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Future Opportunities for Spatial Development of the University in Line with Contemporary City Concepts

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Abstract

The university as a knowledge-intensive space—also referred to as the brain of the city—is one of the key urban factors whose role is gradually being repositioned in the city and society during its social and urban transformation. New concepts of cities have entered professional discourses, and six categories were found to be conceptually distinct enough to be seen as supported by a specific body of theories. The research goal for this study is to define three of these—the sustainable city, smart city and resilient city—and the evolving university-city co-influencing relationship. The main methods used for this study are the analytical and descriptive methods, and the research materials are drawn from wide-ranging literature, such as books, research articles, published analyses, reports, urban plans, and other documents. We draw a conclusion that universities are

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vital urban actors in terms of sustainable, smart and resilient developments. Through two case studies, including University of Prishtina, dimensions of campus ecosystems critical to sustainability and resilience are highlighted, which should be a component of any comprehensive future spatial development of the university.

Keywords: *university, spatial development, sustainable city, smart city, resilient city*

Introduction

For the first time in human history, the urban population has surpassed the rural population worldwide, and the city is the ideal choice for a place to live. It is chosen for settlement over rural areas. As of 2008, more than 50% of the global population was living in cities, and this number is expected to rise to 68% by 2050 (UN/DESA, 2019). Rapid urbanization adds pressure to the resource base and increases demands for energy and water resources, sanitation and public services, education, and healthcare services. Climate change increases cities' vulnerabilities and puts further stress on the adaptive capacities of the poor cities in particular (United Nations, 2013).

People move from rural areas to urban areas with the hope of finding better job opportunities as well as a better standard of living. The city is an important node; it is the focal point of culture, education, politics, finance, industry, and communications. Although it is very productive, creative, and innovative, the city has also become a center of poverty and violence, pollution, and congestion. Even though city is considered an engine of growth, complex problems come with it. These complex problems directly threaten livability, wellbeing, and prosperity, which are also in direct conflict with the principles of sustainability.

During this time of urban and social transformation, important urban actors and resources are being activated. The university, as a knowledge-intense space—often referred to as the brain of the city—is one of the vital urban actors whose role is gradually being transformed in the city and society (Maurrasse, 2001). The university used to predominately be a sort of isolated cluster that hardly interacted with the surrounding urban environment and society in general. However, the relationship between the university and its host city has been transforming in recent decades in Europe, United States and beyond. The European Commission launched a discussion on the role of universities in its concept of a Europe of Knowledge, describing them as key instruments of regional development. In the United States also, regional engagement has long been a concern particularly for state-funded higher education institutions (Benneworth et al., 2010).

The spatial development of universities is one of the significant agents between the city and university. However, the active relation between the university and the city is a development trend that has not been sufficiently researched in the context of contemporary urban development. The role of universities, their effects, and their countereffects in contemporary cities are not yet defined. Present cities need to figure out new ways to deal with new challenges, activating key urban actors such as universities. When examining the relationship between the university and the city, one must also be aware of the contemporary forms of the city.

The research goal is to define the three characteristic concepts (sustainable, smart, and resilient) of city development and the university-city relationship through various parameters. The study explores the general criteria by examining the two case studies: the campus at Virginia Tech, highlighting dimensions critical to resilience, and the central

campus of University in Prishtina, also named Hasan Prishtina, highlighting dimensions critical to sustainability. The research materials are drawn from wide-ranging literature, such as books, research articles, published analyses, reports, urban plans, and other documents. The main methods used for this study are the analytical and descriptive methods.

Theoretical Background

Contemporary City Concepts

Reflecting contemporary city developments, many new categories of cities have entered various professional discourses. A comprehensive bibliometric analysis investigated how the 12 most frequent city categories are conceptualized individually and in relation to one another in the academic literature. The 12 city categories include sustainable, smart, resilient, green, digital, intelligent, information, knowledge, eco, low-carbon, livable, and ubiquitous cities. Regardless of some degree of overlap and cross-fertilization, of the 12 city categories, six were found distinctive enough to be seen as supported by a specific body of theories: the sustainable city, smart city, eco city, resilient city, knowledge city, and low-carbon city (De Martin et al., 2015). For this study, three of these six categories were chosen – the sustainable city, smart city, and resilient city – to resolve ambiguities in the definitions of their notions and the differences and similarities between these three terms.

The Sustainable City

The Brundtland Commission is credited for the present use of *sustainable development* as a policy term. The sustainable city is conceptualized as a place where a higher quality of life is

grasped in tandem with policies that effectively decrease the daily demand on indispensable resources (energy and materials) drawn from the city's hinterland; a city that becomes a more self-sufficient environmental, economic and social system (Lehmann, 2010). Sustainable development is described by means of a vision of development that includes respect for all life—both human and non-human—and natural resources, as it integrates the present concerns of society, such as poverty reduction and gender equality promotion, human rights and education for all, health and human security, and intercultural interchange (UNESCO, 2005).

It is important that, after the report by the World Commission on Environment and Development as the initial step toward a sustainable perception, many initiatives have evolved since. These are linked to sustainable issues, showing the increased attention of global institutions and the global community as our society is entering a new era of insecurity, where what were previously thought as limitless resources, such as energy, water, and food supply, have started to become crucial.

Sustainability tends to mean two different things in developing countries and developed countries. In developed countries, sustainability emphasizes the need to reduce material and energy throughput. However, in developing countries sustainability emphasizes raising daily living standards and lifting people up out of the condition of material need. There are tremendous economic and social differences between developed and developing countries. Many of the basic causes of these differences are rooted in the history of development of various nations, including social, cultural, and economic variables, geographical factors and international relations, and historical and political elements. Most present studies and research on sustainable cities are based on situations in the

developed countries. Developing countries are defined according to GNI per capita per year, at \$11,905 or less (World Bank, 2010). According to the UN, a developing country is a country with a fairly low standard of living, consisting of an undeveloped industrial base, and a moderate to low human development index (HDI). Human development index is a comparative measure of the factors of poverty and life expectancy, education and literacy.

The Smart City

The smart city is a relatively new notion that has become popular in scholarly literature and international policies in the past two decades. This city concept has been interpreted as a progressive successor to the previous city concepts as *information city*, *digital city*, and *intelligent city* (De Martin et al., 2015), although recent academic literature highlights that the smart city concept goes beyond the previous city concepts and is contextualized in social and physical schemes. The term *smart city* is not used in a single holistic way describing a city with certain characteristics, but it is rather used for various features that range from the smart city as an information technology (IT) district to a smart city in regards to the education of its citizens. Smart cities are not static; there is no absolute definition of a smart city. It is not an end point, but rather a process, by which cities become more livable and resilient, and able to respond faster to present and forthcoming challenges. *The smart city* concept brings together hard infrastructure, social capital, and technologies to support sustainable economic development. Disadvantages of the smart city concept have risen, such as extreme dependency on technology and on corporations dominating technology and related services, besides the still-unknown social and economic consequences of introducing

smart technologies into city buildings (Kunzmann, 2014). Additionally, a city can be defined as smart if investment in human and social capital, combined with investment in ordinary transport and up-to-date information and telecommunications infrastructure, leads to sustainable economic development. A smart city concept promotes smart management of natural resources (Caragliu et al., 2009). A smart city embodies innovative solutions facilitated by digital technologies that are able to create and sustain livable and vibrant infrastructure, and ecosystems for socio-economic benefits of communities, enterprises, and governments, effectively and efficiently (Barbar, 2016). A city that acts future-oriented in six characteristics: smart people and smart living, smart economy and smart mobility, smart environment and smart governance. Additionally, a smart city is based on the *smart* combination of equipment and actions of self-determined citizens (Giffinger & Gudrun, 2010).

The Resilient City

Resilience determines the ability of a city to grow as a center of human habitation, production, and cultural development, regardless of the challenges posed by climate change, population growth, and globalization. Urban resilience consists of the capacity of individuals and communities, institutions, businesses, and systems within a city to survive, adapt, and grow regardless of chronic stresses and shocks they may be faced with. City resilience increases when the city has more adaptive capacities, and it decreases when the city is more vulnerable. Vulnerability is defined as city's exposure to shocks in terms of frequency and magnitude (Barkham et al., 2013). Urban resilience is emerging as a critical aspect of sustainability, while cities worldwide continue to grow and

various threats keep increasing. Measuring urban resilience is a challenging issue, since resilience is not absolute. A city's resiliency can alter over time, and compared to another city. While some parts of a city might be more resilient, other parts of it can be highly vulnerable (Hoornweg, 2015). City resilience is defined as the ability of a city to evade or bounce back from an undesirable event that comes from the interplay of adaptive capacity and vulnerability. Some of the possible dimensions of vulnerability are: climate shocks and environmental degradation, shortages of resources, failed infrastructure, and community suffering due to inequality (Barkham et al., 2013). The resilient city illustrates various perspectives of resilience research: responding to environmental problems and dealing with disasters, coping with shocks in the development of urban and regional economies, and promoting resilience through urban governance and institutions (Leichenko, 2011). The *resilient city* is a fairly recent notion in architecture and urbanism research. It remains to be seen whether related keywords in the research will develop into essential components of city's conceptual identity.

The Evolving University-City Co-Influencing Relationship

The university has a long evolving history, starting from the cradle of medieval religious philosophy to a Renaissance nation-builder, to its recent role as a training ground for the world's managerial class and major leading industries. University needs to reposition its role in the city development, discover and define its new mission: to create diverse models of local and global innovation; to assist society in transforming to a new world of free of cars, energy-saving society; and to help

transform the city to be sustainable in general (M'Gonigle et al., 2006).

The university's institutional role in sustainable urban development is shown in spatial aspect through sustainable campus development being considered as a model of sustainable development type, and universities' leadership and guidance in promoting sustainable city development (Goddard & Vallance, 2013). Campus planners and city planners are increasingly joining their forces to accomplish mutual goals as campuses are also being shifted from places to study into places to meet, and gradually becoming vital and essential parts of their host cities. *Building community* and *creating a sense of place* are on the agendas on many university boards, despite *place-independent processes enabled* from smart technologies. In addition to opportunities, there are also threats within these synergies, where cities and campuses are cooperating increasingly, and campus management is becoming much more complex. As the cities have become more complex, they are influencing the campus in all its organizational and functional, technical, and financial aspects (Den Heijer, 2008).

This evolving relation between universities and cities shapes wider processes of urban and regional development. As the spatial relationship between the university and the city is shifting, universities and their host cities are growing into *knowledge cities*. They are being established and recognized as laboratories for a new *Denkkultur* (thinking culture). The goal of this mutual evolution is to create an environment that can best nurture the dynamic synergies considered necessary to create sustainable centers of knowledge and learning, and innovation incubators (Hoeger & Christiaanse, 2007).

The relationship between the university and the city is a longstanding matter of mutual concern, also defined as the town-gown relation. This town-gown relation consists of the

physical fabric of the university, students, faculty, and host communities. The university affects the city by shaping urban morphology and ultimately promoting urban competitiveness. The university's spatial development influences and is also influenced by host city urban transformation (Liu, 2013).

Communities and higher-education institutions can develop compatible development missions. Various strategies have been used to revitalize local neighborhoods while simultaneously achieving aspects of their institutions' mission. Universities aim for win-win collaboration, in which their mission is also accomplished through partnering with local communities (Perry & Wiewel, 2015).

The importance of universities in today's complex societies is clearly stated by Goddard (2009), who raises provocative questions regarding the role of universities: In the context of the territorial development of a country and development of the city, what are universities for? The notions of the *civic university* or *connected university* are some initiative programs that start to respond to these raised questions.

The spatial development of universities plays an important role as a meeting point between the city and university, and it could further stimulate social and economic development and manage growth. Case studies show that university-city collaborative initiatives focused on university properties reveal an aspiration to create innovative and competitive new urban spaces that reinforce the position of the university in the city, and their partnership has the potential to give results in the global economy. Universities have been expanding successfully in collaboration with their host cities, highlighting the fact that city-university collaboration is advantageous, and can be mutually beneficial, including possible tensions and issues that derive from diverse and complex spatial relations (Benneworth et al., 2010).

Education and the Three City Concepts

The role of universities, as a knowledge-intense space, goes even further than just the spatial conditions in relation to urban transformation. Education is a primary transformation factor for sustainable, smart, and resilient city development because it is able to increase people’s capacity and ability to transform their visions for society. Universities play a strategic role in the world, especially in terms of contemporary city development. They act as knowledge and reflection institutions to develop critical thinking and strategy making, in addition to educational institutions that pass on knowledge (Leal Filho et al., 2018). Universities must develop their own models to redefine the curricula of their courses and activities, and to promote integrative, innovative, and diverse approaches in the context of the new city notions. Table 1 shows various educational aspects for the sustainable, smart, and resilient city notions.

Table 1: Educational perspectives for the three city notions.

	City notion		
	Sustainable	Resilient	Smart
Educational aspects	Education for all Multidisciplinary education Education based on sustainability Various ways of providing and receiving education through classes, community workshops, and lectures	Education for all Creative education Affordable education Diverse education	Unlimited sources Unlimited access Smart education Innovation

A Case of the Virginia Tech Campus: Highlighting Dimensions Critical to Resilience

In terms of spatial layout and organization, universities are either organized on campus or integrated into the city. The term *campus* was first used for the area around Princeton University and refers to a particular territory reserved for university institutions use only. Over time, the original spatial model has assumed more urban characteristics, both through the growth of settlements on the peripheries of the city and through the fact that many of the new university campuses are urban, but with the idea of preserving the concept of the openness of the original model (Lotus, 2018). Numerous case studies in the United States and Europe have demonstrated the evolving relationship between the two models (Wiewel & Perry, 2008). In terms of spatial development, university campuses have evolved considerably from some of the earliest colleges, such as Oxford and Cambridge (known as “Oxbridge”) to present-day campuses. The college spatial development is evident from the square and closed campus type, to the present campus developments. The closed campus type model developed in Oxbridge was also applied to some of the first American colleges, which became a characteristic feature of these college campus developments. University campuses in the United States and Europe are now transforming from the isolated type of campus to open campuses, including Columbia University campus. Unlike the gated campus, Columbia University has become an institution with urban character, rooted in New York’s city culture. The new campus covers 17 hectares of the Manhattanville neighborhood, and the project includes the construction of an open city campus, on which the ground floors of university buildings will be used for public activities as an extension of the street. A network of open spaces and

pedestrian axes connects the buildings within campus. All streets within the campus remain public, and pedestrian access through the campus will be further enhanced, as it connects the campus to Hudson River Park (Lotus, 2018).

The campus case study, which illustrates the university's resilience and ability to survive and thrive in the face of various *types* of threats, is at Virginia Tech, North Carolina State University, and Florida Atlantic University (Storms et al., 2019). The study highlights three dimensions of a campus ecosystem that are critical to resilience: the built and natural environment, the financial and economic environment, and the broader social environment of resilience, to which universities often contribute leadership, extraction, and resources. The authors estimate that these three dimensions should be part of a comprehensive campus master plan.

The built environment of the campus is extensive and consists of various components: buildings, utilities, transportation networks, and shelters and emergency services are the four most critical areas for the resilience of the campus and communities. The location of an institution is a key to its resilience concerns: coastal universities may be at risk from sea level rise and others from earthquakes or tornados. The key factors for resilience are the age of the buildings, their decay, and the extent to which they are built in line with sustainable design guidelines. A well-maintained and redundant supply infrastructure increases the resilience of the campus. Transport networks help keep people safe and limit the number of negative consequences of dangerous situations. Universities often provide space for students, staff, and residents to protect them during and after catastrophic events.

Financial and economic resilience depend on the size of the university's funding in relation to the number of students. Although not perfect, a currency unit per student funding

provides a useful measure of the financial resources available to a university. The diversity of the university's revenue sources is crucial because excessive dependence on one source of income or another exposes the university to unnecessary risks. This is particularly true of many small liberal arts schools, which rely heavily on tuition as a source of funding and face the challenge of remaining open as the economic environment changes and enrollment decreases.

Decisions about resilience are relevant for the entire campus, which extends to and is connected with the surrounding community. The involvement of the various community participants is critical for ensuring the resilience of a campus, whether in campus operations or future campus spatial planning.

The University of Prishtina–Center Campus: Highlighting Dimensions Critical to Sustainability

Prishtina is the capital city and at the same time the fastest-growing city of Kosovo, an eastern European country that is both a developing country and a post-conflict country dealing with poverty and underdevelopment (Tahiri & Ažman Momirski, 2019). Sustainability is an issue for the post-conflict developing country of Kosovo, and in particular for Prishtina. Numerous analyses have discovered deficiencies in governance, and the distribution of economic, social, and environmental costs appears to be largely imbalanced. Priority has been given to providing broad access to energy (heavily dependent on coal) in the short term while sacrificing long-term social and environmental sustainability (Lappe-Osthege & Andreas, 2017). Kosovo has the fifth-largest lignite reserves in the world, which is being mined since 1922 (KPMG, 2016). The oldest power plant, also known as The Kosovo Power Station, is

the worst individual source of pollution in Europe (KODIS, 2014).

Massive postwar population migration to Prishtina, along with the failure of urban policies and urban plans implementation, has contributed to Prishtina's urban chaos. Massive urban sprawl has resulted in new developments lacking basic infrastructure for social wellbeing (Gallopini, 2016). Rapid urbanization has also made water supply and solid waste management serious problems. More effective waste management is very important in order to harmonize environmental protection with economic growth (Krasniqi et al., 2013). The country still lacks an organized waste management system; waste is simply transported to dumps without any sorting, treatment, or processing. Many rural areas lack waste disposal systems, and illegally accumulated waste is a persistent issue (GIZ, 2016).

Based on the human development approach to wellbeing, Kosovo falls into the group of countries with high human development, with a rank of 87 out of 187 countries worldwide, but this ranking is still lower than the regional countries (Stanculescu & Neculau, 2014). Prishtina is the educational, academic and knowledge center of Kosovo, with the greatest number of schools and universities, both public and private. The statistics show that the number of students enrolled for the first time in higher education almost doubled between 2008 and 2009, leading to a larger number of private institutions (Richter et al., 2013). The public University of Prishtina is the largest university in the city, with an enrollment of more than 40,000 students. In addition, there are currently 20 other private colleges, some of which have not been accredited recently (Kosovo Accreditation Agency, 2019). Regardless of the increased enrollment rate in higher education, Kosovo lags behind other economies in the region such as Croatia and North

Macedonia in terms of university graduates. The research capacity of universities and research institutes remains weak, and the lack of financial resources and insufficient government support, a non-strategic approach to research and development, and the low absorption capacity of the economy are the current risks to the Kosovo education system (Richter et al., 2013).

The University of Prishtina was founded in 1969 and consists of 17 faculties, the majority of which are sited on the central campus, also known as the University of Prishtina-Center, except for a few such as architecture and engineering, medical, agriculture, some departments of arts, and other disciplines (University of Prishtina, 2019). As an institution with an urban character, it houses over 3,000 students in dormitory buildings, located within walking distance from the central campus.

This study highlights four dimensions of a campus ecosystem that are critical to sustainability: urban planning and transport, socio-cultural features, water and biodiversity, and energy and materials.

The University of Prishtina-Center campus is located in the city center, consisting of the faculties of economics, law, education, chemistry, sports, math and natural sciences, philology, philosophy, and fine arts. A draft campus masterplan was issued in the 1970s, but it was never approved. However, some of the buildings on the campus were nonetheless designed and built based on that plan. The campus is property of the Municipality of Prishtina. The campus is a relatively low-density area, covering more than 15 hectares, 70% of which is open green space. The urban planning of this campus falls under the regulatory plan of the Center 2 zone (Municipality of Prishtina, 2005b). The central location of the campus within the city is key with regard to pedestrian and urban transportation accessibility. Because there are busy

streets on three sides of the campus, there is traffic noise and pollution along these campus edges. There are some parking areas within the campus reserved for staff only. The majority of the faculty buildings built before 1999 have now been renovated and upgraded, in addition to a few new ones.

The campus is not considered homogenous with regard to its usage types. In addition to the facilities that house the majority of the university faculties, there are other facilities such as the Chancellor's Office and University Administration. The National Library, which is also listed as modern architecture heritage and serves as a research center, consists of spaces that host presentations and community events; it is also a tourist attraction. The National Art Gallery further enriches cultural activities with regard to the arts, and there is also the University Library and the Albanian Studies Institute. This mixture of buildings contributes to the vibrancy of the campus, except for the political issue of the Serbian Orthodox Church, which remains a non-functional building. Despite the mixture of building types, the ground floors of buildings such as the Library, Gallery, and even faculty buildings do not coordinate into an open and interconnected campus.

Despite a great amount of open space, the landscape lacks maintenance year-round. There is also a lack of well-designed gathering spaces, a lack of street lighting (which impacts the safety factor), a lack of handicapped accessibility throughout, and a lack of biodiversity. No effort is made for water management on the campus. Per the latest regulatory plans, the campus is supplied with drinking water and a sewage line for the disposal of precipitation and wastewater. There is no water management or water treatment on the campus site (Municipality of Prishtina, 2005a).

The campus does not have waste management plans in action. The waste management falls within the municipal

framework, where the collected waste is gathered and diverted to municipal landfills. There is more progress with regard to energy efficiency than renewable energies. The majority of the building envelopes from the 1970s and 1980s have been improved with insulation and new windows that contribute to energy savings, except for the National Library, which requires exceptional treatment as modern architecture heritage.

Conclusion

As the three of the city notions are defined, distinctive boundaries between them are stated, despite some degree of overlap. Sustainable city is fundamentally keyed on achieving the balance between economy, society and environment. Smart city prioritizes information and communication technologies, and knowledge to stimulate new future developments. Resilient city focuses on responsive and adaptive qualities of urban developments, while ensuring that the original urban structure is not altered. There is no doubt that universities are important urban actors in terms of sustainability, smart development, and resilience, which are three terms that define contemporary city concepts in their larger communities. This represents an increasing opportunity for professionals, university researchers, university leaders, and higher education institutions to take some leadership to either address the future spatial development of the campus or the spatial integration of the university in the city. A better awareness of how the infrastructures, systems, and characteristics of a university contribute to its sustainability, smart development, or resilience to various risks is the key to a proactive and reactive way of university activities addressing university spatial development. Universities should also continue or begin to address the challenges and opportunities for sustainability, smart

development, and resilience on any scale. Only such actions will succeed and continue to meet the needs of students and communities, and support the idea of universities as think tanks for the transformation of their cities. The public and private universities of Prishtina can contribute to the city by developing new models of sustainable economic growth, improving social equality and wellbeing through regeneration and cultural development, and offering new approaches to alternative energies.

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