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KEY FEATURES OF SUSTAINABLE UNIVERSITIES: A LITERATURE REVIEW

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ABSTRACT

The concept of sustainable development has a broad nature. Despite this, the question of the sustainable organisation has a gap for deeper analysis. Assuming that universities are seen as a specific type of organization, this makes such analysis even narrower. The surrounding social and economic environment on the one hand and the management and performance of the university on the other – both are essential for the university while reaching sustainability. Therefore, the purpose of this article is to identify the key features of the sustainable university.

In order to answer this research question, the analysis was based on reviewing the findings of scientific papers published during the last decade in the database Thompson Reuters Web of Science. In total, 66 research papers were included in the analysis. Three main themes were identified after the literature review analysis: (1) Management tools for universities' change and development, (2) From green campuses and environmental footprint to university capacity building, (3) Content, curricula and education for sustainable development. Altogether they represent different approaches to this topic. The analysis revealed that sustainable development of universities is determined by its internal factors in relationship to the surrounding environment. The university's ability to develop sustainably mostly depends on the exposure to surrounding conditions.

The article provides a comprehensive framework for the sustainable university. Obviously, there is a need for more detailed analysis in order to identify the key features of sustainable universities as a specific type of organisation.

Keywords: Sustainable development, universities, literature review.
JEL classification: I23; L2; M00; M21

INTRODUCTION

The concept of sustainable development is not new. Moreover, it evolved during the second half of the 20th century. It also has a broad nature in the sense that the current needs of humankind are satisfied through the rational use of natural resources in order to preserve the earth for future generations. The report "Our Common Future", issued in 1987 (Brundtland, 1987), added social and economic dimensions to the already existing environmental dimension of sustainable development. It also can be considered as a starting point for an increased strategic point of view regarding sustainable development (Siva et al. 2016: 148–157). At the Earth Summit in Rio de Janeiro in 1992, sustainable development was established as a key long-term social development ideology. The declaration was adopted laying down the basic principles of sustainable development. Later on, the ideas of sustainable development were disseminated worldwide. In recent decades the concept of sustainable development has become one of the key drivers for countries in developing their national sustainable development strategies. Here are several examples of national strategies on sustainable development of the Baltic Sea countries (information source: http://www.sd-network.eu/?k=country%20profiles (2017.05.20)):

Estonia – the Sustainable Development Strategy of Estonia was approved in 2005. The Strategy covers three dimensions of sustainable development, plus the sustainability of Estonian culture.

Lithuania – the National Sustainable Development Strategy of Lithuania adopted in
2009 (updated in 2011), with concrete bodies responsible for its implementation. The list of sustainable development indicators is also supplemented.

Latvia – the Sustainable Development Strategy of Latvia was adopted in 2010. The strategy has become the core long-term strategic planning document (until 2030) and includes long-term priorities, respective goals and action lines. The medium-term National Development Plan for 2014-2020 and sectoral policy planning documents contribute to the implementation of the Strategy.

All European countries have their strategies for sustainable development with the mechanisms of vertical as well as horizontal integration, supplemented by the evaluation (review) and monitoring (indicators) practices. In 2015 the United Nations proclaimed 17 sustainable development goals as a new sustainable development agenda to be reached in the future.

In light of the sustainable development concept, higher education is one of the sectors where this concept is broadly implemented and analysed. Conditions influencing the activities of universities have changed rapidly, especially during the last few decades. They determine the increase of competition among universities as well as difficulties in becoming exceptional through discovery or pursuit of a unique direction. Under such conditions it is challenging to resist the struggle with the consequences of the present conditions (short-term focus) and maintain the basic direction of activities leading to sustainable organizational development (long-term focus). It should also be taken into consideration that universities are different from other corporations in that they are dedicated to educating future leaders, decision-makers and intellectuals (Amaral et al. 2015: 155–172).

In the current decade, new initiatives have influenced the higher education sector and universities. The Bologna Process provided a number of policies for European Higher Education Area signatory countries to implement in order to strengthen the level of higher education in Europe and make it more competitive worldwide.

Currently, a new sphere, the so-called "third mission" of universities, has been forming beside the main activity spheres (studies and research) of universities. It includes knowledge management, cooperation between different sectors of the economy and society, and pursuing a new role for knowledge and higher education in the changing world. In this way universities' missions have expanded over the frontiers of studies and research, incorporating service for society, which requires mutual cooperation and partnership (Maric, 2013). Acceptance of the third mission does not self-sustain institutional development, but it offers new potential (Nelles and Vorley, 2010).

Searching for ways to become exceptional and attract more students, universities create and provide new study programmes, look for contacts and cooperation with business and employees, and track their graduates' careers. They also care about the techniques of marketing or participation in national and international

rankings of higher education. Some authors highlight the rankings as policy and managerial tools (Agasisti and Johnes, 2015), while others note that despite active participation in different rankings, it is still unclear what the relationship between reputation and quality of HEIs is (Ramirez and Berger, 2014).

Although the sustainable development concept has existed for a long time, the question "What does sustainability mean to universities as a very specific type of institution (organization)?" still seems to be relevant today. In order to address this topic, an analysis was performed of research articles issued during the last 10 years and included in the most prestigious scientific database Thompson Reuters Web of Science. The research articles address a very broad range of topics such as implementation of sustainable development, engagement and participation of stakeholders, university campus and environmental operations, sustainability reporting and assessment, organisational change management, and curriculum development. Nevertheless, this sort of investigation fills the research gap by indicating the range of issues related to sustainable development universities are facing and dealing with currently. This analysis is also intended to identify new possible research gaps regarding universities' performance in terms of sustainable development.

METHOD

This section is composed of two parts. Firstly, the article selection process is described. Secondly, the coding of selected articles and generation of themes is elaborated.

Selection of articles

Among the large number of existing research databases worldwide, the Thompson Reuters Web of Science is one of the most prestigious bibliographic citation information databases covering all fields of science; there are publication author and journal citation indices and the possibility to create citation reports and comparisons. This type of publication is becoming an obligatory requirement for Ph.D. students as well as for tenure-track professors at most universities in Lithuania. At the same time, the author recognizes that the option to choose only one database can be treated as a research limitation.

The article search in Web of Science was performed in March 2017. Several search paths with the following key words were used in the subject fields: [(sustainable development) AND (universities)], [(sustainable university)] and [(sustainable organization)]. The timespan for the search was 2016 to 2006. In total 59 research articles were selected based on abstracts. After this stage of the relevant article search, a scan of abstracts was performed and after this round of review, 31 articles were considered as relevant for further research. The selected papers were published in the following journals: Journal of Cleaner Production (11), International Journal of Sustainability in Higher Education (5), Sustainability (3), Environmental Education Research (2) and others.

After the selection of articles based on their review, it was found that some of them contained other possibly related references. 18 additional articles were selected based on their abstracts for further review. During the snowballing review, 4 articles were considered as relevant for further research. At this point, the first stage of research was completed with 35 articles selected for deeper analysis to identify what the scientific trend for the sustainable development concept has been during the last decade. Figure 1 provides a visualization of the article selection process.

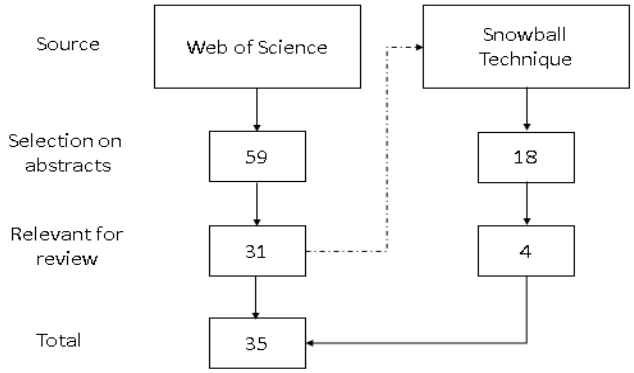

Figure 1. Article selection process
(Created by the author)

Coding of articles and generation of themes

After the primary selection of 35 articles, a review of keywords and article content was performed. The following were selected as coding criteria (Barratt et al. 2011: 329–342): publication year, type of article, conclusion/synopsis/contribution, data collection method, methodology, outcome and focus on at least one of three bottom lines (environmental, economic and social). According to these criteria, the selected articles were assigned to one of the generated themes.

RESEARCH FINDINGS

Three main themes were identified after reviewing the keywords and content of the selected articles (Table 1):

Table 1

Main keywords of selected articles for further content analysis
(Created by the author)

Keywords	
universities	campus greening
higher education institutions	campus operations
sustainable university	institutional transformation
sustainable development	corporate sustainability
sustainability model	education for sustainable development
organizational sustainability	sustainability assessment and reporting
sustainable management	implementation of sustainable development
sustainable development integration	organizational change management

Below there is a more detailed explanation of the themes investigated.

Theme I – Management tools for universities' changes and development

The analysis of selected articles disclosed that a number of articles provide suggestions for the future development of universities in terms of organizational changes, highlighting the element of strategic management.

A comprehensive managerial model for a sustainable university model was proposed by Velazquez et al. (2006) which covers all university composition spheres from strategic management (vision, mission, university-wide sustainability committee) to sectoral strategies that foster sustainability (education, research, outreach and partnership as well as sustainability on campus). In model development phases the importance of networks and networking is highlighted. The structure of the sustainable university should also include: networking with other universities; sustainability audits to monitor, analyse and control the performance of sustainable initiatives; and obedience to the continuous improvement principle (Amaral et al. 2015: 155–172). Deming's PDCA cycle is seen as a managerial tool assuring the continuous improvement of models' implementation. This research was based on empirical data collected from about 80 higher education institutions from all over the world (Velazquez et al. 2006: 810–819).

The process and elements for a university in reaching sustainable development are presented in research by Lukman et al. (2007). The research of four universities in Slovenia discovered that they include sustainability issues in their curricula, but not at the forefront of other university activities. The proposed methodology comprises Deming's PDCA quality circle complemented with four steps: policy, operations, evaluation and optimization. Altogether they incorporate sustainability principles into university activities: management performance, education and research, operations for networking with and reporting to stakeholders (Lukman et al. 2007: 103–114).

Another study looked into institutional transformation in strategic and systematic ways. Following this, two sustainable university research and development projects from higher education institutions in Germany and Canada positioned themselves in a framework of responsibility and accountability (Beringer et al. 2008: 607–623).

With regard to integrating sustainability into the university's internal activities (curriculum, research, operations), another interesting case comes from the Technical University of Catalonia (UPC). The latest strategy of the UPC University Sustainable Plan 2015 has adopted a different focus, which was designed through a participatory approach, involving many internal and external stakeholders (Ferrer-Balas et al. 2009: 1075–1085). While developing the strategy for the university, the FLA approach composed of three interacting dimensions of change for achieving sustainable development – framework, level of transition and actors – was used. FLA analysis based on the need to balance and combine changes in the framework, level and actor dimensions disclosed the possible applicability of the 'FLA Analysis' method in analysing a systems transition strategy (Ferrer-Balas et al. 2009: 1075–1085).

There is a study providing the translation of education for sustainable development theory into practice by developing a process framework for including ESD in quality management systems in higher education based on continuous improvement and systematic thinking. The framework was developed in a network of 11 universities in the Nordic countries and it was based on the PDCA cycle (Holm et al. 2015: 164–174). The framework included planning, assessment, monitoring, and implementation of

education for sustainable development. The role and involvement of stakeholders were also highlighted.

The connection between education for sustainable development and quality assurance was disclosed by a survey at universities in China and the Nordic countries. Despite the fact that both regions are enhancing education for sustainable development, the main aspects of this concept in the Nordic countries were related to ecology, while in China, they were related to quality assurance. According to the survey in China, the respondents viewed quality assurance as sustainable development (Holm et al. 2015: 529–537).

A study analysing barriers for the integration of sustainable development at higher education institutions revealed the importance of human factors such as resistance, communication, empowerment and involvement, and organisational culture in organisational change management (Verhulst et al. 2015: 189–204). The case of sustainable development integration at KH Leuven was presented. The research showed two types of resistance that emerged: resistance related to financial and structural support and resistance related to empowerment and personal support.

Other studies contributed to the importance of academic staff in achieving university sustainability in terms of personal interest and motivation to be engaged in sustainable development (Cebrián et al. 2015: 79–86), while another study revealed that academics engaging in multi-stakeholder initiatives have much potential for making significant contributions toward advancing a university's organisational goals, such as performing high quality research addressed to "solve" sustainability-related problems (Dentoni et al. 2015: 68–78).

Amaral et al. (2015), in their paper "A quest for a sustainable university", presented a shift from environmental sustainability practices at universities (Green Building Initiatives) to management initiatives (Environmental Management Systems, ISO 14001) and to sustainability management systems which integrate environmental and social goals into the decision-making process. Universities, as a unique type of organization, need to address not only all three dimensions of sustainability (economic, environmental and social) but also the five dimensions of their organizational activity (education, research, operations, community outreach and reporting) (Amaral et al. 2015: 155–172).

The strategic management experience of the University of Johannesburg provided by Barnard et al. (2016) highlights the importance of innovation management at universities. It includes decisive leadership in strategic directions; regular, flexible and inclusive planning; regular culture climate surveys; constant monitoring of progress; and strategic agility, which is essential for promoting innovation among the entire workforce (Barnard et al. 2016: 208–227). Areas of innovation for universities include such fields as brand strategy, organizational culture transformation, fresh research focuses, technology transfer infrastructure and student experience.

A model for generating "trend-based scenarios" for universities has been proposed, based on a combination of various futures studies methods. The advancement of sustainability through societal collaboration and various functions such as education, research and outreach will increasingly constitute a core mission for universities (Beynaghi et al. 2016: 3464–3478). Through a qualitative trend analysis, the authors revealed three trends: "the development of higher education", "the development of sustainable

development" and "the advancement of sustainable development-higher education". They also discussed projecting possible future orientations based on these three scenarios for a socially oriented, environmentally oriented and economically oriented university. Policy measures for achieving each scenario were also provided.

Reporting about implementation of sustainability initiatives is a tool to inform multiple stakeholders as well as engage them in a university's life. Research on Lithuanian university websites has revealed that they provide a mainly static information presentation without the possibility of dialogue with stakeholders (Katiliute et al. 2015: 865–871).

To summarize, regarding management tools for universities' change and development, strategic and operational management elements remain important. Quality management approaches serve as a framework for integrating this concept into universities. Assessment, monitoring and reporting elements are necessary to assure continuous improvement of these developments.

Theme II – From green campuses and environmental footprint to university capacity building

The analysis of selected articles disclosed that a number of articles provide suggestions for universities in order to achieve green initiatives on their campuses, reduce their impact on the environment and strengthen their position as leading institutions in developing the city or region where they operate in a more green or sustainable way.

There is an article focusing on universities' waste management as directly related to the environmental and socio-economic dimensions of sustainable development. According to the study, conducted at Danish and Malaysian universities, it was expected that this would be achieved through new study curricula on problem-oriented and project-based learning with necessary faculty training. (Agamuthu et al. 2007: 241–246).

Another study conducted with the participation of facilities management directors of Canadian universities revealed that despite the fact that sustainable development and sustainable universities do not always constitute a clear idea, the respondents often commented on resource use and waste reduction at universities. The main barriers of sustainability initiatives at the universities were found to be financial and resource-based and resistance to change (Wright et al. 2012: 118–125).

Another interesting case comes from Malaysia and concerns energy waste at universities, proposing a theoretical framework of critical success factors (CSFs) to implement energy management towards university sustainability by using the Talloires Declaration 10-point action plan as KPIs. Five clusters consisting of 23 CSFs cover these elements: top management support, a comprehensive energy management team, stakeholders' involvement, awareness, and risk management (Saleh et al. 2015: 503–510). This study was complemented by another study of CSF for participatory approaches in campus sustainability initiatives. The findings offered empirical evidence for some of the characteristics related to stakeholder engagement and associate higher education for sustainable development with empowerment and capacity building, shifting away from a previous focus on environmental sustainability. The authors used a combination of Delphi-method, semi-structured interviews and focus groups with participants from twenty countries in order to identify critical success factors of participatory approaches in sustainability assessment (Ramos et al. 2015: 3–10). The success of participatory

approaches was interdependent with structural institutional conditions and the persons engaged, highlighting the importance of specific skills and participatory competencies. A better integration of the dimensions of participation into sustainability assessment practices could help in defining and establishing participatory approaches on an institutional level and fostering a culture of participation in the transition to sustainable universities (Disterheft et al. 2015: 11–21).

A framework using seven CSFs integrating quality and sustainability into universities identified the employability of students and the quality of academic staff and facilities (dos Santos Martins et al. 2012).

The methodology proposed by Lukman focusing on the Deming Cycle was used again in 2015 while evaluating universities in Italy. The research revealed that sustainability results are linked to the use of resources and the reduction of environmental impact. Recent institutional changes have emphasized the role of society and public and private organizations as the main stakeholders in universities (Vagnoni et al. 2015: 217–236).

The necessity of establishing mutual beneficial relationships between universities and their urban areas according to the university-city complex model is illustrated by a case from Vietnam with the idea of building an intelligent and ecologically friendly city (Ngo et al. 2016: 92–99).

A study by Sonetti et al. (2016) describes the current use of the Campus Sustainability method (CSAs) at universities, proposing a new approach that encompasses clusters of homogeneous campus typologies for meaningful comparisons and university rankings. The article introduces the need for indicators, beyond measuring pure energy efficiency, which are attentive to local and societal constraints and provide long-term tracking of outcomes (Sonetti et al. 2016: 1–23).

It follows therefore that the theme of the environmental aspect of sustainable development in university life has progressed from an understanding of "green campuses" – covering waste management, recycling, and saving natural resources – to the next level, comprising implementation of these ideas into study programmes, study subjects, curricula and teaching methods.

Theme III – Content, curricula and education for sustainable development

Education for Sustainable Development (ESD) is another large topic, encompassing policymakers' and universities' initiatives to adapt the content of studies and curricula to sustainable development. It should be emphasized that ESD is transformative education rather than traditional education (Lu et al. 2013: 48–62). A number of the reviewed articles correspond to this topic.

A study on China by Niu et al. (2010) revealed that the main barriers to the balance and promotion of ESD in higher education are identified by focusing on regional differences in this vast developing nation and the need for broader educational approaches across academic disciplines. As a result, teaching about sustainable development has been integrated into technical fields, especially at universities in major cities, and research has been undertaken to develop economically effective and environmentally friendly innovations. Almost 50 percent of universities in China have launched general courses linked to sustainable development, and almost all universities have begun to address the need for curriculum reorientation in line with ESD (Niu et al. 2010: 153–162). During the

last decade, other studies were performed in China regarding ESD. The article provides the cases of two universities in China that comprised both the formal curriculum and the informal curriculum (campus greening and extracurricular activities) (Lu et al. 2013: 48–62):

- Pedagogic changes are required to realize transformative education. Integration of more active learning into the curriculum is needed.
- A project-oriented approach could be employed to enhance interdisciplinary cooperation.
- Engagement of students is possible through linking extracurricular activities back to the curriculum and offering opportunities for students to take part in campus operations.

That the model of integration of extracurricular activities with internal environmental factors influences students' involvement in such activities, the university's attractiveness to them, their academic performance and their integration – this was also revealed by Dumitrascu et al. (2015) (Dumitrascu et al. 2015: 1483–1502).

In addition, a very interesting case was implemented in France, where the authors found that with the integration of sustainable development into programmes, there was a decrease in disciplinary knowledge to focus on the acquisition of principles of governance related to sustainable development and project management (Barthes et al. 2013: 269–281).

Problems of implementation and the need for support on the undergraduate and postgraduate levels have been discussed while exploring Japanese universities. The initial stage of ESG implementation at universities prioritized environmental sustainability. The main barriers to wider use of ESD are related to lack of internal consensus and staff entirely engaged in this topic, increased workload of staff, and limited financial resources. There is also a lack of effective linking of classes in the curriculum, difficulties in evaluating students' achievement in fieldwork, and a lack of systematized collaboration with local stakeholders (Kitamura et al. 2014: 207–225).

An example of the process of designing and delivering a new course on organisational change management for sustainability (OCMS) for an environment and business BA degree is provided by the University of Leeds, UK. The course was designed to educate students as sustainability change agents competent to deal with the complexities of sustainability and organisational change management. While developing this course, the main challenges were designing the course, linking it to the other degree courses in the curriculum, developing the form of assessment and teaching a new topic with limited academic literature (Lozano et al. 2015: 205–215).

The review of the articles that concentrate on this theme revealed the importance of rethinking the study content and curriculum itself in the process of integration; interdisciplinary, project-based activities involving students; and networking between higher education institutions seen as key drivers in developing a new generation with a deep understanding of the importance of this topic. Pedagogical competencies and involvement are also highlighted in making these integrations a reality.

KEY FEATURES OF THE SUSTAINABLE UNIVERSITY

In order to summarize the findings and to provide a full picture of key features of the sustainable university, the question regarding the relationship between sustainable development and a sustainable university needs to be discussed. Is a sustainable university an outcome of sustainable development or vice versa? To answer this question, it is necessary to come back to the complexity of the university's performance. Obviously, the university does not act alone and is surrounded by a range of factors (or acting bodies) determining its activities. Starting with national policy on higher education, which sets basic rules and requirements for universities from a legal perspective, we can shift to the large number of stakeholders (external as well as internal). Networking is another broad topic for universities, covering cooperation nationally and internationally, corresponding to the needs of stakeholders (mainly employers) and the labour market. Finally, accounting not only means direct accountability for state allowances or funding, but should also be seen as positioning itself in a national and international market for higher education (achievements, awards, rankings) and social status for alumni.

From the point of view of universities' performance complexity, the concept of sustainable development is seen as a beneficial driving force or an action plan for the university while developing its strategy and responding to everyday challenges in a timely manner.

Sustainable development is seen as a very strong tool for university strategic management. A number of models have been proposed as a way to develop universities' vision, mission, strategies and approaches. They are usually followed by assessment, monitoring, reporting techniques and a number of proposed indicators. Quite often the meaning of continuous improvement and quality management standards is based on constant monitoring of progress. We also can indicate the attempt of universities to integrate sustainable management into their activities and performance. This may happen due to the resistance to such change that was revealed in numerous studies. The success of the implementation of such strategies is possible "only when the top-down approach mixes with a bottom-up approach" (Lu et al. 2013: 48–62). According to a modern managerial paradigm, university administrative structures save the monitoring function and turn process control into result control. Higher education quality evaluation becomes the main aspect of result management (Dolinina et al. 2015).

The biggest changes were discovered in Theme II. It was found that a shift occurred in the understanding of sustainable development, from "green campuses" – covering waste management, recycling, and saving natural resources – to implementation of these ideas in study programmes, study subjects, curricula and teaching methods.

The section on education for sustainable development highlighted the need for interdisciplinary, experiential study programmes and transdisciplinary research. Student involvement and project-based activities are also very important. The main shift in this theme is that study programmes and curricula should educate the young generation in a new way, allowing them to become active change managers of society.

The key features of the sustainable university, based on the scientific article review, are summarized in Figure 2.

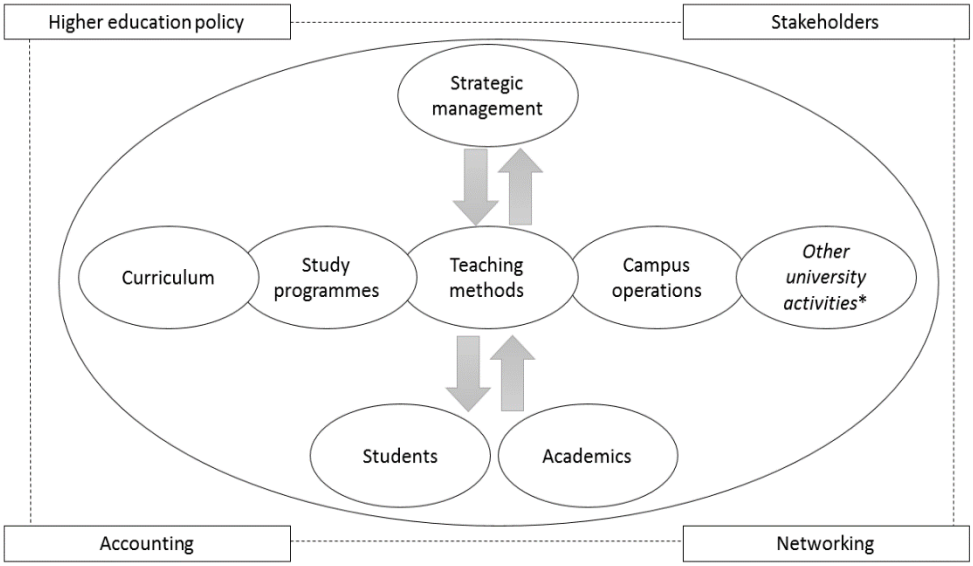

Figure 2. Key features of the sustainable university *(Created by the author)*

Figure 2 covers only the university activities or functions revealed from the research. In order to have a full picture of the university's activities, functions such as research and development, commercialization of research, universities' "third mission" and contribution to society should be combined. They are included under "other university activities" in Figure 2. Nevertheless, through a number of the elements in Figure 2, the main outcome is obvious. It is necessity for universities to ensure top-down and bottom-up approaches, to combine them through practical activities.

CONCLUSIONS

1. The analysis of theoretical and empirical research papers confirmed the relevance of the sustainable development concept in the context of higher education. Also, it should be noted that implementation of sustainable development at universities is a longitudinal process, and the barriers and obstacles are natural and inevitable. The concept remains broad in its meaning, but seems to be applicable when guiding universities and forming their role in important and sometimes contradictory tasks.
2. The concept of a sustainable university should cover all components of sustainable development: environmental protection, economic performance, and social cohesion (Lukman et al. 2007: 103–114). It is notable that during the last decade, the understanding and perception of the concept has become more complex, yet more integrated into universities' strategic decisions. It has been changing from a simple concern about the waste of resources and ineffective operation management as a primary level to a more strategic level, covering all activities of the university in relation to networking, stakeholders and society.
3. The sustainable development concept serves as a guiding instrument for universities when facing new challenges and dealing with requirements and expectations from a

network of stakeholders. Most importantly, this concept may be helpful for universities in striving for a competitive advantage as well as identifying and positioning themselves among other universities.

4. This approach allowed for the framing of sustainable development in university life, indicating internal and external influences. It also paved the way for further research by suggesting the necessity to explore the sustainable development concept. This could be performed while including a comparative analysis of certain cases, for example, diving into certain macroeconomic settings and investigating the role of universities in mature economies in comparison to developing economies. The abovementioned approach could provide a comparative, yet rich perception of sustainable development as well as evidence of its immense influence on the strategic management of universities with simultaneously tremendous effects on the macroeconomic progress of either the state or the region.

REFERENCES

1. Agamuthu, P., Hansen, J.A. (2007). Universities in capacity building in sustainable development: focus on solid waste management and technology, Waste Management and Research 25(3): 241–246. DOI: 10.1177/0734242X07079155.

2. Amaral, L.P., Martins, N., Gouveia, J.B. (2015). Quest for a sustainable university: a review, International Journal of Sustainability in Higher Education 16(2): 155–172. DOI: 10.1108/IJSHE-02-2013-0017.

3. Barnard, Z., Van der Merwe, D. (2016). Innovative management for organizational sustainability in higher education, International Journal of Sustainability in Higher Education 17(2): 208–227. DOI: 10.1108/IJSHE-08-2014-0120.

4. Barratt, M., Choi, T.Y., Li, M. (2011). Qualitative case studies in operations management: Trends, research outcomes, and future research implications, Journal of Operations Management 29(4): 329–342. DOI: 10.1016/j.jom.2010.06.002.

5. Barthes, A., Alpe, Y., Bader, B. (2013). Questions and positions on education for sustainable development at university in France: example of short professional cycles, Environmental Education Research 19(3): 269–281. DOI: 10.1080/13504622.2012.690854.

6. Beynaghi, A., Trencher, G., Moztarzadeh, F., Mozafari, M., Maknoon, R., Leal Filho, W. (2016). Future sustainability scenarios for universities: moving beyond the United Nations Decade of Education for Sustainable Development, Journal of Cleaner Production 112: 3464–3478. DOI: 10.1016/j.jclepro.2015.10.117 [Žiūrėta gegužės 22, 2017].

7. Beringer, A., Adomssent, M. (2008). Sustainable university research and development: inspecting sustainability in higher education research, Environmental Education Research 14(6): 607–623. DOI: 10.1080/13504620802464866.

8. Brundtland, G.H., (1987). Our Common Future. Oxford University Press, New York.

9. Cebrian, G., Grace, M., Humphris, D. 2015. Academic staff engagement in education for sustainable development, Journal of Cleaner Production 106: 79–86. DOI: 10.1016/j.jclepro.2014.12.010.

10. Dentoni, D., Bitzer, V. (2015). The role(s) of universities in dealing with global wicked problems through multi-stakeholder initiatives, Journal of Cleaner Production 106: 68–78.

DOI: 10.1016/j.jclepro.2014.09.050.

11. Disterheft, A., Caeiro, S., Azeiteiro, U.M., Filho, W.L. (2015). Sustainable universities - A study of critical success factors for participatory approaches, Journal of Cleaner Production 106: 11–21. DOI: 10.1016/j.jclepro.2014.01.030.

12. Dolinina, O. Lobacheva, G. (2015). The Components of the Sustainable Development of the Modern University. ICERI2015 Proceedings, 8th International Conference of Education, Research and Innovation Seville, Spain. 18-20 November, 2015. ISBN: 978-84-608-2657-6 / ISSN: 2340-1095

13. Dumitrascu, O., Ciudin, R. (2015). Modeling factors with influence on sustainable university management, Sustainability (Switzerland) 7(2): 1483–1502. DOI: 10.3390/su7021483.

14. Ferrer-Balas, D., Buckland, H., de Mingo, M. 2009. Explorations on the University's role in society for sustainable development through a systems transition approach. Case-study of the Technical University of Catalonia (UPC), Journal of Cleaner Production 17(12): 1075–1085. DOI: 10.1016/j.jclepro.2008.11.006.

15. Holm, T., Sammalisto, K., Grindsted, T.S., Vuorisalo, T. (2015). Process framework for identifying sustainability aspects in university curricula and integrating education for sustainable development, Journal of Cleaner Production 106: 164–174. DOI: 10.1016/j.jclepro.2015.04.059.

16. Holm, T., Sammalisto, K., Vuorisalo, T. (2015). Education for sustainable development and quality assurance in universities in China and the Nordic countries: A comparative study, Journal of Cleaner Production 107: 529–537. DOI: 10.1016/j.jclepro.2014.01.074.

17. Katiliute, E., Daunoriene, A. (2015). Dissemination Of Sustainable Development On Universities Websites, Procedia - Social and Behavioral Sciences 191: 865–871. DOI: 10.1016/j.sbspro.2015.04.337.

18. Kitamura, Y., Hoshii, N. (2014). Education for sustainable development at Universities in Japan, Emerging International Dimensions in East Asian Higher Education: 207–225. DOI: 10.1007/978-94-017-8822-9_11.

19. Lozano, R., Ceulemans, K., Scarff Seatter, C. (2015). Teaching organisational change management for sustainability: Designing and delivering a course at the University of Leeds to better prepare future sustainability change agents, Journal of Cleaner Production 106: 205–215. DOI: 10.1016/j.jclepro.2014.03.031.

20. Lu, S., Zhang, H. (2013). A comparative study of education for sustainable development in one British university and one Chinese university, International Journal of Sustainability in Higher Education 15(1): 48–62. DOI: 10.1108/IJSHE-11-2012-0098.

21. Lukman, R., Glavic, P. (2007). What are the key elements of a sustainable university?, Clean Technologies and Environmental Policy 9(2): 103–114. DOI: 10.1007/s10098-006-0070-7.

22. Nelles, J., Vorley, T. (2010). From policy to practice: engaging and embedding the third mission in contemporary universities, International Journal of Sociology and Social Policy 30(7/8): 341–353. DOI: 10.1108/01443331011060706.

23. Ngo, L.M., Trinh, T.A. (2016). A university-city complex, a model for sustainable development: A case study in Vietnam, Procedia Engineering 142: 92–99. DOI: 10.1016/j.proeng.2016.02.018.

24. Niu, D., Jiang, D., Li, F. (2010). Higher education for sustainable development in China, International Journal of Sustainability in Higher Education 11(2): 153–162. DOI: 10.1108/14676371011031874.

25. Ramos, T.B., Caeiro, S., van Hoof, B., Lozano, R., Huisingh, D., Ceulemans, K. (2015). Experiences from the implementation of sustainable development in higher education institutions: Environmental Management for Sustainable Universities, Journal of Cleaner Production 106: 3–10. DOI: https://doi.org/10.1016/j.jclepro.2015.05.110.

26. Saleh, A.A., Mohammed, A.H., Abdullah, M.N. (2015). Critical Success Factors for Sustainable University: A Framework from the Energy Management View, Procedia - Social and Behavioral Sciences 172: 503–510. DOI: 10.1016/j.sbspro.2015.01.392.

27. dos Santos Martins, H., Correia Loureiro, S.M., Castro Amorim, M.P. (2012). Critical Success Factors As Drivers To Quality and Sustainable in Higher Education Institutions, 5th Annual EuroMed Conference of the EuroMed Academy of Business (January 2011) Prieiga per internetą: http://www.academia.edu/download/30346091/EuroMed_eBook_5_Glion-Montreux_October_2012_Final.pdf#page=528.

28. Siva, V., Gremyr, I., Bergquist, B., Garvare, R., Zobel, T., Isaksson, R. (2016). The support of Quality Management to sustainable development: a literature review, Journal of Cleaner Production 138: 148–157. DOI: 10.1016/j.jclepro.2016.01.020.

29. Sonetti, G., Lombardi, P., Chelleri, L. (2016). True green and sustainable university campuses? Toward a clusters approach, Sustainability (Switzerland) 8(1): 1–23. DOI: 10.3390/su8010083.

30. Vagnoni, E., Cavicchi, C. 2015. An exploratory study of sustainable development at Italian universities, International Journal of Sustainability in Higher Education 16(2): 217–236. DOI: 10.1108/IJSHE-03-2013-0028.

31. Velazquez, L., Munguia, N., Platt, A., Taddei, J. (2006). Sustainable university: what can be the matter?, Journal of Cleaner Production 14(9–11): 810–819. DOI: 10.1016/j.jclepro.2005.12.008.

32. Verhulst, E., Lambrechts, W. (2015). Fostering the incorporation of sustainable development in higher education. Lessons learned from a change management perspective, Journal of Cleaner Production 106: 189–204. DOI: 10.1016/j.jclepro.2014.09.049.

33. Wright, T.S.A., Wilton, H. (2012). Facilities management directors' conceptualizations of sustainability in higher education, Journal of Cleaner Production 31: 118–125. DOI: 10.1016/j.jclepro.2012.02.030.