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Cultural heritage challenges and Smart city concept (a strategic planning tool in a strategic planning framework)

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The Smart City concept is often debated in academic, corporate, and institutional spheres, highlighting its conceptual model variations and technological interests. Many cities have decided to implement the Smart City concept as another development strategy with the vision of growth and efficiency enhancement. Such strategy refers to an extra instrument, in many cases, for bridging technological-based solutions with urban development. However, a social aspect is increasingly considered as the missing piece in the Smart City concept. This paper examines the presence of socio-economic aspects in the Smart City conceptual model and the difference by its practical implementation, searching specifically for cultural heritage. The paper uses case studies to investigate the models of cultural heritage integration in different existing Smart strategies of the historical cities and cities significant for their cultural heritage. Case studies aim to provide an oververview of Smart strategies and Smart technologies, that support cultural heritage as one of the main aspects of its development and address its global challenges. The paper provides a critical view of Smart strategies based on technological innovations in historical cities, where the aspect of cultural heritage as an identity creator was neglected. The research addresses the overall position of the Smart City strategy in the strategic planning framework. It draws attention to coherence with other development strategies searching for cultural heritage objectives, in the case study of Nitra. The paper concludes with recommendations for positioning Smart City's strategy in strategic planning frameworks.

Keywords: Smart City conceptual model, Smart strategy, cultural heritage, urban development, strategic planning framework

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Introduction

Over the past decades, We have witnessed the evolution of the Smart City (SC) concept. The concept that evokes technological revolution in development strategies seems "known" and "unknown" at the same time. The SC concept in terms of urban development has been transformed into a strategic tool as a part of the urban planning approach (Vanolo, 2014). Local authorities strive to implement the concept to improve and simplify all the services and living, and overall city's performance for the inhabitants and users by integrating technological innovations into urban planning processes. Perception of the SC concept from a purely technological approach of technological tools and innovations shifted to the concept of a systematic development strategy that focuses on several development areas of the city. This development strategy aroused a trend of modern and innovative cities – Smart cities (Sikora-Fernandez, 2016). While such a trend brought various approaches to designing the SC conceptual model into strategic urban planning processes, its implementation and methodological basis stay "unknown" (Neirotti, 2014; Zubizarreta, 2015). Overall, different approaches towards SC concept models and their implementation occurred. The concept does not have a unified academic and scientific background (Dameri, 2013), which brought many researchers to compile its definitions and recommendations for its adaptation and implementation.

Nevertheless, the most quoted definition and the structure of the concept defined by Giffinger et al. (2007) attribute six dimensions of urban development to where the technological innovations should be focused. Various studies further developed definitions and designs of the concept, based on Giffinger's extensive study. The extension of the concept thus reflects its inflexibility and the absence of a more precise methodological basis, which points to its criticism and limitations. (Neirotti, 2014). Much of the criticism point towards SC perception, which pictures the concept as an explicitly technological infrastructure.

Many practical examples of the concept when implemented still depend only on technology-oriented solutions that testify to its narrow and technological-based understanding (Sánchez-Corcuera et al., 2019). Many studies point to the fact that in practice, the technological perception of the concept is reflected through poorly designed strategies or purely technically oriented solutions (Kummitha et al., 2017). In such studies, authors complement the concept of socio-economic dimensions of urban development, which have hitherto been lacking in either perception or designing the strategies (Kar, 2019). This paper focuses on the cultural heritage as part of the socio-economic dimension of urban development, which is an integral part of urban development and is the creator of the uniqueness and identity of a particular place. The paper overviews the SC concept as a strategic planning tool and its conceptual models towards urban development areas. The paper analyses approaches of the concept concerning cultural heritage as a development factor. Literature review seeks to identify the relationship between SC concept and cultural heritage based on examining social aspects in the SC model resulting from several studies. Identification of the relationship helps understand the socio-economic approach of the SC conceptual model. The presence of cultural heritage in SC strategy is investigated using a case study method of cities with notable cultural and historical significance, to bring an overview of practical examples of SC implementation. The case study approach enables the classification of the types of integration of cultural heritage into SC strategy in various cases. This answers the partial research question: What are the different approaches to integrating a cultural heritage in an SC strategy? Summarizing the theoretical and practical approaches to integrating a socio-economic and identity-forming attribute of urban space such as as cultural heritage, aims to answer the main research question: Under which circumstances might a SC strategy be a supportive strategic

development tool of cultural heritage development and the identity of the city? This results in another contribution of the paper, based on case studies examination. SC strategy in strategic urban development figures as sectoral strategy, which also outlines the examination of SC strategy and its position in the strategic planning framework. In-depth case study analysis – city of Nitra highlights the coherence in strategic planning framework focusing on the presence of cultural heritage in strategic objectives.

Defining the Smart City concept and socio-economic aspects of the Smart City concept

Numerous definitions have been addressed to the SC concept as the concept is a very still frequent topic and the objective of research in the scientific literature (Winkowska et al.,2019). Many definitions stem from different understandings, adaption to different trends, and disciplinary areas amongst researchers and practitioners (Chourabi et al., 2012). Primary scientific sources aim to extend the previous definitions or the model of the concept itself based on a comparative approach. However, a unified and ambiguous definition of the concept's methodological and scientific origin is still missing. Such an approach suggests that the concept is still volatile, and its practical implementation is very individual for each case (Dameri, 2013).

The original idea of smart cities does not only correspond to the involvement of information and communication technologies (ICT) in the urban planning processes. Instead, it was a kind of alternative to traditional urban planning regimes, where the role of ICT is to deal with urban/city problems caused by the urban population growth and rapid urbanization based on more efficient data collection (Alawandhi et al., 2012). Nevertheless, transforming the idea into the involvement of ICT throughout the SC concept implementation to modernize cities takes place. Here it is often forgotten that the original objective of SC concept was to tackle global issues such as population growth, climate change, environmental issues, and other urban challenges (Giddens, 1999; Caragliu, 2011). The current perception of the concept by the practical example mainly refers to implementing technological-smart solutions driven by the hi-tech companies oriented to specific areas to bring not only the simplification of processes and urban life but also the presentation of technological innovations. Such trend contradicts the original idea of not only solving urban problems but also connecting the city as a whole, solving problems effectively on a faster basis of communication and connecting its areas (Dameri, 2013; Angelidou, 2014; Neirotti et al., 2014; Allam and Newman, 2018). In this respect, it seems that a misunderstanding of the original idea of the concept can lead to even greater fragmentation and isolation of individual areas of urban development at the expense of its harmonization. “Smart city” became a label of the smartness associated with the involvement of ICT in an urban environment (Allam and Newman, 2018). SC has been defined based on ICT involvement in managing various city functions (Ramaprasad, 2017) and structured by dimensioning urban development areas, while the following period addressed its characteristics the role in urban development (e.g. Intelligent, Digital, Inclusive, Sustainable) (Dameri,2013).

The past decade that refers to SC research significantly moved its focus on the social aspect of the concept. Shifting from ICT-oriented aspects of the city development in terms of SC concept implementation into a broader concept finally focused on the social dimension. Monfaredzadeh and Krueger (2015) addressed a topic of social factors in the SC concept, where the social, human, and cultural capital is underlined as a neglected factor of the SC concept. However, some contributions created a basis for the social-economic aspect development of the SC concept even before. For example, Dameri (2013), in the publication already mentioned, that "the most important subjects in the smart city definition should be the

citizens." Socio-economic aspects refer to social, cultural capital, and economy, and the integration of such aspects means bringing quality of life for citizens, support participation, responding to population needs (Monfaredzadeh and Krueger, 2015). Integrating socio-economic aspects in the SC strategy would aim to goals specific for each city made for its inhabitants with its own identity, history, cultural and economic profile. Human capital is a fundamental asset of the cities. Therefore, the stress of the social and economic dimension in SC strategy design might strengthen the position of the inhabitant. Furthermore, this refers to intellectual capital, generating knowledge, developing social and cultural capital, implementing technology that responds to the interests and needs, supporting technological literacy and digital inclusion, and respecting diversity and individuality (Angelidou, 2014; Radziejowska & Sobotka, 2021).

SC concept is a multidisciplinary construct that would transfer the city into an extensive organic system connecting many subsystems and components. Hollands (2015), in the study, pointed to defining the social problem first in designing SC initiatives, rather than focusing on answers immediately in Smart technology. The paper's purpose and a focus on the social aspect as cultural heritage, a representation of the most popular definitions, is complemented by its area focus with the emphasis on social aspects.

Table 1 provides an overview of the most frequent academic definitions of SC in scientific literature. Most of the definitions aim to define SC as a city performing technological innovations concentrated in different city areas. However, there is no common agreement on the SC definition. Definitions of the SC follow up on the model of the concept pointing on certain aspects, where some of them define the model of the concept via dimensions (Giffineger, 2007; Toppeta, 2010; Washburn,2010; Petrolo,2015), elements (Chourabi et al., 2012), factors (Nam and Pardo, 2011), domains (Neirotii, 2014) and others in performing characteristics (Hall, 2000; Herrison, 2010) or type of the city (Lombardi et al., 2012). The overview looks for social aspects present in the definition/model of the concept. As the Table shows, almost every academic author emphasize the social aspect in defining an SC. Some authors integrate such factors into the SC concept as separate dimensions – Smart people, Liveability, Wellbeing (Giffinger, 2007). Many point to social factors in definition (Caragliu et al., 2011; Nam and Pardo, 2011; Dameri, 2013). Each definition or characteristic of the SC concept is based on ICT integration. However, many contributions define SC in technological or institutional-oriented literature. One example is a study where Toli and Murtagh (2020) overviewed such differences while defining the SC concept. Technology-oriented definitions offer corporate visions via a top-down approach and refer to the presentation of technological innovations. In contrast, institutional-oriented definitions of SC focus on connecting technological innovations with the socio-economic development aspects. These definitions mainly offer development characteristics of the SC concept – sustainable, inclusive, and many more. (Toli and Murtagh, 2020).

Table 1. Defining a smart city with an emphasis on the social aspect

Author (Year of publication)	Definition /Characteristics	conceptual model	Social aspect/s
Hall (2000)	"A city that monitors and integrates conditions of all of its critical infrastructures, including roads, bridges, tunnels, rails, subways, airports, seaports, communications, water, power, even major buildings, can better optimize its resources, plan its preventive maintenance activities, and monitor security aspects while maximizing services to its citizens"(Hall,2000,p.1)	Monitoring, integration, ICT innovations	Citizens
Giffinger (2007)	"A city well performing in a forward-looking way in economy, people, governance, mobility, environment, and living, built on the smart combination of endowments and activities of self-decisive, independent and aware citizens." (Giffinger, 2007,p. 11)	Six dimensions model - Smart economy, Smart people, Smart Governance, Smart mobility, Smart environment, and Smart living	Citizens, Smart Living, Smart People
Harrison et al. (2010).	A city "connecting the physical infrastructure, the IT infrastructure, the social infrastructure, and the business infrastructure to leverage the collective intelligence of the city" (Harrison et al.,2010, p.2).	Instrumentation Interconnection Intelligence	Social infrastructure
Toppeta (2010)	A city "combining ICT and Web 2.0 technology with other organizational, design and planning efforts to dematerialize and speed up bureaucratic processes and help to identify new, innovative solutions to city management complexity, in order to improve sustainability and livability" (Toppeta, 2010, p.4).	ICT technologies, new innovative management solutions/ Governance, Sustainability, Liveability	Liveability
Washburn et al. (2010)	"The use of Smart Computing technologies to make the critical infrastructure components and services of a city—which include city administration, education, healthcare, public safety, real estate, transportation, and utilities—more intelligent, interconnected, and efficient" (Washburn et al., 2010,p.2).		Smart Liveability Smart Education Smart Healthcare Public safety
Caragliu et. al. (2011)	"A city to be smart when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of	Community, technology, liveability, sustainability, governance, policy, accessibility	Human and social capital, participatory planning, community

	natural resources, through participatory governance" (Caragliu et al. 2011,p.70).		
Nam and Pardo (2011)	Technology factors (Smart, mobile and virtual technologies and digital networks), human factors (human infrastructure and social capital), institutional factors (governance, policy, and regulations /directives) (p.. 286-287))	Information, infrastructure, efficiency, mobility, decision making	Human infrastructure and social capital
Chourabi et al. (2012)	Incorporating sustainability and liveability issues by internal and external factors affecting Smart cities. (p. 2291)	Management, organizations, technology, governance, policy context, people and communities, economy, built infrastructure, natural environment	Citizens, communities
Lombardi et al. (2012)	Triple helix model with a civil society that empowers universities, governments and industries. (p.140)	entrepreneurial cities, pioneering cities, livable cities and connected cities	Liveability, Connectivity, Education
Dameri (2013)	"A smart city is a well-defined geographical area, in which high technologies such as ICT, logistic, energy production, and so on, cooperate to create benefits for citizens in terms of well-being, inclusion and participation, environmental quality, intelligent development; it is governed by a well-defined pool of subjects, able to state the rules and policy for the city government and development" (Dameri, 2013,p.2549).	Dimensions: Smart Governance Smart People Smart Living Smart Environment	Citizens oriented approach, well-being, inclusion, and participation
Neirotti et al. (2014)	"SC is a wide notion that encompasses many different socio-environmental aspects and ICT applications"(Neirotti,2014, p.34).	Tangible and intangible urban assets: Hard domain (energy, lighting, environment, transportation, buildings, and health care and safety issues) Soft domain (Education and culture, society, government, economy)	Soft/ intangible domains
Petrolo et al. (2015)	"Smart city is a multidisciplinary task that involves various stakeholders from different thematic areas like politics, finance, city management, and organisation and ICT". (Petrolo et al., 2015, p.8)	transport energy, emergency services, waste management, air, and water - recreation	

Socio-economic aspects of the SC conceptual models primarily include social capital, communities, participatory planning, health care, education, or economy. These aspects are usually transmitted into one component as "liveability" or "quality of life." However, none of the definitions nor characteristics mention the identity or cultural heritage, which is, after all, the city's main characteristics and forming socio-economic factor (identity/ "face", visual). The only Neirotii's (2014) study includes Culture in SC concept structure as a part of soft domains. His study revealed the misbalance between the SC components by measuring the model differentiation of the components in existing SCs conceptual models. According to Neirotti (2014), less than 10% of worldwide SC development strategies integrate cultural heritage management or culture in the SC strategies. Misbalance between the development areas in SC strategies also proves Mapping Smart cities in EU (2014) study. Component's coverage measured in the Smart cities different sizes in Europe shows that the "Smart living" component, which should possibly include support of the cultural development, is covered by only 12% out of 599 cities examined (Manville et al., 2014).

Challenges of cultural heritage development

Cultural heritage represents the cities' uniqueness; it forms its identity and refers to its characterizing attribute (UNESCO, 1972) as development factor refers to a multidimensional object and dynamic factor (Bandarin, Van Oers, 2012; Ferreti, 2014). Physical and spiritual representation of cultural heritage together creates an irreplaceable picture of the cities. Therefore, cultural heritage as a development factor carries one of the biggest challenges in spatial development (UNESCO, 1979; Borowiecki et al., 2016). One of these challenges refers to the continuity of cultural heritage values synergically with modern spatial development (Bandarin, Van Oers, 2012). In the past century, the main objectives of cultural heritage management/development became preservation, valorization, and its presentation (Guzmán et al., 2017). However, with the onset of globalization and the digital age, other challenges came to the forefront (Borowiecki et al., 2016). The digitalization era is responsible for cultural changes. Its speed creates a gap between digital technology development and the slow pace of the cultural models and their inherent values (Combi, 2016). "The greater our awareness of living in a global world, the more strenuous our defense of local identity is," argues Combi (2016). Therefore, in the digital age, the cultural heritage faces challenges such as preserving its values the identity of cities/places and sites while integrating technological innovations that might be effective or contradictory in answering those challenges. However, digital technologies are a potent tool. On the contradictory, they might appear as a threat in the field of cultural heritage development – they might change the identity of the places, cultural aspects, a misleading presentation of cultural heritage might be caused as well (Borowiecki et al., 2016; Zubizarreta, 2015).

The SC concept represents the new cultural idea of modern cities led by technological-based innovations. That could suppress the existing culture, identity – genius loci, competitiveness, and uniqueness resulting in conflict between cultures – one that the city already has, and the one (digital) SC is creating (Zubizarreta, 2015). However, there is the possibility of taking advantage of its conveniences - transmitting information and preserving cultural heritage through ICT as well as its ability to present it (Borowiecki et al., 2016). Economou (2015) discusses conveniences that Smart technologies offer in cultural heritage management. Her analysis points to data in capturing, modeling, audience engagement in various contexts, such as schools, cultural tourism, museum visits, and life-long learning as a tool for cultural heritage management applicable for its tangible and intangible elements. Economou (2015) also points to the employment of Smart technologies that might be sensitive and used in answering cultural heritage challenges. Cultural heritage and its challenges in globalization and

modernization are not discussed nor answered in the SC concept. Cultural heritage became one of the sustainability pillars (Nurse, 2006); however, it is not considered a priority for urban development (Ruoss, 2013). SC concept cannot apply to any city in the same way and under the same conditions, simply because each city has its own “local needs and development priorities, building on existing assets of the city and the identity of place” (Angelidou, 2017). SC concept seems incompatible with Cultural Heritage preservation, presentation, and management, despite its potential to merge the objectives of both fields.

Methods

Based on a literature review of the SC concept in the context of cultural heritage, available existing SC strategies and cultural heritage context was searched for, in localities with cultural and historical significance. The first part of the research refers to content analysis of SC strategic documents and analyses its models focusing on cultural heritage integration. The process of selecting cities was conducted based on the SC ranking list. The cities with cultural and historical significance (UNESCO sites, monuments present) with SC strategy adapted were selected (UNESCO, 2019; Smart City Index, 2021). Using a ranking list, a list of existing SCs was available. Another step of selecting was the availability of data and present aspects of cultural heritage. The analysis of this part consists of the model of the strategy, its cultural heritage context – what is the objective and focus of the SC strategy in the context of cultural heritage and the following projects using case studies – London, Bologna, Prague, Rome, Sydney. In the third part, the "smart tools" analysis is assembled. Case studies from Sardinia, Pompey, Karlsruhe offer "Smart solution-level options in the context of cultural heritage.

The following part aims to analyse the cultural heritage context in SC strategies frameworks in Slovakia. The country was chosen precisely because of its strong cultural and historical assets and identity representation. Within the country, four cities have compiled their SC strategy. The paper studies the integration of cultural heritage through the SC model and its specifications by the same approach.

Additionally, a comparison of spatial development strategic objectives is chosen in terms referring to the coherence of overall strategical development objectives and balance between strategic approaches in strategic urban planning. The fourth part examines a case study of Nitra city as an in-depth analysis of one particular case, where the comparison of the SC and overall strategical framework is analysed. Comparison of objectives and evaluation of coherence between individual objectives of strategic development plans follows the proposal of a unified socio-economic strategic framework of urban development with integration of SC strategy.

SC strategy as a tool for cultural heritage development – cultural heritage as the main component of SC strategy

Cultural Heritage can also be involved in Smart culture as evidenced by the analysed examples – cities, which place Cultural Heritage as a significant component in their SC strategy. Table 2 shows different approaches to Cultural Heritage management and its presentation support in SC strategies. Practical examples offer an SC strategy model – in each case by the components (Bologna, Pague, Rome) or a vision of certain development areas (London, Sydney). Culture and history of the SC strategy context develop areas and focus of particular goals. Projects offer actions of SC strategy towards implementing an SC strategy.

Table 2. Cultural Heritage as a part of SC strategy is analysed examples

City	Smart concept - components	Culture and history context	Projects
Bologna	*Cultural Heritage* Iperbole 2020 Cloud & Crowd Intelligent networks Sustainable Mobility Safe and sustainable neighborhoods Health and Welfare Education and technical training	Enhancement and requalification of the historical center and its cultural heritage, the porticoes and tourism	Data not found
London	Put Londoners at the core, Provide access to open data, Leverage London's research, technology, and creative talent, Collaboration networks enable London to adapt and grow Enable City Hall to better serve Londoners' needs, *Offer a 'smarter' experience for all.*	- cultural heritage promotion as part of city hall services to citizens and visitors. - inclusive 'smart London' experience to all -one - offer of integrated services across several functional areas, such as cultural heritage promotion, transport, and collaborative governance.	- collaborative urban planning and policymaking - integrated wayfinding navigation system (journey planner) including points of interest - clean streets application
Prague	Mobility Smart buildings and energy Waste-free city *Active tourism* People and the urban environment Data	-modern visitor's attractions throughout Prague and a universal tourist card for easier moving around, entering the main attractions. -friendly and fun tourism, the release of crowded streets in the city center, data collection for further use, and tourism management.	An app offering tourist information and several additional functions - for example, an extensive list of monuments and attractions, including information about them, routes for various target groups, the possibility of discounts, navigation to points of interest, current cultural, sports, social and other events.
Rome	Energy Environment Mobility Economic development Tourism *Culture* Education and school Social security	Data not found	Data not found
Sydney	A city supporting (connected, empowered communities)	Seamless integration of the physical and digital to strengthen the community's connection to	Leverage the city's wayfinding network as a platform for interactive art installations, such as

	A city fuelling (global economic competitiveness and attracting and retaining global talent) A city future-proofing its environment and bolstering resilience *A city cultivating (vibrant, livable places)* A city providing customer-centric, efficient services	place and each other, celebrating the unique identity, culture, and history of the local area	virtual/augmented reality and digital city walks, enabling communities to experience local art and architecture and the history and culture of the First Nations people. Working with the local area's art and cultural institutions can help promote the digital amplification of their assets across the community. Expanding the deployment of free Wi-Fi across the local area can unlock a range of opportunities to enhance the city's livability and social connectedness. For example, the network can help tourists navigate the city and support communities to create online groups, share ideas and resources and organize meetups.

Source: (Smart Prague official website,2021; University of Bologna official website, 2021, City of Sidney,2020; TIM Group official website,2020; Greater London Authority,2016).

Practical transformation of the theoretical SC strategy models is in case studies proposed by components – development areas. The study cases show the extension of the theoretical models and the adaption to an urban development need of an SC strategy (tourism, economy, environmental improvement, value, and awareness-raising). A cultural heritage might be integrated into the SC strategy variously. Cultural heritage is a multidisciplinary subject in terms of urban development. Likewise, each city has different needs and goals in cultural heritage development. In the case of Bologna, Rome, Prague, and London, the integration of cultural heritage in SC strategy is linked to tourism development. In the case of London and Sydney, projects of SC strategy are aimed at community connectivity or participatory planning. In this case, the paper spots an integration of cultural heritage into the SC as the primary objective – component refers to its importance in urban development through various areas – cultural heritage, culture, tourism, identity, participation, communities.

Cities supporting culture and history by Smart City solution-oriented model

Smart technologies enabled a connection between Cultural Heritage and its visitors, among the objects/territory and the visitor, and the digital platform's real and virtual worlds. Assets of the Cultural Heritage as the objects of interest become more accessible via technologies (QR codes, Internet of Things, sensors, Wi-Fi, GPS, Smart devices, etc.) and for its observers more tempting (Chianise, 2014). It seems that in this way, we can talk only about the tourism sector, but in this sense, Smart technologies offer a broad range of possibilities to access its representations. Smart Solutions at the experience level could be addressed to a broader audience and make it easier for their users to feel it as something of their own and leisure-

oriented, educational, informational benefits, not to mention participatory planning. Paquin (n.d.) stated: "In this case, heritage, being as it is the root of the identity/identities of a society (new or old) formed by ancestors or by newcomers, makes up its essential pillar. Therefore, in order to optimize global strategies towards a SC view, an in-depth reflection is required on the role to be played by culture and heritage as one of its fundamental pillars."

Table 3 displays the brief review of the Smart technologies as a tool for cultural heritage development implemented as a project without a broader strategical connection to SC strategy. Case studies of Pompei, Sardinia, and the city of Karlsruhe offer a practical example of implementing a Smart technology to enhance the identity and cultural heritage of the place. Pompei offers an experiential journey through the Smart paths based on augmented reality, filling in the missing places. This project focuses on informative character and spreading the identity of the place. Sardinia connects its historical mosaic of historical and cultural goods platformed on mapping the whole region, using augmented reality in place. The city of Karlsruhe offers a much broader concept of implementing Smart technology through the involvement of institutions and stakeholders by promoting cultural assets and creating a collaborative channel. Table 3 defines a Smart technology and describes its benefits.

Table 3. Apps/ innovations applied for Cultural Heritage support

Pompei/ Italy	Smart placemaking – Smart paths are equipped with sensors and information points that should inform about the history and culture of these places and immerse people in the atmosphere of the place in an innovative way.
	The new approach aims to improve knowledge of Pompeii from a different perspective: to encourage well-being from this place through its best and lesser-known sources of contemporary identity, not only in relation to its archaeological site, but especially in terms of its cultural environment and local roots. A network of public spaces with different identities is an experiential journey based on the promotion of local products.
Sardinia / Italy	Smart experimental paths / RAR technology (relational augmented reality) A mosaic of historical and cultural goods platform, which undertook to map the Sardinian regional heritage (currently contains about 15,000 cultural artifacts and manifestations) and serves as a basic source of knowledge for the study of the cultural landscape.
	Links fragmented cultural heritage with local food and wine, accommodation, cultural and recreational offerings).
Karlsruhe / Germany	AR and VR applications: enhancement of visitor experience in historical sites; application brings images, stories and other content of the past from the city archives to the present. The 'Culture in Karlsruhe' initiative, a marketing effort where cultural institutions, promoting cultural assets, culture-related events and knowledge exchange. Stakeholder ecosystem development: collaboration channels and knowledge exchange networks across cultural heritage stakeholders.
	Promoting smart cultural heritage as a tourism development component. Using dedicated, as well as other informative app, combined with offline initiatives.

Source: (Garau,2014; Sepe,2015; Karlsruhe City official website, 2019).

Cultural heritage integration examination in SC strategy models in Slovakia - Does the strategy support cultural heritage development?

A country placed in the heart of Europe inhabited by 5,6 million people has few cities marked as smart cities in its territory. In this small country with relatively disharmonized spatial development, I analysed 4 smart strategies. Slovakia is a small country but rich in its history and covers many tangible and intangible heritage sites and cultural and natural sites (O Slovensku official website, 2021). Table 4 analyses strategical objectives in socio-economic development plans and the SC strategy model that refers to a component model in each case. It compares and searches for coherence between them. Lastly, the present context of cultural heritage is analysed in individual SC strategies, if there is one.

Table 4. Slovak SCs

City	**Spatial socio-economic development strategy objectives / focus areas /priorities**	**SC strategy - components**	**Cultural heritage context**
Bratislava /capital city / 437 725 inhabitants	Bratislava - supraregional center Economy of knowledge Quality of life and human potential Environmental and urban quality Transport and technical infrastructure City administration and management	Mobility Energy Environment Circular economy Business Public spaces Social inclusion Education Culture Tourism Sports	Protection and enhancement of the movable cultural heritage; care for cultural monuments - intangible and tangible; improvement of services for the use of cultural monuments, cultural facilities and public spaces of the city; modernization of cultural objects with the use of modern technologies in order to increase the quality of comfort for visitors; development of culture, cultural and creative industry on the territory of the capital of Bratislava; introduction of innovative information systems on the history and present of the city (trips through Bratislava history, monuments, traditions, curiosities, green spaces, bike

			paths, educational trails); building local patriotism and the citizen's relationship to his city; protection and restoration of cultural monuments, including the construction of new premises for research and educational activities (deposits for the protection and safe storage of historical and artistic objects, etc.
Poprad / 51 235 inhabitants	Smart economy Quality of life Tourism Partnership Smart governance	Ecology and health Energy Mobility Education, entrepreneurship, and innovation Tourism	Tourism and cultural heritage support
Nitra / 78 353 inhabitants	Nature and culture Mobility A living standard Partnerships	Mobility Living standard Smart energy Energy management	Does not include cultural heritage support
Prešov / 88 464 inhabitants	Economic development Transportation Environment Security Social care Education and training of children and youth Culture, sport, tourism Efficient management	Mobility Environment Digital city Energy	Does not include cultural heritage support

Source: (Magistrát hlavného mesta,2018; Mesto Poprad, 2017; Nitra Smartcity official website,2021; Prešov Smart city official website ,2021,).

As data shows, the leader of SC is the capital – Bratislava, where the concept shows comprehensive coverage of many development areas and describes the objectives in detail. Additionally, culture is placed as a major component. Comparing the socio-economic objectives and SC strategy components, different and conflicting formulations of individual objects can be seen. Both correspond to urban development areas. However, only a few match. In many cases, technocratic perceptions of a theoretical concept as a predetermined template or a one-size-fits-all approach mislead to develop only supportive technological strategies (O'Grady and O'Hare, 2012). This may result in incoherence between urban development strategies (Neirotti et al., 2014; Zubizarreta, 2015). Case studies from Slovakia indicate such an issue. Differences in the determination of strategic objectives in individual

strategies for the particular city might lead to fragmentation of overall urban development and development intentions.

SC strategy as a part of socio-economic strategic planning framework in the historical city of Nitra

The cultural heritage of Nitra – Identity, and challenges

The oldest city of Slovakia, built on seven hills - Nitra, has been experiencing dynamic growth in the recent period. This city also became home to the automobile industry developer (Jaguar Land Rover). Other residential development projects ensure the city's expansion, while the character of cultural heritage and its historical identity started to fade slowly (Krogmann et al., 2021; City of Nitra official website, 2021; Borotová, 2020). Further characteristics, challenges of cultural heritage and management, and the strategic planning are summarized in Table 5.

Table 5. Cultural heritage characteristics, challenges of cultural heritage, its management and strategic planning

Characteristics	**Challenges of cultural heritage**	**Challenges of cultural heritage management and strategic planning**
Heritage reservation and a Heritage zone Cultural heritage fund - 134 monuments Archaeological sites Traditions Cultural events, local authority's engagements Private-public partnership Private organizations/actors Cultural events organized by private sector Performing arts traditions, developed activity of theatre organizations	Fragmented identity Cultural events attention prevails over the cultural heritage itself and its presentation Non-functional cultural objects owned by the city; unused cultural spaces owned by the city Support for subjects of cultural and creative industries Unadopted infrastructure for tourism and the modern visitor	Destination marketing, branding of the city is missing Using public spaces for cultural activities and events Care for the monuments in private ownership, non-use of available financial resources for the maintenance Unharmonized territorial development and industrial development, real estate development projects in historical centre The image of the historic centre disturbed by modern construction, modern elements of public spaces

Source: (Krogmann et al., 2021; City of Nitra official website, 2021; Borotová, 2020).

Strategic planning framework

In the system of strategic development planning in Slovakia, optimal tools, methods, and systemic relationships other planning activities are searched to ensure the harmonized socio-economic area of urban development (Finka, 2014). For example, in the case of Nitra, socio-economic strategic planning tools (Fig.1) refers to the Programme of social development and economic development city of Nitra. Sectorial development plans in cultural development are a strategy for the development of culture and creative industry in Nitra and Strategic and

marketing plan for the development of tourism in the Nitra (Fig.1). The program of social development and economic development city of Nitra refers to a document that conceptualizes a strategy aiming to address shortcomings and strengthen the competitiveness of urban development by defining a planning and financial framework by precisely defining activities (City of Nitra, 2014).

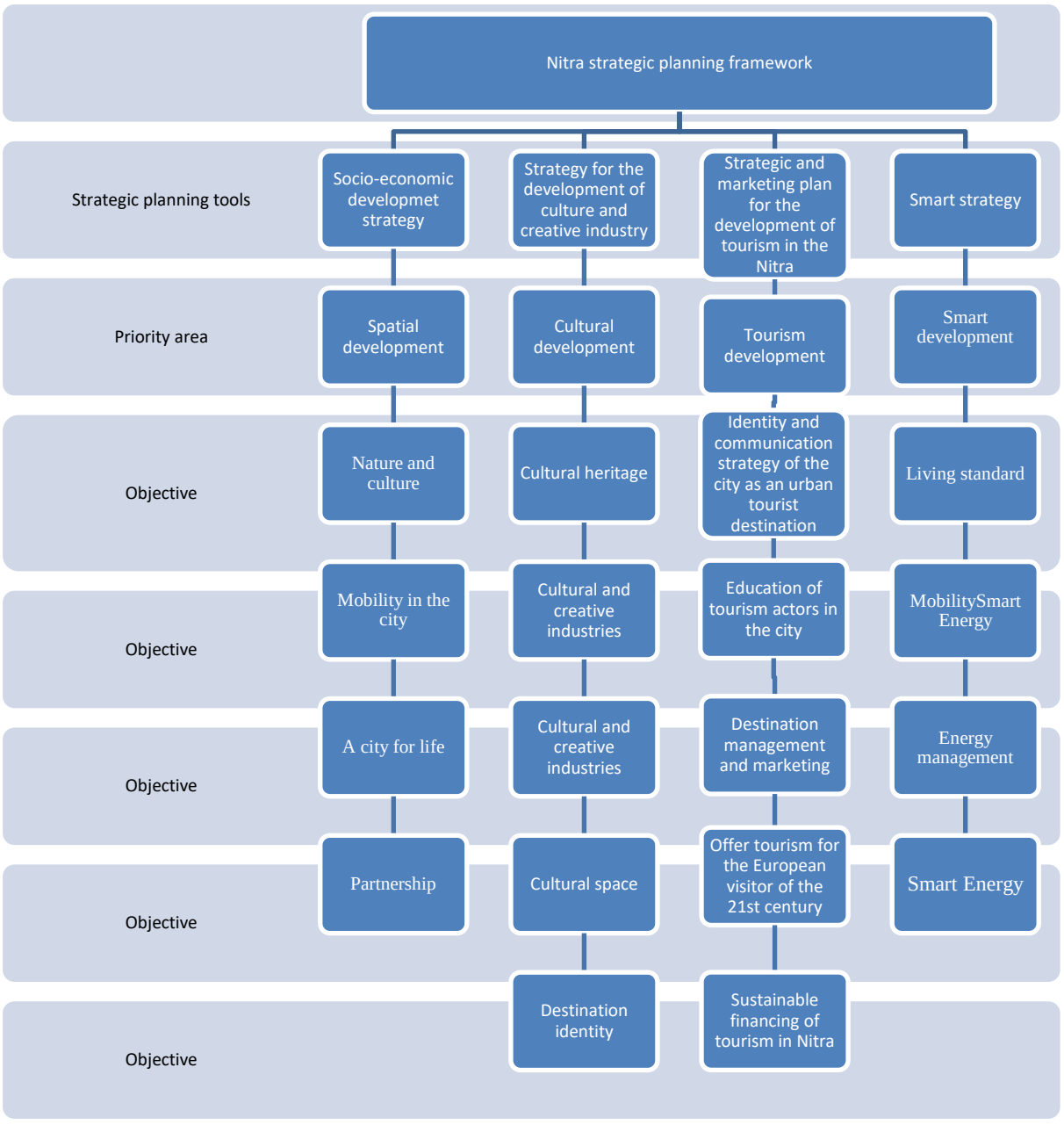

Figure 1. Nitra's strategic framework, strategic tools, and objectives
Source: (City of Nitra, 2016; Smartcity official website,2021; Tourist Information Board of Nitra; Pálenčíková, 2020 ONplan lab, 2020)

In the case of SC strategy, four pillars were integrated into the SC strategy - Mobility, Living standard, Smart energy, and Energy management. The Mobility component mainly focuses

on public transport, bicycle transport, and parking. The Living standard (safety of life in public spaces) aims to create public lighting projects, the lighting of buildings owned by the city, and of apartment buildings, and sports grounds. Smart energy focuses on municipal waste management, water, and heat management. Energy management includes energy efficiency and city security, electronic services, information, and communication (Nitra Smartcity official website, 2021). However, the SC strategy was compiled based on a technological approach. None of the pillars that refer to SC components aim to connect to social aspects or interconnect other strategic planning tools. Figure 1. displays the strategic planning framework in the case of Nitra. The figure provides an overview of strategic planning tools and their priority areas, touching cultural heritage development.

Using the example from the city of Nitra, I search for addressing cultural heritage challenges in strategic planning framework that are partially present in sectorial development strategies. By analysing the framework itself, the relations between strategic objectives and positions of SC strategy that are not linked in the case of Nitra are observed. Adapting a sectorial strategy for cultural heritage development and tourism development, it is unclear which sector should dominate in terms of cultural heritage care and its development. Whereas strategies are subject to various time frames, the individual strategic objectives differ. Pointing on the SC strategy of Nitra, the objectives are directed at the solution-oriented level, however, as they appear to respond to dimensions of the SC conceptual model. In this case, it might spot a lack of complexity and inconsistency with the broader planning context of the city that might result from purely technological understanding and designing SC strategy. Therefore, a lack of methodological or legislative background in designing SC strategy might cause incoherence and the absence of synergy in an overall strategic framework. As a result, various challenges concerning Nitras' identity and cultural heritage emerge, ultimately making development conditions more difficult or even exacerbating the challenges that cultural heritage faces. Therefore, the proposal for a unified strategic planning framework for SC strategy integration and coordination of the strategic objectives is drawn in Figure 2.

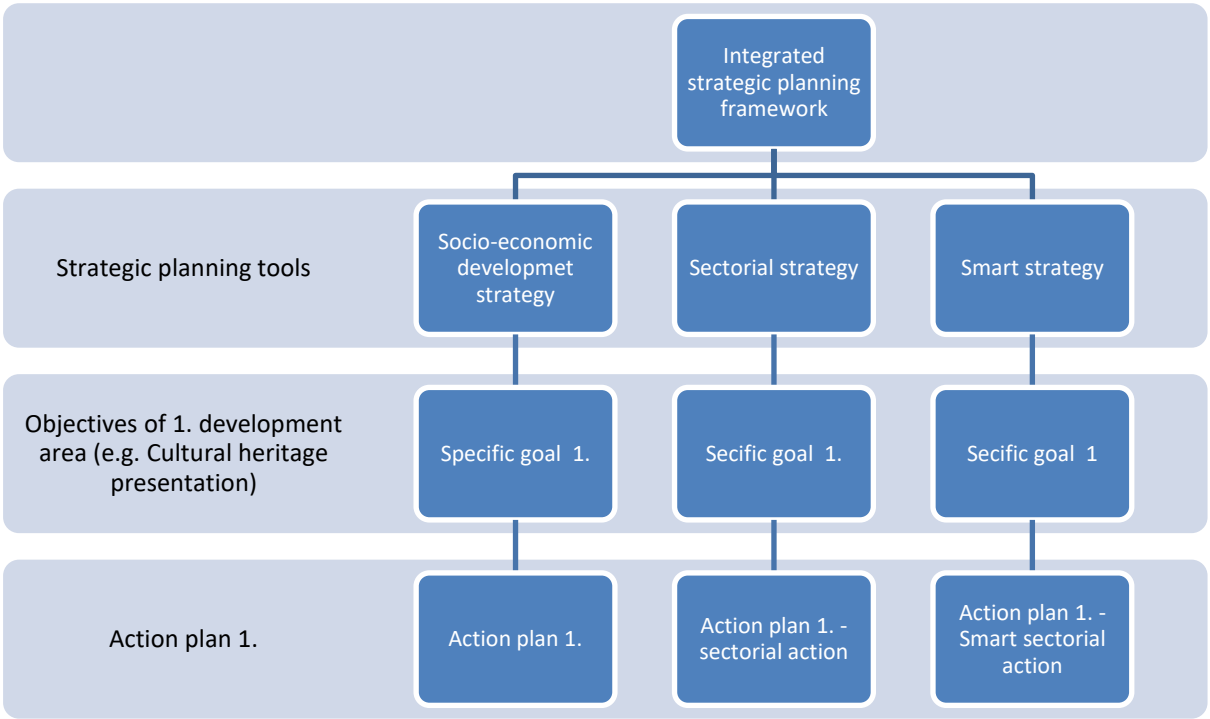

Figure 2. Socio-economic strategic framework of urban development proposed scenario

The scheme describes how development and sectoral strategies could take to achieve coherence and mutually consistent individual objectives. However, developing an integrated strategic planning framework requires uniform processing and a uniform methodology, which should be the role of local government to ensure that policymakers (whether private agencies or municipal companies) cooperate to shape future interventions. In the case of the city of Nitra, it is precisely the opposite; as the references suggest, almost every strategy is created by various external companies with a different methodological approach, applied in a different time sequence. However, the formulation of strategic objectives must not lead to subsequent conflicting activities, whether within one or different sectors.

Discussion and conclusions

The paper draws attention to several shortcomings of the SC conceptual model and its practical representation as a SC strategy. It also highlights the absence of a segment of cultural heritage, and what position the SC strategy should have in strategic urban planning to achieve coherence in strategic planning frameworks. The paper points out the difference between theoretical, conceptual, and practical SC strategies models. The critical approach of summarizing conceptual models towards social aspects such as human, citizen, and identity approach was conducted by searching specific socio-economic aspects – cultural heritage in SC conceptual models. The paper identifies a large gap and even a total absence. However, research critically analysed SC conceptual models in this matter. As a product of the SC concept, many practical examples suggest that SC strategy can effectively address the global challenges facing cultural heritage today. In major cases, historical and cultural heritage is an identity former that should be preserved and cultivated in the cities. Today, we are witnessing that the SC strategy is often used to modernize cities and thus also modify its identity (as in the case of Nitra or Poprad in Slovakia and in many other metropolises around the world). Transmitting SC conceptual models into the development strategies has shown that most case studies use the dimensional SC model. The paper analyzes case studies where an SC strategy integrates a cultural heritage as a movable component reflecting different approaches to respond to its challenges and support its development. A comparison of case studies confirms that preserving and raising awareness of cultural heritage should be part of the SC strategies. Case studies from Pompeii, Sardinia, and Germany provide evidence that cities might support cultural heritage preservation and presentation and fragmented link identity by the Smart technologies.

Nevertheless, the specificity of the Smart solutions and implementation methods should be used to dace the global challenge of cultural heritage might be a topic of further research in linkages between cultural heritage and SC concept implementation. Cultural heritage might be part of the SC concept, although it does not figure as a significant component in the conceptual models. Where culture shapes identity and participates in the development, its position in the strategy should be clearly described. By not appearing within the general SC concept, evokes its absence. It encourages policymakers to omit it, which points out that the SC strategy needs a further methodological and legislative background to adapt to the development needs of a specific area. In practice, policymakers adopt strategic objectives to the needs of cities, as in the case of the strategies analysed in the paper. This approach leads to the absence of a uniform definition or methodology for developing SC strategies. The absence of a legislative or methodological basis for creating the SC strategy is evidenced by a case study from Nitra, whose type of strategy does not in any way comply with the objectives of either the socio-economic development strategy or sectoral strategies. Lack of linkages between goals and developing strategies at the same time are revealed. The absence of integration of cultural heritage in SC conceptual models and practical examples brought a

much broader focus in answering the question of what circumstances an SC strategy might be a supportive strategic development tool for cultural heritage development and the city's identity. The SC strategy can be effective in responding to the challenges of cultural heritage only if it is part of the strategic framework in coherence with other strategies. A negative example in the case study from Nitra points to a non-harmonized strategic framework, where the SC strategy has been classified as a completely separate strategy, unrelated to both the definition of objectives and the time frame. Such an approach might lead to conflicting non-harmonized development and the incorrect solution of development problems in practice, as in the case of Nitra's cultural heritage.

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