office stated:

> *The process to gather data is quite well consolidated as we have a long tradition in social reporting, started in 2006; this required at the beginning a high efforts to coordinate the offices to collect data, but now is quite routinized,*

new data on sustainability research funding, community outreach and sustainability in advanced training programs had never been collected before.

Collaboration of employees on the implementation of the framework was also examined: some of them supported the initiative and gave complete availability for the collection of data; whereas others complained about the working load that their routine job brought. As one of the employee stated during a colloquium the lack of time prevented a proper data collection, and in any case

> We cannot engage in a detailed data collection..at the moment we have urgent activities to be carried out for the correct functioning of the office

The resistance encountered, although in one case, was not dictated by a reluctance to sustainability, but it was mainly related to the difficulty of the office to deal with daily activities coherently with Disterheft et al. (2015). The application of the framework was at the end successful and useful to fix future actions for the improvement of the evaluation process. This was possible thanks to the involvement of different stakeholders (mainly academics, university's governance and non-faculty staff) who shared ideas about SD and on the variables that affects its operationalization and measurement within the university's context. Next section will uncover the main results deriving from its application as well as the main limits linked to its adoption.

4.4 The adoption of the SPMS: main results on monitoring activities

The first application of the SPMS was retrospective. Then, the research group also assessed the performance of the university related to the year 2014/2015.

4.4.1 Education

Courses dealing with sustainability have been accounted looking to: a) the name of the course as specifically addressing sustainable development, and b) to sustainability related competences under-graduates were required to develop attending the course. Sustainability-specific matters in university courses were present only in the training for years 2013/2014 and years 2014/2015. In 2013/2014 there were two relevant courses at the Department of Architecture: the course "materials for environmental sustainability" was inserted in the program of Industrial Design, and "sustainable design" was inserted in the program of Architecture; both were optional and linked to a first degree program. In 2014/2015, three courses related to sustainability were added: the optional "sustainable economic planning" inside the program of Economics, the compulsory "natural and sustainable cosmetics" inside the program of Biotechnology were optional, and "environmental sustainability lab" inside the program of Civil Engineering as an alternative to curricular internship. With reference to Master programs offered by University Beta, the trend in sustainability-specific courses decreased from 21% (four programs out of 19) in the academic year 2011/2012 to 10% (one in 10) in the year 2014/2015; this was due to a decrease in the number of Sustainability Master programs offered as well as to a decrease in the total amount of Master programs offered, driven by the lack of students' enrollments. In addition, the regulatory framework emerging from the Italian Law No. 240/2010 that led to rationalization of the number of training courses offered, could justify a reduction in the number of programs related to SD over time. From discussions on the capability to create training initiatives for the local community, some dedicated events were promoted, starting from 2011, mainly concerning sustainability topics: each year saw a specific cycle of seminars introducing SD topics, but in 2014 and 2015 an interdisciplinary perspective was added to meetings through the intersection of disciplines (such as seminars on sustainable healthcare, sustainable agriculture, etc.).

4.4.2 Research

At the end of 2014, there were five structures (four departments and medical schools) out of 14 committed to sustainable research (architecture, economics, physics and engineering) including two research centers, six labs and three research units. At the same time, 25% (three out of 12) of Doctoral programs offered included sustainability competences in the description of the course. National projects financed by FAR (university fund for scientific research) increased from eight in 2011, to 11 in 2012, and 12 in 2013 (year 2014 is under evaluation), concerning several topics such as energy upgrading and sustainable design of buildings, social inclusion and local development. Despite the increase in the number of projects, they represented a residual part of the amount of projects funded by the university (from 4% to 8%), showing a low commitment to the proposal of projects related to sustainability issues. At the national level, only a project financed by the National Research Program (PRIN) was detected as applicable to sustainable water management; it had a budget of 82,033 Euros and involved two Italian universities as partners. With reference to projects funded by individuals through tax returns, one project out of 15 was detected in 2011 and two out of 23 in 2013 (the only 2 years in which budgets were fixed for the university research call) mainly related to sustainable cities and energy efficiency. The most interesting performance is related to joint projects with research centers, firms and municipalities: 12% of the projects over time were dedicated to sustainability including themes such as sustainability training and accounting, energy and water management and sustainable health. With reference to publications, the research of works in Scopus indexed journals, revealed a presence of three publications published in 2011 and three in 2012, increasing to four in the years 2013 and 2014, on SD issues. Finally, short research contracts increased from one in 2012, to three in 2013, to nine in 2014, for a total amount of 88,030 Euros, encouraging investments in this field.

4.4.3 Operations

For what concerns, *resources management* in the last 4 years the university was committed to rationalizing the rate of energy consumption. One of the major results achieved concerned the production of renewable energy through photovoltaic plants patented by the university: in 2013, two plants of 180 kW each were available, as well as allowing coverage of 15% of the total annual energy consumption of universities' facilities. Considering the period of cost amortization (5.5 years) and the durability of plants (30 years), to produce energy could be a potential source of saving compared to the costs of electricity. In 2012, an experimental facility consisting of four concentrated photovoltaic systems was realized; the facility uses lenses able to focus solar radiation, has a power of 15 kW, and has smaller and more efficient cells compared to traditional ones.

In 2014, the Sustainable Committee approved the realization of a photovoltaic plant on the local University Hospital's parking for the production of 698.88 kW on an area of 12,000 m^2.

With reference to consumption rates, Figures 1,2, 3, and 4 show resources consumption, as well as the costs of their supply.

<Insert figure 1>

<Insert figure 2>

<Insert figure 3>

<Insert figure 4>

The trend for water consumption was negative indicating that the strategy to reduce the use of natural resources was successful. For gas consumption, a waving trend can be found, with an increase in 2013, which was mainly due to the reactivation of the Department of Humanities, closed in consequence of the earthquake of 2012. To explain the costs' trend, a clarification is due: Resolution No. 6/2013/R/COM of the Energy Authority introduced some concessions on water, gas and electricity services as a result of the earthquake of 2012, which included low prices for supply and deferral of payment of bills for 2013; in addition, supply costs decreased over time since the university was able to access more affordable tariffs. From 2011 to 2013, savings were 126,502 € for water revealing a good performance and 13,158 € for gas. Despite an attempt to reduce gas consumption, the costs were stable over time mainly due to an increase of supply tariffs applied. In addition, some interventions were made to reduce water consumption: the replacement of faucets with mixer units equipped by flow gearboxes, and replacement of toilets with double button outlet boxes to optimize the use of water inside the facilities. However, the water cost in the last year increased signaling a need for more efficiency. Focusing on electricity, it can be noted that the electricity supply cost was stable over time except for an increase in 2012, which was probably due to the management of the emergency (earthquake). Finally, district heating in the city in which the university is located is supported by geothermal sources; this means that 90% of the university's facilities are heated at zero CO_2 emissions. However, an increase in the rate of consumption revealed a limited commitment to the rationalization of users' practices. The achievements of university in term of resources' use were underlined by the new Delegate of the Rector on Sustainability:

> *considering the global performance of the university, compliance with Rio+20 parameters was achieved as the 55% of energy production derived from renewable resources.*

With reference to *sustainable mobility* two agreements with local public transport suppliers were made by the university. The first program was signed in 2012 to incentivize sustainable mobility for staff and students of the School of Medicine between the university and the local hospital using methane buses. That program saw conflicting results, given the number of students accessing the service more than doubled from 2012 to 2014, while the number of staff become a third in the same period. The second was signed in 2008 to facilitate the use of public transport for academic personnel in the home–office commute. Facilitations consisted in the possibility of a transport subscription at more affordable prices with a part of the amount directly funded by the university and/or even a discount obtained on the list price. For the second path positive results were found, given the number of users quintupled (from 11 users in 2010 to about 55 in 2014).

In addition, in 2014, the university gave the local municipality access to the bike sharing program "Mi muovo in bici"; bikes racks were placed in some of the green areas of the university to support citizens' green mobility, testifying to the educational and example role of the university in sponsoring the city's sustainable mobility. In 2015, a high-tech photovoltaic shelter project allowing the recharging of electric bikes was formalized through a collaboration between the Department of Architecture and the Department of Earth Sciences; the shelters will be located within the green areas of the university and will allow the use of ICT services through dedicated workstations.

University's engagement in greening operations covered also public procurement; indeed, *green purchasing clauses* were introduced relating to university contracts: for example km zero food for vending machines, supplies of paper with recycled content and recyclable packaging, criteria for separate waste collection for

cleaning services, and ecological criteria in the purchase of furniture for the classrooms of the university hospital. However, for other goods such as computers and office equipment the centralized procedure is driven by the purchasing center of public administrations in Italy and the university is unable to ask for a green standard compliance.

For what concerned *building construction*, the university placed a request for the voluntary LEED (Leadership in Energy & Environmental Design) certification for new buildings and historical ones hit by the earthquake of 2012, to be accountable for environmental performance concerning energy efficiency, CO_2 emissions and respect of ecological standards in the building design, etc. In addition, in 2014, it started to formalize a program for LED lighting with the intent to reduce energy consumption; it will be totally in practice from 2015 being only one structure of the university being completed at the end of 2014.

With reference to *waste management,* Legislative decree no. 152/2006, art. 179, stated that the use of waste as an electrical source had to become secondary to reuse, recovery and recycling activities; thus, waste going to final disposal must be reduced as much as possible by enhancing prevention and re-use activities, recycling and recovery. The authors were able to account for the production of special waste; it decreased over time for electrical and electronic equipment and bulky waste. For chemicals, production was stable except in 2013, when medical waste increased due to a relevant increase in medical research (see Figure 5).

<Insert figure 5>

The overall amount of special waste produced by the university decreased from 44,951 kg in 2011 to 31,610 kg in 2014. However, the amount of waste recovered by the university diminished from 53% in 2011 to 28% in 2014, but the number of stations for the collection of plastics increased as a result of the adopted program of separated waste collection guaranteeing a major coverage of the university's facilities[4]. In addition, for contracts related to waste disposal, the university introduced some provisions to which firms have to present ISO or Eco-Management and Audit Scheme (EMAS) certification as a requirement to present candidacy in the public competition.

4.4.4 Community engagement

Considering other universities' engagement with sustainability issues, the university was joint creator of two sustainability networks over time: "Routes toward sustainability" and "Unitown" have respectively the roles of enhancing sustainable and interdisciplinary research and training, and the sharing of best practices through collaboration with local authorities. Many initiatives were launched to increase the interest of students in the topic, such as introducing and sponsoring monetary prizes for a sustainability-related thesis; for example, the fourth edition *Università e Sostenibilità (University and Sustainability)* is given to students of Undergraduate, Postgraduate and Master Programs with the opportunity to win monetary prices for a thesis on sustainability. In 2015, a competition was launched for the design of the logo of the Sustainability website of the university, and other prizes from external sponsors were promoted with the aim of increasing the awareness of the academic community. In addition, the university organized in September 2014 an event named researchers night, aiming at presenting the work done in the last year for SD implementation, and in February 2015, the doors were opened to high school students to show them the most relevant research projects undertaken on the topic of sustainability.

In addition, considering *minorities and disadvantaged people,* the university developed over time many projects for students with specific needs: sometimes physical and psychological conditions can affect students' capabilities to face an academic route. The university has many services that can address those

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[4] The program covers plastic, glass, cans, paper, cardboard, batteries and toners.

specificities to help students organize their study planning and take charge of problematics linked to the structural limits of the university's buildings: a support service for disability, a counseling and psychological support service and tutoring. Figure 6 shows that the number of students accessing the disability service and the counseling service remained relatively constant[5]. However, the tutoring services saw a decrease, except for last year: the decrease in access may be explained by an increase in the quality in the organization of teaching which led to less frequent use of tutoring to learn methods of study.

<Insert figure 6>

Therefore, the university provided services to orient the students from the choice of their course to entry into the labor world. The project "Path to employment" (PIL), was designed to favor interaction among firms and graduates to provide the best link between competences needed and offered: Figure 7 reveals a constant trend concerning the number of firms available to provide internships for recruitment as well as the number of workplaces offered. The number of students participating at the several phases of the process decreased over time, probably due to an increase in the sense of disbelief in the possibility to find a job as a consequence of the economic crisis affecting Italian firms.

<Insert figure 7>

Many initiatives were also taken to incentivize women's participation in university life; in 2014, an agreement was signed between the local municipality and the University to add 10 seats to the kinder garden dedicated to children of students and employees of the university excluded from the council lists, regardless of their place of residence. In addition, from 2012 some positions of telework were created (seven beneficiaries in 2012 and four in 2013) to help women to find a job that could reconcile assistance and family commitments with economic independence.

4.4.5 Strategy, structures and investments

From 2011 the university adopted a well-formalized structure composed of two bodies (a sustainability committee with approval function and a drafting committee with operational tasks) and a rector's delegate to manage the sustainability projects of the university through a TBL approach (Elkington, 1999). The plan is formalized and gains direct approval from the Sustainability committee, which meets approximately four times a year.

5. Discussion

In those 4 years, many things concerning SD implementation changed at the University Beta. Although the process went slowly in the early years, the period from 2011–2014 showed achievements in terms of the university's sustainability. This engagement saw not only the involvement of social partners for projects delivered to academic groups (such as sustainable mobility, gender supportive initiatives), but also other universities at the international level to promote SD education and research through an interdisciplinary logic ("Unitown" and "Routes towards sustainability" networks). The construction of a sustainability strategy has increased and improved over time, but the lack of a systematic thinking and monitoring system made it difficult to optimize results achievement. However, from 2014, the university planned to enter the GreenMetric Ranking in order to compare its performance at the international level concerning sustainability

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[5] The disability service saw in the last year a small increase in line with a rise in the number of disabled people frequenting public schools, which in Italy increased from 202,314 in year 2012/2013 to 209,814 in 2013/2014 (CENSIS, 2014).

implementation; at the same time, a need for evaluation emerged from the necessity of a better SD plan. The fragmentary management of sustainability initiatives left to separate working groups and the need to identify the overall sustainability performance of Beta led to the construction of a customized SPM. In addition, University Beta formalized the strategic goal to measure and to periodically monitor performance for improvement in the Sustainability Plan for 2015 reinforcing the importance to have a systematic thinking on SD. As the 2015 sustainability performance plan reported, a major priority of the university was to

measure sustainability performance of the university based on the use of quantitative parameters, and to outline the virtuous practical activities of the university in order to pursue sustainable development in a more harmonious and rational way (Beta's sustainability plan, 2015).

In facts, before the adoption of the framework the attempts to monitor performance were mainly connected to the reporting activity of the university and were mainly addressed to capture single projects, without the possibility to exploit synergies coming from a whole strategy approach. Based on the results of evaluation, university's plan addressed important goals for what concerned activities and monitoring processes. For what concerned *operations*, sustainable mobility was enhanced through the born of the project for a photovoltaic roof for bikes; in addition, monitoring goals become deeper formalized in the year 2015 involving the possibility to conduct a census for car and bike users in the university in order to reduce parking spaces and empower conventions with local authorities for the fruition of public transports. In addition, Beta started a project to promote responsible behavior of students, staff and citizens on the use of water and through the collaboration with the Center for Communication Technologies, Innovation and Distance Learning promoted the realization of documentaries accessible by all web users. The project was also intended to be beneficial for Beta from an economic point of view, considering the increasing tariffs applied by suppliers on the fruition of water in the last year of evaluation. Considering LED lightning project, at the beginning of 2015 only one building of universities facilities was completed, thus the intention was to continue progressively the substitution of old lightening plants with electricity saving devices. With reference to energy consumption policies, Beta aims to increase its independence from suppliers: this justifies the growing investments that took place in 2014 for photovoltaic systems located next to the university hospital and the development of patents that could be exploited to increase university's efficiency. Considering *education*, a more thorough survey of the courses was carried out and signaled on the Beta web-site; the complexity of the process however due to the fact that teaching courses and matters can change in a couple of year. Considering *research* and *engagement to stakeholders*, networking was considered as an aspect to be improved and deployed through concrete actions: Beta entered the European Energy Research Area, containing 17 projects to foster research in energy management; it committed to the "Advanced Materials and Processes for Energy Applications", a project involving the fostering of basic research that can enable technologies to respond to the challenge set by the European targets on energy consumption and production. Local community involvement in sustainability projects resulted weak in the past, and university's action for year 2015 was especially ruled to increase the participation of local community in the initiatives of Beta: for example, a three day sustainability journey was launched by Beta to show to the city the results obtained by the university in SD education and research, and at the end of September, UNIFESTIVAL initiative (September 2015, 25th-27th) took place in which a dedicated section was dedicated to sustainability projects implemented by Beta: exposure of research posters as well as ecological and sustainable product realized by research centers were presented in order to involve the local community to take part in practical activities increasing their sensitiveness on sustainable development issues. The aim of those events was to increase community awareness and responsible behavior on SD topics, and to show stakeholders how money from taxes was spent to introduce sustainability goals. Finally, in the strategic plan for 2015 other monitoring goals were added as the recognition of green spaces of the university in order to set specific initiatives for ecosystem preservation, and currently are processing. Related to gender equality, university Beta become in 2015 the leading university in the "Gender Report in Public Administration" project run by the Italian Ministry of Equal Opportunity, to develop possible assessment and reporting tools on gender equality for

public administrations, given the tradition and expertize of the university in gender accounting. Looking at *strategy, structures and investments* news concerning a periodic evaluation to be made in March of the planned year to make possible the correction of strategy from fixed objectives, and the introduction of the long term vision planning (three years planning) starting from year 2016 were main results achieved. The defined evaluation framework gave the possibility to evaluate the university's engagement in the field of sustainability, and to create awareness among academic staff about the importance of such initiatives. However, the process of data collection was hampered by information systems that were not traditionally oriented to gather sustainability variables; thus, some data were missing for scheduled reports and some others currently are to be processed such as total investments for sustainability implementation. In addition, accounting for sustainability really requires an investment in time and resources to realize a new information system, with the complicity and support of operative offices. Some employees initially perceived it as secondary to their role; however, the majority cooperated because they perceiving the project to be beneficial to the whole organization. Another criticality emerging from the examination of the case study was the lack of performance measurement of some of the old single projects such as "Still useful"; the recognition of the state-of-the-art of those projects would prove to be useful in order to orient future actions. Furthermore, the authors believe that greater emphasis should be placed on outcomes of education and research with respect to external effects of implementing sustainability strategies, looking at societal context, as urged by Yarime and Tanaka (2012). In effect, although established criteria were followed to account for sustainability education and research (such as the denomination and/or the program of courses identifying sustainability competences graduates should develop), a certain level of subjectivity in the process of evaluation had been found. On the contrary, the approach to outcomes was adopted to capture the potential value of the initiatives: such as the number of teleworkers and the number of job places provided through the collaboration with firms' systems. They represent outcomes as they concern the capability of the university to act in partnership with firms' demand for the development of the local territory, as well as the capability of the university to help students sustain their academic career when their social and personal conditions can make it difficult. In line with the call made by Godemann et al. (2014), the university started to be committed to social responsibility, tracking the impacts of its action on different stakeholders' groups. With regard to research, the number of publications on SD could also be considered as an outcome as it represented the attempt (coherently with Yarime and Tanaka, 2012) to make research results immediately accessible to the scientific community and a tangible contribution to the development of the sustainable knowledge society. Despite its introduction, data were not immediately available to measure SD publications, and its implementation remained at an early stage.

6. Conclusions

The present article adopted an exploratory case study investigating the implementation process of a sustainability performance measurement system in an Italian university. The paper contributes to improve knowledge on universities' sustainability performance measurement systems in several ways. It aimed at fill the gap about the need of research looking at stakeholders' involvement for sustainability decision-making (Godemann et al., 2014). Indeed, the use of SPMS to support and improve decision-making (Adams, 2013) is discussed, based on internal stakeholders' involvement that allowed to deploy sustainability with a shared meaning in the organization, to fix the variables that can influence its achievement and to measure them tracking the progress of the university' SD performance. The case discusses a sustainability performance measurement system that was constructed thanks to the collaboration of different organization's members such as academics, technicians, administrative offices, and university's governance, overcoming problems of disciplines' divide (Disterheft et al., 2013). Based on the analysis, the definition of the new assessment path followed the transition phases discussed by Arroyo (2015) consisting in the reflecting, monitoring and planning role of SPMS. The process started with the definition of a common meaning of sustainability assessment that was deployed looking at the contextual specificities, and based on a systemic thinking

approach. It emerged as initially difficult to implement the new SPM system given the lack of ad hoc information systems to collect sustainability data, as well as the necessity to match the collection of data with daily routines. Although some indicators (education and research) were defined, they were affected by a degree of subjectivity, given that sustainability continue to be a matter of personal judgment (Gray, 2010); in other cases it was oriented to catch outcomes of undertaken actions (such as the provision of services), in coherence with Adams (2013). With regard to the latter point, the paper contributes to provide evidence of the application of an appraisal framework including outcome indicators. Indeed, scholars have called universities to overcome the focus on measurement of environmental impacts of organizational activities, and to sheds lights on the role universities play for the society' shift towards sustainability, including training and research' potential (Godemann et al., 2014; Yarime and Tanaka, 2012). As a way of example, university's capability to satisfy firms' local demand for graduate students, as well as the provision of services to make students able to sustain the academic career, or actions to support the less represented gender, were the major social outcomes achieved. Moreover, in tracking research that can contribute to SD and its financing by the State, the engagement of the university to solve SD problems was proved, despite the current monitoring of these aspects is in its initial stage and do not allow to assess the impact of the projects on society' sustainability. However, the introduction of the indicator "number of publications" on SD themes can be seen as an attempt to measure the outcome of research in line with Yarime and Tanaka (2012). The university's intention to take part in GreenMetric Ranking was an opportunity to refocus the information system to catch sustainability data, according to the adopted TBL approach (Elkington. 1999), and the intervention of an accounting professor that acted as a propeller favored the definition and implementation of such a customized framework to be applied for further planning. The need for a systematic thinking approach emerged as a major challenge to which SPMS had to be addressed to, and specific areas of interventions were defined to clear the university's sustainability strategy using a multi-stakeholders' approach coherent with Godemann et al. (2014). The project helped not only to detect performance data related to the operationalization of the framework for the years 2010-2014, but also to set future intervention plans for year 2015. Goals for regular and enhanced monitoring were included in the planning for 2015, connecting the use of measurement to better decision-making practices. In addition, the empowerment of evaluation techniques was also considered such as in the case of sustainable mobility, to make planning more effective. Therefore, the case's aim was to tell the story of an academic institution that started to integrate sustainability performance measurement to strategy, although in the academic field these efforts have been minimal (Adams, 2013). However, authors could not prove its stable adoption for the future, since the management of Beta has currently gone through wide changes, and it has not been clarified what will be the orientation on sustainability, yet. Thus, further research is needed to investigate if Beta will follow the institutionalization of the SPMS. A minor contribution of the paper can be ascribed to the potential extension of the developed framework to other Italian universities that are currently missing models for sustainability performance measurement, although CRUI has urged universities to act (2015). This will however require improvements to the proposed measurement model, to insert indicators that can catch sustainability outcomes, especially for training programs that were missing, given the relevant role universities can play for the whole society's sustainable development (Adams, 2013; Fadeeva and Mochizuki, 2010). Identifying the sustainability performance of the entire Italian university system would also make sustainability policies more effective at national level and it would allow at visualizing the results of the strategic actions of the university system's institutions, according to the role public organizations play in foster sustainability (Ball and Bebbington, 2008). Such an ideal should be supported by a shared value on sustainable development and by a clear policy engagement that nowadays it is not widespread in the Italian higher education context, being the efforts mainly oriented to the lower level of instruction and referred to the definition of curricula. Considering the relevant social function of universities, there is a hope they can actively contribute to the development of a sustainable society, thus developing appropriate evaluation tools to oversee their sustainability strategies.

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Figures
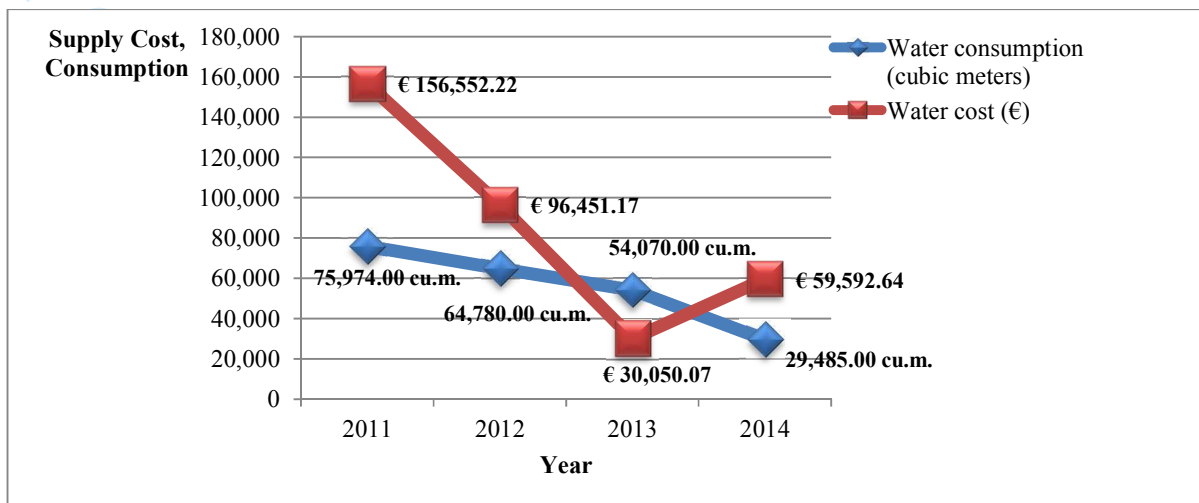
Figure 1: Water consumption and supply costs

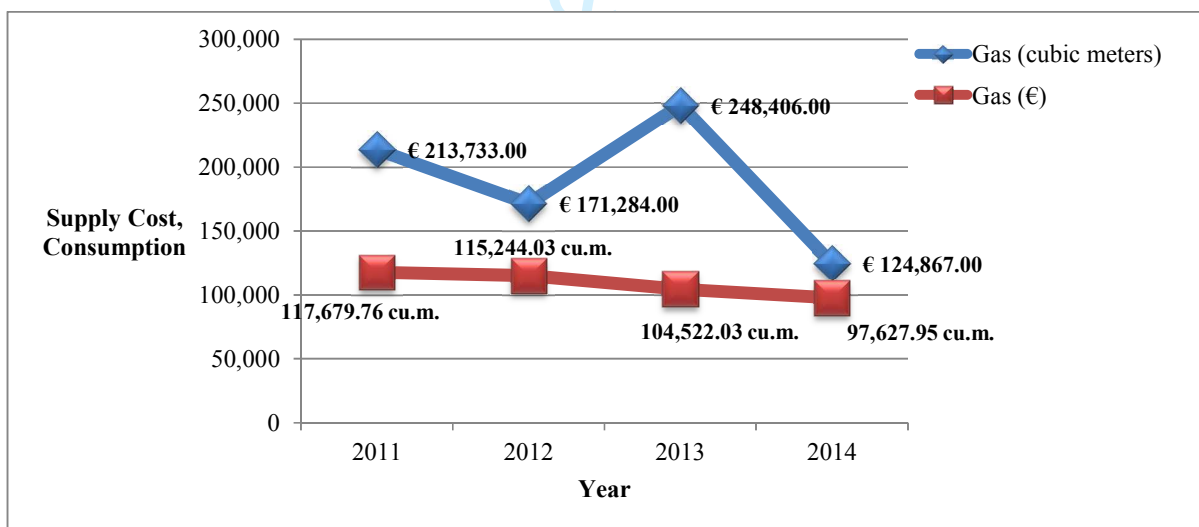Figure 2: Gas consumption and supply costs

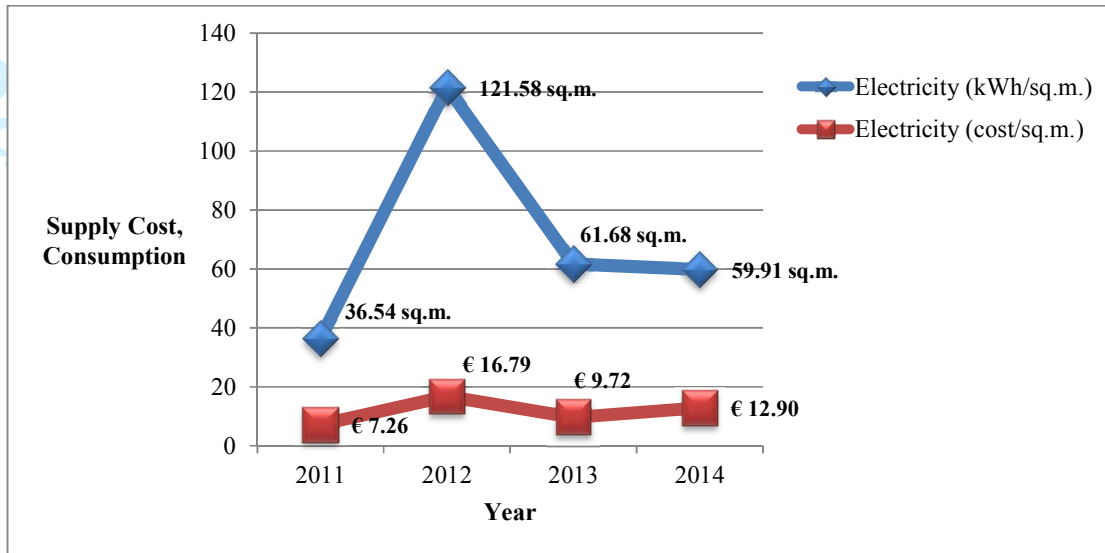Figure 3: Electricity consumption and supply costs

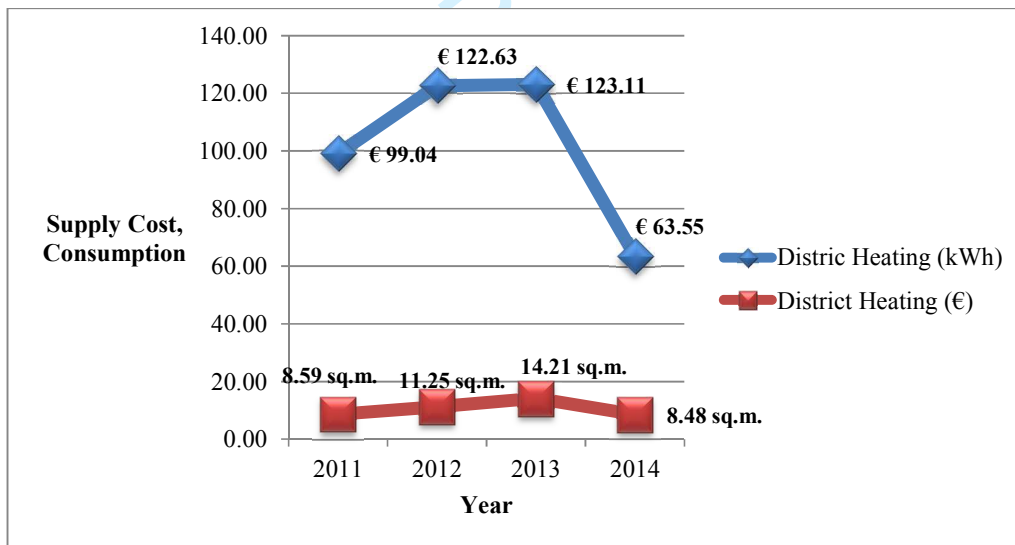Figure 4: District heating consumption and supply costs

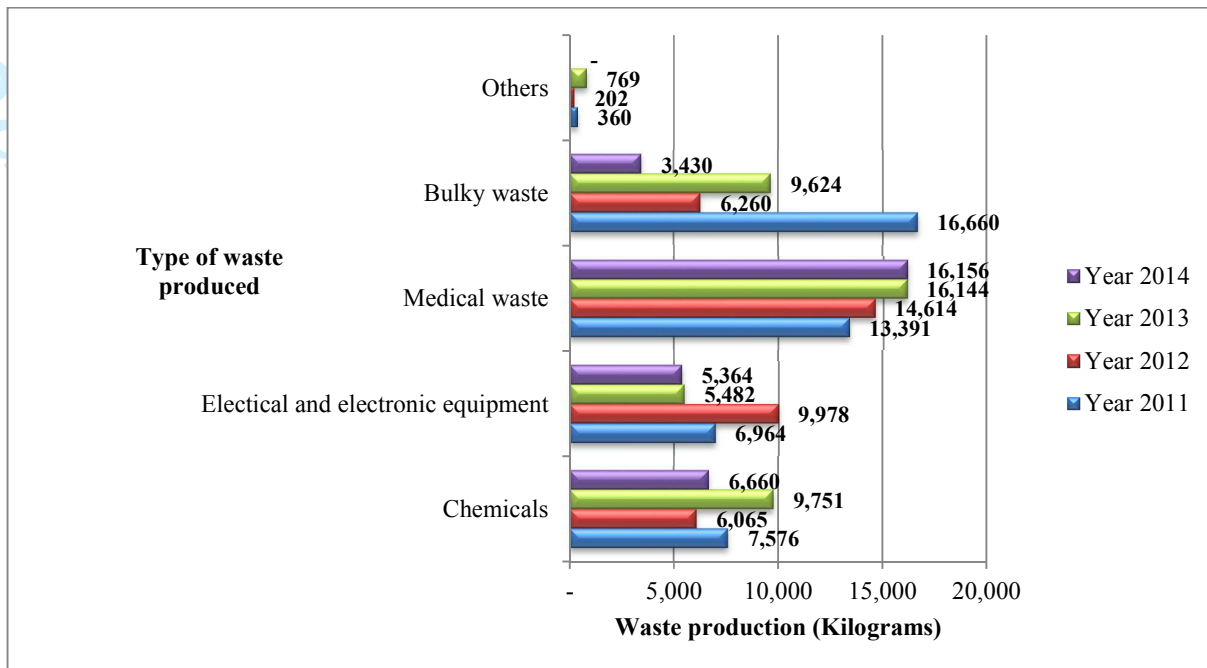Figure 5: University's production of waste (kilograms) per year

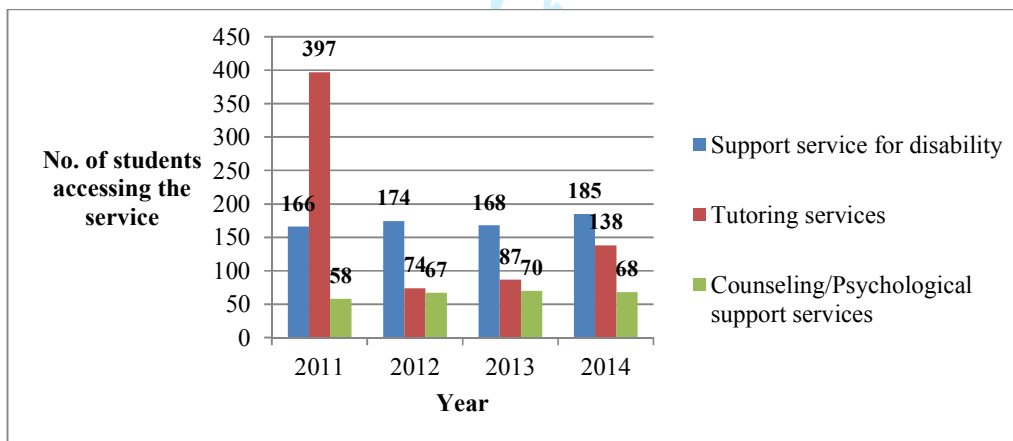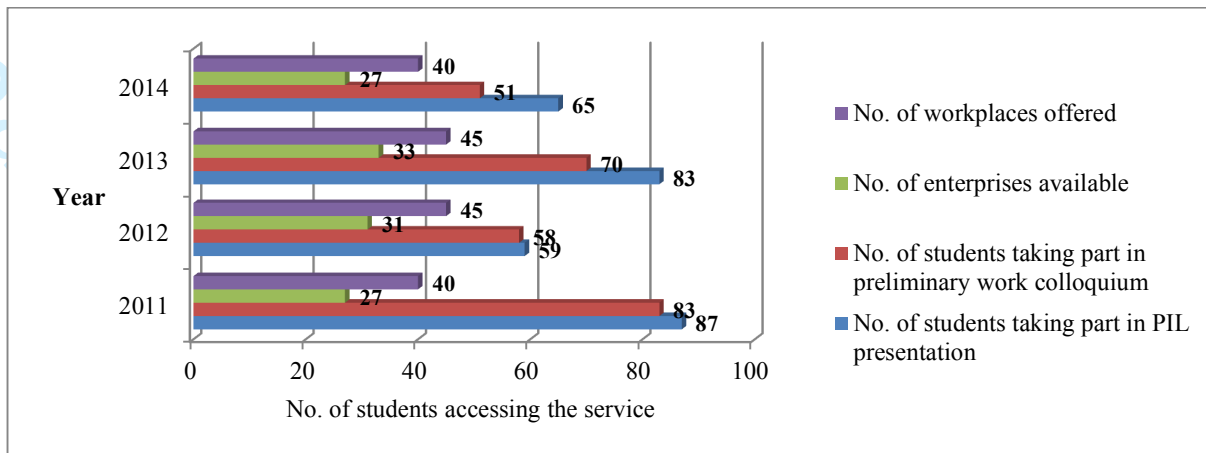Figure 6: Students' use of support services per year

Figure 7: PIL project: workplace, enterprises, and number of students taking part in preliminary colloquium and in PIL presentation per year

Tables

Table 1: Case study' sources

Interviews	Period of examination	Site	Time
Old Delegate of the Rector for Sustainable Development Planning	May, 2013	Interviewee's office	40' minutes
New Delegate of the Rector for SD Planning	March, 2015	Interviewee's office	20' minutes
Professor of Accounting	February 2013, and May, 2015	Interviewee's office	1 hour and 30 minutes
Member of University's Sustainability Committee	May, 2013	Interviewee's office	20' minutes
President of Equal Opportunity Committee	May, 2016	Interviewee's office	40' minutes
Head of the Training Programs' Planning	February, 2015	Interviewee's office	1 hour and 20' minutes
Head of Health and Safety Office	March, 2015	Researchers' office	20' minutes
Head of the Procurement Office	March, 2015	Interviewee's office	15' minutes
Focus group 1	Period of examination	Site	Time
Head of Technical Office	March, 2015	Interviewees' office	1 hour
3 Employees of Technical Office (resource consumption)			
Focus group 2	Period of examination	Site	Time
Head of Planning and Control office	October, 2014	Interviewees' office	40' minutes
2 employees of the Planning and Control Office			
Direct observation	Period of examination	Site	Time
Delegate of the Rector for SD Planning' presentation on action taken for university facilities' SD (Conference cycle of Routes	May, 2016	University's Institute for Higher Studies	40' minutes

Towards Sustainability's Network)			
University's presentation to Higher Education schools (Seminars on Sustainability Patents' developed by the university, 2015)	September, 2016	University's Department of Law	60' minutes
University researchers' night	September, 2014	Within city's context	1 day
Others (archival data and website)	***Period of examination***		
University's social report	Editions from 2006 to 2015 examined from year January, 2014 to December, 2016		
University' SD website	From May, 2013 to May, 2015		
University's Resolutions on the introduction of SD strategy and governance	May, 2013		
University's Declaration of Commitment on SD	May, 2013		
University's SD Plan 2015	May, 2015		

Table 2: The sustainability assessment framework for University Beta

Category	Variables	Key Performance Indicators
Education	Single courses	N° courses with specific reference to sustainability(ad hoc) and trends over years N of compulsory courses/total amount of sustainable specific courses
	Undergraduate programs	N of undergraduate programs on SD/total undergraduate programs, focusing on the description of the training as well as on the name of the program
	Doctoral programs and academic learning	N of doctoral programs on SD/total undergraduate programs, focusing on the description of the training as well as on the name of the program N of workshops (or conferences) offered on SD per year
	Outward education	N of training programs embedding sustainability opened to community
	Educational outcomes	N of students graduated in SD programs/total graduated students (even by department)
Research	Research staff	N of internal research contracts to the university for SD projects per year
	Structures	N of departments engaged in SD research/total number of departments
	Projects	N of national/international projects on SD
	Publications	N of publications on SD per year
	Funds	% of funds assigned by the university for SD research and trend over time
	Funds	% of funds received by the Ministry of University and Scientific Research (MIUR)/EU on SD projects and trend over time
Operations	Energy consumption	Energy consumption reduction (Energy consumption for the year × total square feet)–(energy consumption for the year x-1/total square feet)
	Renewable energy	Amount of renewable energy generated (or acquired)/total energy consumption + trends of the past year
	Energy management	Presence of light sensors/LED lighting For e.g.: % of square meters using LED Energy savings due to energy consumption reduction Energy savings by wireless technologies (for e.g. VOIP)
	Water consumption	Water consumption for the year and trend over time
	Water management	Presence of a program for water management (e.g. toilet and lavabo flushes to save water) Savings for water consumption reduction

	Waste generation	Kg of waste generated and trend over time
	Waste diversion from landfill/incinerator	Weight of materials recycled or recovered/total waste generated and trend over year
	Electronic waste recycling	Weight of electronic waste recycled/total waste produced and trend over time
	Hazardous waste	Weight of hazardous waste produced/total waste produced and trend over time
	Limiting printings/materials online	Programs to reduce paper Type of processes dematerialized over years
	Green purchasing	Presence of contractual provisions including "green criteria"
	Food purchasing	Presence of contractual provisions for km zero food; % of expenditures for Km zero food on total expenditures
	Transport	N students taking the bike or walk/total N employees taking the bike or walk/total Car sharing/bike sharing program % of students/employees participating in the municipalities system of bike sharing or participating in a car sharing program launched by the university % of employees using public transport, % of discount for employees using public transport provided by the university
	Building design and construction	Number of new buildings with Leadership in Energy and Environmental Design certification/total new buildings Type of certification acquired and total square meters certified
	Climate	Presence of a program of inventory of CO_2 emissions
Commitment to stakeholders	Community engagement	N of partnerships (with firms, public entities and associations) on sustainable projects/total partnerships developed in a year N of students engaged in institutions and organized community services (e.g. volunteering) and its trend over years
	Universities engagement	Number and type of partnerships on sustainability initiatives with other universities and their trend over year N of universities participating in networks on SD and its trend over year
	Minorities and disadvantaged people, students' support	Presence of programs for handicapped people: Hours of counseling offered per year and trend over time N of enrolled students that accessed the service in the year and its trend over time Hours of orienting services done per year and trend over time N of students enrolled that accessed the service in the year and its trend over time Hours per year of tutoring services (training) offered and trend over time N of students that obtained tax reduction/total student asking per year and its trend over time N of students obtaining a room/total students requests for house per year and trend over time N of scholarships assigned per year and trend over time
	Staff	N of initiatives of telecommuting offered N of teleworkers and trend per year Presence of initiatives for women's inclusion
Strategy, structures and investments	Planning	Presence of a formalized sustainability program
	Structure	N of bodies involved in sustainability action planning N of meetings held per year on SD goals and periodicity
	Investments	Expenditures on sustainability initiatives/total expenditures and trend over years

Reviewer 1	Authors' Answer
Recommendation: Accept Comments: You have addressed my concerns and although I might not agree with everything you write i do think the paper is sufficiently developed to contribute to the literature. I think your paper now is up front about the exploratory nature of the work and this is helpful. there seems to me to be much more detail in this round, but that may simply be because it is better explained. I see the paper as empirically rich and theoretically informed if not well theorised. it is the rich empirics that for me make the paper a good contribution to the literature.	We wish to thank you very much for the suggestions and comments you provided to the paper during the whole process of review. Thanks for supporting the paper for publication in this journal!
Reviewer 2	**Authors' Answer**
Recommendation: Minor revision First the paper really needs to be written with a more traditional paper structure Introduction, Literature Review/Theory Development, Research Method, Case Description, Analysis/Discussion, Conclusions. At the moment to introduce case material before the method does not make any sense and reduces the ability to get some continuity in the explanation of the case.	Thanks a lot for precious comments you gave to the paper. We appreciated a lot and we tried to address your points in order to improve paper's quality. We gave a more precise structure to the paper: papers' sections were retitled as introduction, literature review, methodology, results, discussion and conclusions. Moreover, the methodology section has been put before the discussion of the case to increase paper's comprehensiveness. Please note that in the results section, as a thematic analysis was conducted to analyze the case study, we inserted sub-sections indicating the main topics we wanted to discuss: the sustainability project at University Beta: the starting point (section 4.1); operationalizing sustainability: 2010-2014 (section 4.2); the need for assessment: developing a sustainability assessment framework for University Beta (section 4.3); the adoption of the SPMS: main results on monitoring activities (section 4.4). This is also coherent with the historical timeline of the introduction of sustainability management and assessment in the university under study. We hope that these modifications will help to increase the paper's readability.

Second, the Method section needs further explication. A Table in back of the paper the outlines who was interviewed, how long, when, etc. and a clear explication of how many interviews were conducted is needed. Furthermore a Table with the other data sources would be helpful. A Table with times, dates, length of time etc. for observational data would be helpful. Then a clear explanation of how the analysis was done within data sources and between data sources.	Methodology section was re-written to consider the points you addressed. At first, based on the literature, we defined the preliminary themes we wanted to investigate and wrote as follows: "The study was an attempt to discuss the process of adoption of a new sustainability performance measurement framework in an Italian university. Thus, authors defined a set of preliminary themes to deepen by the case-study's analysis; first, the paper aimed at discussing how the SPMS was introduced thanks to a participative approach and perceived by the members of the organization during its process of implementation; second, the paper aimed also to explore the relation among the adopted SPM and the shift of the organization to sustainability systemic thinking. More in depth, benefits and limitations of SPMS' adoption were discussed focusing on: a) results achieved in predetermined sustainability related performance areas especially considering outcome indicators, b) the planning process. To this end, authors discussed how SPMS was useful to support sustainability decision-making within the university. The authors of the paper supported the operationalization of the designed framework in order to verify the commitment to sustainability over the timeline 2011–2014, in line with Ball et al. (2014). The case study is an exploratory one (Benbasat et al., 1987; Scapens, 2004), and it is discussed through the analysis of the content of planning and reporting documents, university's official website, interviews collected and the researchers' participation to specific focus groups. The complete list of sources used for case study's analysis is represented in table 1." Subsequently, as suggested, we inserted table 1 to provide details for the use of sources. Please find it attached in the Tables' file. In order to better explain the use of sources for data collection, we wrote as follows: "Eight interviews were taken with staff involved in the implementation of the new SPM systems; among the interviewees, both the previous and the current Delegates of the Rector for Sustainability Planning, the Head of Health and Safety Office, the Head of the Training Programs' Planning, the Head of the Procurement Office, one member of the University's sustainability Committee, the President of Equal Opportunity Committee, the Professor of

Accounting proposing the introduction of the SD performance measurement system. Interviews' total duration was of about 325 minutes. Each interview was taken mainly at the interviewees' workplace. The protocol of interviews looked at investigating the birth of the SD project within the university, the main projects undertaken in the field of SD, the motivations to introduce a SPMS, the construction of the tool and data collection process; moreover, interviewees' perceptions on criticalities and benefits related to the introduction of the appraisal tool were deepened. Interviews were recorded and transcribed, previous permission of the interviewees. Personal diaries were useful to record changes over time. Other university's offices, such as the Right to Study and Disability Office, although not directly involved in the interview process, participated to the gathering and elaboration of data on SPMS. In addition, two focus groups were conducted to enrich case study's results: the first one was conducted with the Head of the Technical Services and three of its employees working in the technical area (consumption management and servicing), while the second was conducted with the Head of the Planning and Control Office and two of its employees, for a total duration of 1 hour and 40 minutes. Direct observation included participation to conferences organized by the University, and open to the public, in which the results achieved with reference to university's sustainability were presented (e.g. the Researchers' Night, Seminars' cycles organized by the Institute for Higher Studies of the University and open to high schools and local community). While other sources considered, included University's resolution on sustainability programming and strategic plans, University's formal declarations of commitment, social reports, archival documents related to implemented sustainability projects, web site's disclosure. Then, the multiple sources were used for triangulation coherently with case study's methodology that requires within and cross cases analysis to identify themes to be discussed, to construct theory comparing results from cases and supporting/contrasting results with relevant literature (Eisenhardt, 1989). The collection of data for the case study's analysis took a period of approximately 3 years, and involved a coding process that allowed to identify common patterns to discuss. With reference to the construction and application of the university' SPMS the coding process was facilitated by the presence of Arroyo'

framework (2015) that calls researchers to investigate reflecting, monitoring and planning role of SPMS[1]."

In the methodology section, we also specified that within and cross-cases analysis were made considering different sources, and added Eisenhardt (1989) and Eisenhardt and Graebner, M. E. (2007)' studies as leading references for methodology (references added to the paper). Cross cases analysis is in this occasion useful to reach saturation and triangulate among different sources' results. The coding process, for what concerned the development of the assessment framework, was supported by literature: in facts, the paper of Arroyo (2015) furnishes specific categories to study the design and application of performance measurement tools; as well as monitoring phase that classifies results considering education, research, community outreach and operations. In other cases, we started with the preliminary list of topics to be deepen by interviews and we refined the themes progressing with the coding process.

In the results' section, we introduce a refinement of themes that were first identified in the methodology section, in order to orient the discussion of results; in the section, we added as follows: "Major themes that were detected, starting from the preliminary list and progressing with the coding process were: the introduction of the sustainability project within the university, the operationalization of sustainable development during the years 2010-2014, the development of the sustainability assessment tool, and its application in order to track university's performance considering benefits and limits connected to its use. With reference to university' sustainability project, the authors identified other aspects to be deepened in the discussion process and mainly referring to: "SD championing" and "university governance' support". For the operationalization of SD, they identified "university's vision and policy on SD", "the translation of SD vision in effective goals (projects)", "criticalities about SD projects' implementation". For the development of the sustainability assessment tool, authors considered the "process of construction", "indicators' role to track performance" and "data collection" as the main issues to discuss. Finally, for what concerned the

	application of the framework, the issue "monitoring of results" was investigated looking at different university's activities: education, research, operations, community engagement and strategy, structures and investments. The above cited topics are discussed in details in next sub-sections especially focusing on stakeholders' contribution to the process of operationalization of SD and sustainability performance measurement system's construction within the university." The study of Ball et al. (2014) has been also added to support the presence of the researchers in supporting the application of the framework.
A more challenging point – but you are closer to solving this now you have a better literature focus - it is still not clear to me what the theoretical motivation for the paper is and how it provides a theoretical contribution. I think it is an interesting description of sustainability performance measurement in an Italian university but what does this actually tell us that is new theoretically? Just looking at SPMS in a university or in an Italian university is not enough. There needs to be something different about this setting that enlightens us in relation to the practice of accounting and in particular the practice of sustainability performance measurement. There is a considerable literature on PMS and a lot of sustainability PMS or environmental PMS – we need a clearer explication of the key findings from this literature and what your tell us that is new in relation to this. As out outlined in my last review (and I can see you have started to explore the point) you have a unique organisational setting with the role of universities being a producer of knowledge, disseminator of knowledge and managing its own operating activities. Most organisations would only be dealing with the last point – this makes in an interesting case to examine implementing sustainability strategy in. What makes SMPS interesting the very different activity sets that need to be addressed in this setting – however you need to be able to use this and speak back to what we know more generally about these issues. A paper I find helpful when thinking about theoretical contribution is Whetten (1989) 'What	Thank you very much for this precious comment, we try to respond to the challenge you posed. First, we refined the literature review in order to clarify the problems that we detected about currents practices of SPM within universities. Indeed, it emerges from the literature, that such tools often stops with measurement of operations impacts, leaving social sustainability under-investigated (as a matter of example, how the university is able to provide actions for the less represented gender, or to support disadvantaged students). Moreover, performance measurement tools that are used for sustainability assessment did not consider outcome indicators, that are needed to measure the contribution of the university to the society's shift towards sustainability. Third, the majority of these tools are not constructed considering stakeholders; this impedes the organization to share values of sustainability , to nurture a sustainability culture and to take a whole-of-institution approach that are essential to the shift toward SD. We discussed these limits in the paper introducing new references, both in the introduction and literature review sections. In the introduction section (line 9), we wrote: "As a consequence, sustainability performance measurement (SPM) within these organization has been mainly used to track the progress on their operations (Godemann et al, 2014; Yarime and Tanaka, 2012) and governance (Yarime and Tanaka, 2012), while aspects of social responsibility where scarcely addressed in accounting for SD (Godemann et al, 2014)".

constitutes a theoretical contribution'.
Best wishes with the paper

In literature review section, line 33, we wrote: "A part from these attempts, it is opinion of the authors of the present paper that in higher education institutions, SPMS should be designed considering the role universities play for society's transition towards SD. Universities' knowledge generation can help to understand current unsustainability problems and avoid or solve them (Godemann et al., 2014). In addition, universities have major responsibilities in educating students to apply SD knowledge to decision-making and behaviors (Godemann et al., 2014). Current SPMS adopted by universities seems to have forgotten these HEIs' peculiarities and the adopted performance appraisal techniques are often based on the use of environmental management systems that track the progress on university operations' impact; on the contrary, issues such as diversity performance or educational equity, although part of their social mission, have been traditionally under-looked bringing to a scarce development of SD accounting and accountability practices within universities (Godemann et al. 2014). Although HEIs are providers of public services delivered to the community (Ball et al., 2014), cases-study on sustainability assessment practices in these organizations have scarcely discussed the involvement of different stakeholders in sustainability decision-making (Godemann et al., 2014). The majority of sustainability initiatives undertaken by universities are not generally starting from senior management, while leadership and a whole-of-institution approach are essential to propel the shift toward SD (Adams, 2013). Moreover, SD requires integration across different functional areas, (such as technical services and academics), and a collaborative approach to sustain the change (Adams, 2013) overcoming traditional disciplines' divide (Disterheft et al., 2013). In this sense, to study stakeholders' involvement process in order to look at how it shapes organizations' transition to SD is highly recommended by scholars, given the limited literature in the field (Godemann et al., 2014)."

As you suggested, we consider the study of Whitten, about paper's contribution. The refinement of the literature provided us the occasion to be more specific with the contributions of the work.
At line 50, of introduction's section we wrote: "Based on the above premise, the contributions of

the paper are multiple. First, it discusses how the university under analysis shifted from a logic of single projects implementation, based on the Triple Bottom Line by Elkington (1999), to a systemic-thinking involving stakeholders (although mainly internal ones) in the design and application of a SPMS to support monitoring and planning phases of SD within the organization. This is in line with scholars urging for the adoption of the participatory approach to construct sustainability assessment practices that can facilitate higher education institutions' effective shift towards sustainability (Godemann et al., 2014; Disterheft et al., 2015). Second, the paper discusses a case study about a university that overcome the traditional focus on management of operations' environmental impact, extending the SD appraisal to social responsibility (such as educational equality and diversity performance), and introducing outcome indicators of applied research for sustainability, as called by scholars (Yarime and Tanaka, 2012; Disterheft et al., 2013; Adams, 2013; Godemann et al., 2014); indeed, they urge to unlock the potential of universities in the transition of the society towards SD. The implementation of the SPMS and how it accorded with universities' traditional information systems was also examined underlying benefit and criticalities related to the process of change".

Moreover, in the literature review section, at line 75, we also added: "For what concerns the second point, literature also urges to consider the connection of SD performance appraisal with strategy (Adams, 2013). Given the above-cited calls made by scholars, the paper aims a) at investigating the role different stakeholders had for sustainability management within the university under-study (Godemann et al., 2014) from operationalization of SD to construction of the SPMS driving strategy, b) to provide evidence of the use of a performance appraisal framework that started to include outcome indicators in line with the role universities should play to promote society' shift towards sustainability (Godemann et al., 2014; Disterheft et al., 2013;Yarime and Tanaka, 2012)."

Please note that Yarime and Tanaka, 2012; Disterheft et al., 2013; Adams, 2013; Godemann et al., 2014; Disterheft et al., 2015, were new reference included in the bibliography.
These references were also used to improve discussion of results.

	Finally, as you required us to reconsider the contributions of the work, it was necessary to re-elaborate the abstract and the conclusions' section to be clearer on the implication of the study. Please consider the new abstract and the new conclusions' section in the paper. Other corrections: a list of abbreviations has been added for clarity. The old Table 2 (about strengths and weaknesses of STARS and SUSTAINABILITI ASSESSMENT QUESTIONNAIRE) was deleted as it was redundant.