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Creating a Public Information Management System to Drive Riga a Smart Sustainable Tourism Destination in the Post Pandemic Era of Digital Revolution

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Abstract

Purpose of the article: There are at two-folds, *i.e.* creating a public information management system and driving the City of Riga towards a smart sustainable tourism destination with a value-created tourism digital business model in the post pandemic era.
Method: It is grounded by literature review and conceptual framework construction, and the information management system for Riga is established based on the needs of developing Riga into a smart sustainable tourism destination.
Scientific aim: The aim is to identify factors of a public information management system which is storing and processing massive data with information and communication technologies (ICTs), and to illustrate factors of smart sustainable tourism destinations.
Findings: These include the establishment of a framework of public information management system for Riga city, with supporting information and communication technologies (ICTs), as well as uncovering dimensions and outcomes of smart sustainable tourism destinations. The Riga public information management system will promote the city as a smart sustainable tourism destination. The dimensions of a smart tourism destination are presented, namely, smart economy, smart environment, smart governance, smart living, smart mobility, and smart people. The governance aspects include city governance, environ-urban configuration, socio-institutional structure and techno-economic, while social, environmental and economic issues are stressed.
Conclusions: We present a framework of a public information management system containing functions of storing and processing massive data with six ICTs, and revealing three indicators, people, technologies, and governance, for Riga as a data-driven smart sustainable tourism destination.

Keywords: information management system, sustainable tourism destination, smart tourism destination, smart sustainable tourism destination, post pandemic era, digital revolution

JEL Classification: M31, Q01, R11

Introduction

The emergence of information and communication technologies (ICTs) have changed manners in which businesses get in touch with their customers. The tourism sector is also one of those who have been profoundly influenced by ICTs, and technological changes present tourists various but accurate delivery choices of destinations, while enhancing the competitiveness of destinations. Tourism is not an exception in the wave of digitalization. The adoption of digital technologies has aroused a revolution to the entire tourism sector (Mitas *et al.*, 2015; Solvoll *et al.*, 2015). Various technologies are applied to the tourism sector, typically, Big Data in forecasting tourists numbers (Xie *et al.*, 2021), devices based on the Internet of Things (IoT) and Blockchain as incentives for tourists to explore more attractions (Luo, Zhou, 2021), artificial intelligence (AI) establishing strategies for destination competitiveness (Carlo *et al.*, 2021), cloud computing for detection of tourists' geo-tagged photos for behavioural data analysis (Zhou *et al.*, 2015), and machine learning for text mining of UNESCO attractions (Luo *et al.*, 2021). There are abundant research outcomes applying new technologies in the whole tourism sector, which have not been fully presented in this part. However, even if there are countless current and future aspects combining the tourism sector and new technologies, "data" and "value" are the core in the digital revolution ear.

Data has been regarded as values of vital importance in the tourism sector. Traditional tourism data comes from structure data and is applied to some analytical reports, revealing few values to promote the growth of the tourism sector. As the rapid development of ICTs, superabundant unstructured tourism data emerges as an information boom. Tourists are using the Internet to search tourism information, to share tourism information, and to purchase tourism products. Their Internet searching behaviour leaves traces which is data. The data is collected and stored, which becomes information, while this information is used to generate values for the tourism sector. The data is captured in the information warehouse and processed by algorithms according to specified aims of promoting the tourism sector, thus creating values for the sector. The information acquired from diversified resources, structure and format serves as assistance for decision making (Al--Msloum, Alharbi, 2021). Therefore, information management becomes necessary and important for the generated data from diverse resources, structures and format for specified aims of the tourism sector. An information management system helps store information into the warehouse and combine it with facts, gearing knowledge into values (Al-Msloum, Alharbi, 2021).

Information management systems store and process data, while generate random data and transform the random data into values. As a technique of acquisition, identification, sharing, development, utilization and assessment for knowledge (Al-Msloum, Alharbi, 2021), an information management system generates values. Especially, in the post-pandemic era, researchers emphasise social aspects of the tourism sector than ever. Sustainable issues and smart issues of tourism are widely discussed by researchers and practitioners, and a public information management system combining both of the issues making a city competitive when tourists are considering and selecting cities as destinations. Riga is the capital city of Latvia, the largest city of the Baltics, and an UNESCO World Heritage Site designation. Riga is famous for its Old Town (Vecrīga) and city centre (Centrs), with over 800 buildings in the Art Nouveau (aka Jugendstil) style of architecture. However, the competitiveness of Riga as a destination is still a core issue for tourism stakeholders as the tourism sector is an important source of export revenue and a key contributor to the GDP in Latvia.

Therefore, this study aims at presenting a framework of a public information management system for Riga. The public information management system could be functioning as a warehouse for data and values for the tourism sector, responding to the needs of developing Riga as a sustainable and smart tourism destination in the era of digital transformation and its recovery from the pandemic. Besides, this study aims at exploring the themes of sustainability and smartness to tourism destination, answering needs from both tourists and destination stakeholders. Being sustainable and smart are the twin themes of current destinations, so dimensions for both themes should be taken into consideration. Value creation and competitiveness for Riga city as a destination are the vital aims of the study.

1. Literature review

Destinations, geographically, are locations or areas (Buhalis, 2000), either a country, a region, a city or a village (Elbe, 2003). In the context of tourism, a tourism destination, should include services and infrastructures needed for tourists and offer tourists with experiences (Buhalis, 2000). Tourism destinations are unique, since they comprise services, goods, infrastructures, as well as weather, climate, nature, and other natural attributes (Blasco *et al.*, 2014). Tourism destinations contain key elements attracting tourists and meet their needs upon arrivals. Tourism destinations are related with sectors such as tour operators, ground transportation, airline, accommodation, restaurants, and travel agencies (Lohmann, Pearce, 2010). Today's tourists have a large number of choices among destinations, but less time for making decision. Therefore, the use of information communication technologies (ICTs) has radically changed the relationship between tourists and destinations (Malachovsky, Kiralova, 2015).

Sustainable tourism destinations might comprise recognition schemes promoting sustainable development at destinations or destinations achieving sustainable development in a long run (Lee, 2001). The environment, economy, culture, social, and recreation are the dimensions to examine in order to be labelled as sustainable tourism destinations (Nilnoppakun, Ampavat, 2016). Providing destinations with sustainable tourism attractions along with support for indigenous development and active environment management has been considered as essences of sustainable tourism destinations (Shafiee *et al.*, 2019). Effective governance is considered as a result and function of successful developing sustainable tourism destinations and stakeholders at destinations could advance pursuit of sustainable tourism destinations (Roxas *et al.*, 2020). Although sustainable tourism destinations need to be more explored and more accurately defined, sustainability and sustainable development still remain themes attached to the tourism sector and tourism destinations.

Smart tourism destinations – this is a definition emerged with the development of ICTs (Gelter *et al.*, 2020), as well as urban development (Johnson, Samakovlis, 2019), in terms of collection and aggregation of information from tourism operators, infrastructures, and individuals to a particular destination (Gelter *et al.*, 2020). It is a holistic approach with ICTs' support for destination marketing (Lee *et al.*, 2021). With the technological infrastructures, a digital environment is created for destination, and therefore the tourism destinations become smart tourism destinations (Baggio, Del Chiappa, 2014). Those digital technologies create an environment effectively supporting destination knowledge creation, sharing, and exchanging (Buhalis, Amaranggana, 2014). Digital transformation is regarded as the wave promoting the development of tourism destinations, in which smart tourism destinations are regarded as a way of destination

management (Buhalis, Amaranggana, 2014). Digitized information of the destination is used to create commercial and human values for tourists focusing on sustainability, experiences and efficiency (Chen *et al.*, 2021). Meanwhile, the quality of life of the local residents together with the communication among stakeholders have been enhanced, as tourism resources are elevated more effectively and efficiently at smart tourism destinations (Um, Chung, 2021). Smart tourism destinations indicate that data is usefully integrated and available in one place for tourists (Shafiee *et al.*, 2019).

Smart sustainable tourism destinations – this reflects a twin-essence at destinations (Shafiee *et al.*, 2019), smartness of the destination and sustainability at the destination. Sustainable tourism destinations emphaise a multi-pillar nature of the destinations, which is an integration development of social, economic and environmental aspects of the destinations while smart tourism destinations stress the usage of technologies creating values for stakeholders and the competitiveness of the destinations. Being smart may represent a conflict with being sustainable. Therefore, with technologies' empowerment, sustainable tourism destination could also be smart, while with the concept of sustainability, smart tourism destinations could also meet the needs of different stakeholders for long-term sustainable development. An up-to-date development idea for tourism destinations should combine the thoughts of being sustainable with smartness. **Smart sustainability** at tourism destinations (Bulchand-Gidumal, 2022) is a new paradigm, a wheel framework for destination management, with six dimensions and three factors for each dimension, and smart economy, smart sustainability, smart governance, smart tourists, smart mobility, and smart residents are included. A smart tourism destination is depicted and illustrated in details with issues and dimensions, meeting the needs of recovery, reopening tourist destinations and tourism-related sectors after the pandemic mobility restriction. The technologies are also essential in terms of the implementation of information technologies guaranteeing health issues of tourists and residents while saving businesses from shutdowns (Bulchand-Gidumal, 2022). In the era of recovery from COVID-19, technologies of smart tourism destinations are not over-stressed anymore (Femenia-Serra, Ivars-Baidal, 2021). In fact, smart tourism destinations with new technologies are the exact means needed in the digital revolution to overcome the sequel brought by the pandemic.

Information systems (IS) are defined as a set of technologies which collect, process, store, and distribute information to support decision, coordination and control (Laudon, Laudon, 2010). In information systems, data is shaped into a form transforming meaningful and useful knowledge to people, and therefore creates values. Raw facts are understood. People, organisations and technology are key essences of information systems. Facing challenges, information systems provide solutions (Laudon, Laudon, 2010). In the context of tourism, tourism information systems collect, process, store and distribute tourism information and provide tourism stakeholders with the required knowledge. However, the advent of technologies, such as, Big Data, Blockchain, artificial intelligence, cloud computing, the internet of things, and machine learning (Al-Msloum, Alharbi, 2021; Baltistello *et al.*, 2021; Cai *et al.*, 2019; Sun *et al.*, 2021; Yu *et al.*, 2020; Zhao *et al.*, 2020) means that these technologies are applied in information systems, thus becoming **information management systems** due to algorithm and real-time feedback. Information systems put an emphasis on technologies while information management systems stress more real-time solutions. Information management systems are muti-functional to predict, plan, control, trace and also help with decision-making, combining sustainability and smartness issues at

Table 1. Smart cities supported by information management systems.

No.	Authors	Name of the Smart City	Geographical Location	Dimensions	Managerial Scope	Outcomes
1.	Zeng *et al.*, 2020	Qinhuangdao	China	Technology	Smart decision Smart development Smart destination	Big data analytics for smart tourism
2.	Gupta *et al.*, 2020	London	UK	City Governance & Transportation	Openness Diffusion Shared vision	City data ecosystem & orchestration of city data
3.	Camboim *et al.*, 2019	Lisbon Barcelona Vienna Amsterdam	Portugal Spain Austria Netherlands	Governance	Environ-urban Socio-institutional structure Techno-economic dynamics	Sustainable socioeconomic development performance
4.	Esposito *et al.*, 2021	Wallonia Brussels	Belgium	Socio-economic	Gross value added (GVA), Gross Domestic Product (GDP) per capita, 3G, 4G, Internet Speed, Portable device, Website, Social media, Education, ICT specialist, Public governance	Policies for the growth potential of the ongoing digital revolution for regional strategies and human capital
5.	Shamsuzzoha *et al.*, 2021	Helsinki Singapore City London	Finland Singapore UK	Social sustainability Economic sustainability Environmental sustainability	Smart houses, smart energy, smart parking, smart health, smart traffic, smart sustainability, smart technology, smart data, smart city measurement	ICT infrastructure efficiency for urban development, level of city competitiveness, and sustainability
6.	Bjørner, 2021	Copenhagen	Denmark	Economy, City Governance & Environment	Data from technology Smart city network Energy lab Smart waste management Smart parking Street lab Intelligent lighting Smart village City challenges	Smart growth for city cluster with computer-driven urban development for knowledge sharing among municipalities

destinations. Information management systems are the solutions for smart sustainable tourism destinations in the digital revolution.

Information management systems and smart cities are dynamic, integrated and evolving systems represented by the complexity of ICTs. Recent research (Bjørner, 2021; Camboim *et al.*, 2019; Esposito *et al.*, 2021; Gupta *et al.*, 2020; Shamsuzzoha *et al.*, 2021; Zeng *et al.*, 2020) presented smart cities within information management systems. Bjørner (2021) discussed a computer-driven urban development with the smart city for smart growth, with an emphasis on smart economy and smart governance for city cluster. Knowledge sharing and interrelationships between slow-changing urban forms and faster changing urban flows with social, economic, political, technological, and environmental factors are key issues for support from the information management system to the smart city. The complex nature, conflicts and inter-dependencies of smart cities are objectives of the holistic evaluation and success of smart cities (Shamsuzzoha *et al.*, 2021). Urbanization and population are two main trends greatly affecting the way of people's lives and smart cities (Shamsuzzoha *et al.*, 2021). Cities have promoted themselves by introducing ICTs with different stakeholders, building blocks of the information management system construction, and goals of establishing smart cities (Shamsuzzoha *et al.*, 2021). Camboim *et al.* (2019) agreed that smart cities are urban innovation ecosystems where knowledge flows among different stakeholders to create values, and the ecosystems are supported by flexible institutional structure and integrated participative governance models. The features of the ecosystem for smart cities are openness, diffusion, and shared vision (Gupta *et al.*, 2020), which provides insights for information management systems of smart cities. However, regional government attributes should be taken into consideration when the design of the information management system for a smart city is made, since there is no one-size-fit-all approach to smart urbanism (Esposito *et al.*, 2021). Especially, when the holistic strategy is fixed to suit urban environments for tourism city destinations, the potentials of technology and organizational actors could be actualized (Zeng *et al.*, 2020). Table 1 presents several examples of smart cities supported by information management systems with new ICTs. Different dimensions of smartness of cities were emphasised, and different managerial scope of the city governance were presented. Outcomes of the growth empowered by the development of smart cities were also revealed. The complexity and holistic perspectives of smart cities were uncovered. Table 1 is on the next page.

2. Method

This study is based on the literature review. The study constructs a conceptual framework for an information management system for Riga based on the needs of sustainability and smartness at the city destination with new technologies and transformation in digital revolution era facing needs of tourism recovery from the pandemic.

Besides, this study starts from literature review. Webster, Watson (2002) argued that an effective review creates a firm foundation for the progress of knowledge. Wolfswinkel *et al.* (2013) explored a five-step process method for literature extracting information, shown in Table 2. The five-step process includes "Define", "Search", "Select", "Analyse", and "Present". In the "Define" step, criteria and field of the research scope will be identified and appropriate and specific literature resources will be confirmed. The "Search" step is to start searching literature. Besides, the "Select" step is to refine the sample. Moreover, the "Analyse" step is to perform "open coding", "axial coding" and "selecting coding" for constant comparison.

Table 2. A five-stage grounded theory method for reviewing the literature.

1. Define
1.1 Define the criteria for inclusion/exclusion
1.2 Identify the field of research
1.3 Determine the appropriate sources
1.4 Decide on the specific search terms
2. Search
2.1 Search
3. Select
3.1 Refine the sample
4. Analyse
4.1 Open coding
4.2 Axial coding
4.3 Selective coding
5. Present
5.1 Present and structure the content
5.2 Structure the article

Source: Wolfswinkel et al., 2013.

The last step is "Present" the structure of the article (see Table 2).

According to the five-stage grounded theory, this study carried out the screening processes and started the research literature ground preparation. The "define" process focuses on peer-reviewed and published articles in English from the year 2000 to 2022. Key words include "sustainable tourism", "sustainable tourism destination", "smart tourism destination", "information management system", "pandemic", "COVID-19", and "tourism technologies". The "search" process consists in selecting, electronic databases. These include Emerald, Science Direct, IEEE Explore, Taylor, Francis, and Springer. Due to limited access to Google, Google Scholar was not used. Then, 130 papers are presented and reviewed. Qualitative data analysis and information coding are performed using Nvivo11. The core of the study is sustainable smart destinations and information management systems. Thus, the related concepts are classified accordingly.

Based on the literature review, this study constructs a conceptual framework. The conceptual framework reflects the key issue of this study which is to create a public information management system for Riga. The public information management system should be able to collect, process, store and respond to data and provide tourists and stakeholders with solutions and decision making. Technologies should be supportive essences for the public information management system. The City of Riga should be developed as a smart sustainable tourism destination. Moreover, needs of health issues and economic

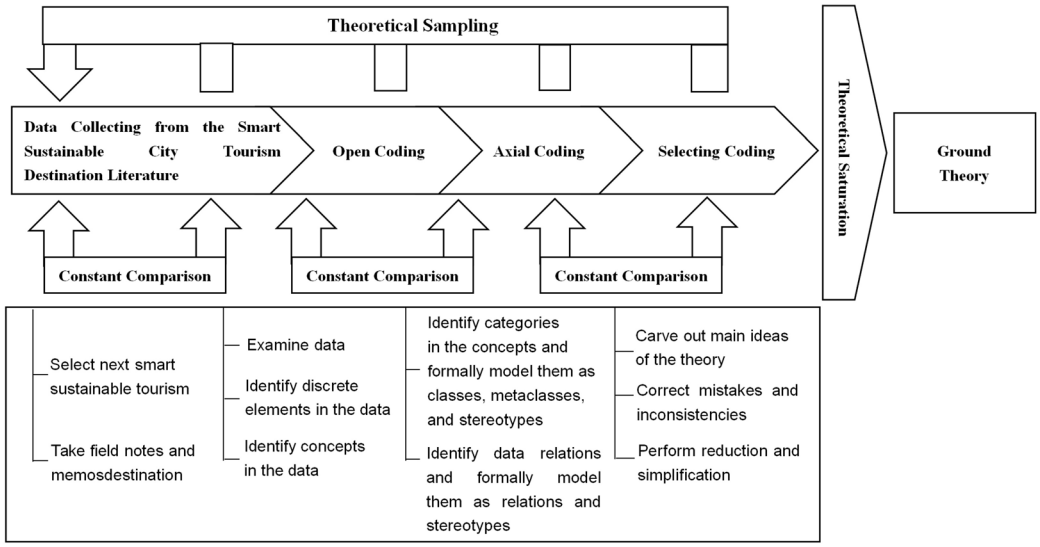

Figure 1. Grounded Theory for this research. Source: Adapted from Singjai, 2021.

recovery from the tourism sector should be considered. Combining all these aspects, the result consists in the conceptual framework of the Riga public information management system.

Figure 1 shows the processes and theoretical saturation of the grounded theory for "smart sustainable city tourism destination". The grounded coding process was modified with UML-based modelling for identifying potential designated model continuously (Singjai, 2021). The analysis was stopped when 10–15 additional knowledge sources did not work anymore for understanding the research topic. Figure 1 presents the research steps with details. In the data collection step, "smart sustainable city tourism destination" was applied, and the open coding step has been performed without UML-based modelling, while the axial coding step has been formalised and categorised. Classes, meta--classes, stereotypes, and formal relations with relation stereotypes are applied, and axial coding was applied to carve out main ideas of the research. Correcting mistakes and inconsistencies to perform reduction and simplification are included in the saturation process (Singjai, 2021). Repeated steps were performed for each data source till the saturation process was fully completed.

The main analytical idea of grounded theory is to compare. By applying constantly when comparing the data and theory, the grounded theory extracts relevant categories and their attributes according to the correlation between the data and theory. There are usually four steps for comparison including: (1) Compare the data according to the category of concepts while code the data and classify the data under as many conceptual categories as possible, and then compare the coded data in the same and different conceptual categories to find attributes for each conceptual category. (2) Integrate relevant conceptual categories with their attributes, compare these conceptual categories, consider the relationships between them, and connect these relationships in a certain manner. (3) Outline the preliminary theory, determine the connotation and extension of the theory, return the preliminary theory to the original data for verification, and constantly optimise the existing theory to make it more refined. (4) State the theory, and describe the mastered data, conceptual categories, the characteristics of categories and the relationship between conceptual categories layer by layer as the answer to the research questions.

When analysing the data, researchers can use the theory initially generated from the data as the standard of data sampling in the next step. These theories can guide the next step of data collection and analysis, such as selecting data, setting codes, establishing coding, and archiving systems. Each theory presented at present has a guiding role for researchers and can limit where and how researchers should go next. Therefore, data analysis should not only stay on the mechanical language coding, but should carry out theoretical coding. Researchers should constantly establish assumptions about the content of the data, generate theories through argument and comparison between the data and assumptions, and then use these theories to code the data. The ground theory with its steps are shown in Figure 1.

3. Conceptual Framework of the Information Management System for the City of Riga

After the grounded literature review, the conceptual framework of the information management system for Riga is created. As shown in Figure 2, technologies are the outer layer, serving as the supportive mechanism for the information management system. The technologies, such as Big Data, Blockchain, artificial intelligence, cloud computing, the internet of things, and machine learning are possible techniques to apply. Therefore, the orange layer represents technological supp-

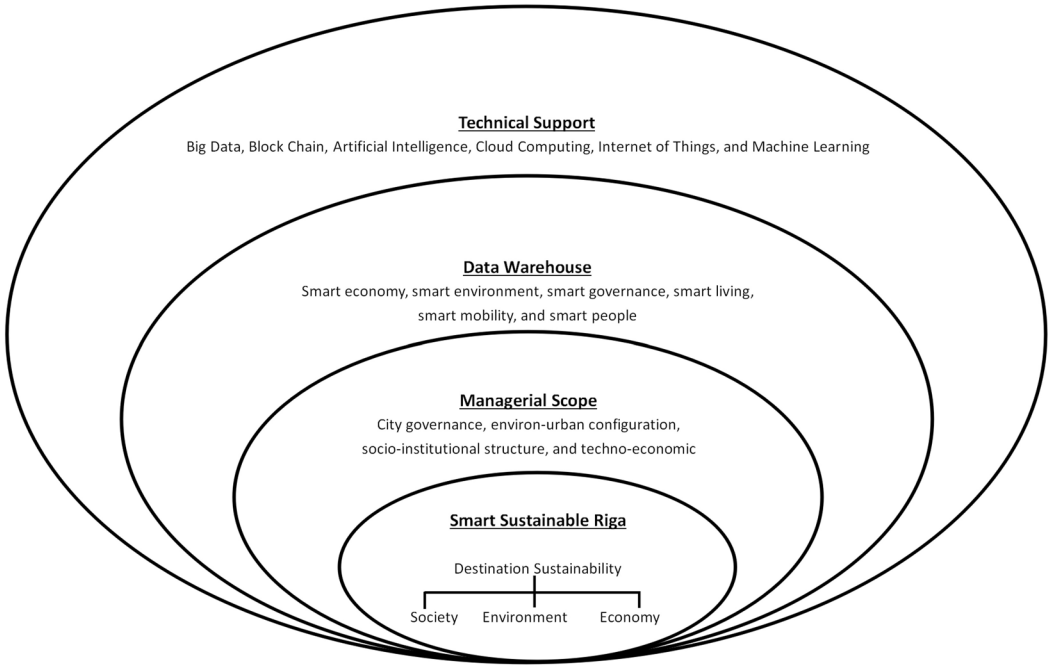

Figure 2. Public Information Management System for Riga City.

ort in the information management system. The second layer, the blue layer, represents data sources from six dimensions (Bulchand--Gidumal, 2022) of the City of Riga. As each of the dimension has three further sub-dimensions, eighteen sources in total could be used as sources of data. The third layer, the yellow layer, represents the city managerial aspects from a smart city perspective. City governance is the philosophy behind the tourism destination layer that Riga city as a city destination has specified needs for city governance. Therefore, information and data to support city governance are also needed. The core, the green layer, is the essences of a smart sustainable tourism destination, which is a three-pillar practice for long-term development. Social, environmental and economic data and information should be collected and stored, representing benefits and needs of both tourists and stakeholders in Riga (see Figure 2).

The construction of the Riga city information management system is conducive to providing better services to tourists through new information technologies. It is also beneficial to allow for the effective use of information resources and the systematisation and intensification of information resources. The construction of the sustainable smart tourism destination information management system integrates sustainable tourism information chain and smart tourism information chain to explore the wisdom, synergy and sustainability of the Riga city as a tourism destination. The interactive function of the information platform is used to meet the communication and interaction among tourists, tourism service providers, local residents and government regulatory authorities, which enhances the efficiency of information resources.

Information management systems include tourism-related organisations and individuals. They are formed based on information service platform and new technologies. In this process, different individuals or organisations effectively cooperate and interact to carry out information interaction and build

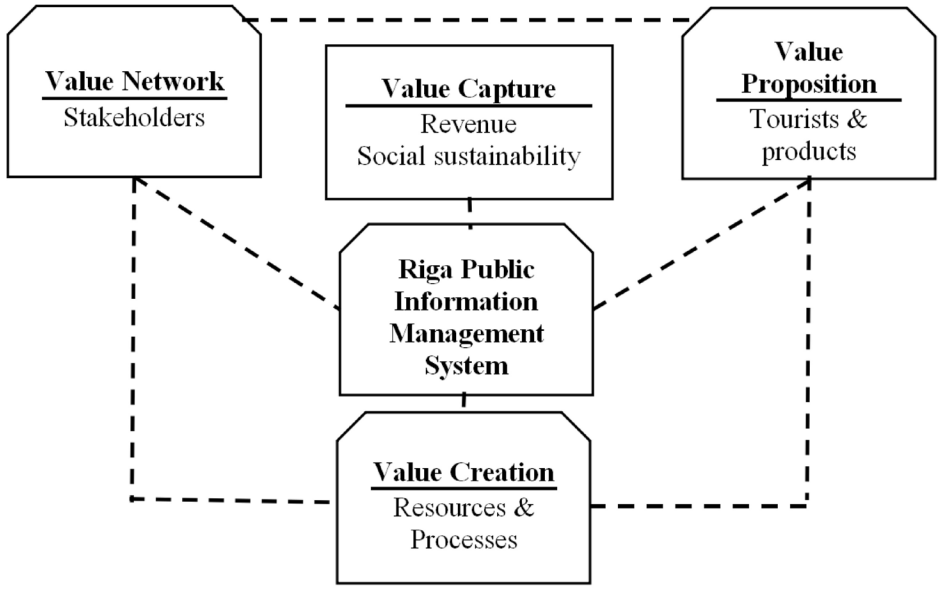

Figure 3. Value of Public Information Management System of Riga City. Source: adjusted from Perić et al.,

relevant systems to ensure that the tourism information management system will achieve dynamic balance. Therefore, it will meet the personalised needs of tourists to a higher degree, realise the effective improvement of tourism service experience, and ensure the sustainability and smart tourism development in the digital revolution times.

The information management system includes different essential elements. Information technologies are the core to make full use of various advanced information sets and data, ensuring the operation of the whole system. Furthermore, tourism authorities at all levels, enterprises, networks, websites, and tourists are the subjects of sharing information. These subjects are also called nodes in the system. A complete information system requires a combination of different types of nodes, such as information producers, organisers, transmitters, and tourists. The different types of information subjects form a smart sustainable tourism information system in the process of sharing information and achieve dynamic balance through continuous optimisation and improvement. Meanwhile, the information management system mainly includes the external environment such as social, economic, and legal, as well as the internal culture and business environment of the enterprise or organisation. These environments directly affect the flow and operation of information in the entire information system. Last but not least, an information management system includes a variety of information such as food, accommodation, transportation, attractions, shopping, and entertainment, generally presented through various texts, pictures and audio-visuals. The information mainly includes two types of information: experience sharing and word-of-mouth. The experience sharing includes comments on attractions, tourism routes, transportation, accommodation, or even foods. The word-of-mouth information mainly reflects tourists' feelings and evaluation after visiting. At the same time, the different needs of tourists will form different information contents, which will influence the competitiveness and attractiveness of destinations. Tourists generated data will become information collected, processed, stored and

evaluated by the information management system.

As a managerial tool, the business model refers to value creation, delivery and capture (Perić *et al.*, 2017). Perić *et al.* (2019) proposes business models for identified sport tourism, which states value creation as a core, with value network, value capture and value proposition, for sport tourism. Adapting Perić *et al.* (2019), destination elements and resources could be connected into the business model to process values. As information is value of the destination, the information management system could be adopted into the business model. See Figure 3.

4. Discussion

The information management system is essentially different from the simple collection of traditional information. Smart sustainable tourism specifically refers to amplifying the overall value through resource sharing, effectively enhancing the breadth and depth of tourism public services and ensuring a higher degree of integration between the tourism sector and the information sector. The smart sustainable tourism destination information management system enhances the level of operation and management quality, obtains the most accurate psychological expectations and service needs of tourists, and even analyses the negative factors affecting tourists' purchase of tourism services, so that travel agencies, scenic spots, hotels, and other business entities could adjust their products and services accordingly and provide more accurate and targeted services to tourists to achieve the goal of improving tourism management quality. In addition, the construction of smart sustainable tourism destination information management system strengthens the supervision of environmental protection. It improves the management system of local environmental protection to implement effective supervision and management of tourism environmental protection. The two systems work together to form the integration of smart sustainable tourism destination information management system to realize the sustainable and high-quality development of regional tourism.

One thing should be ensured that the information in the smart sustainable tourism destination information management system could be updated in real time. On the basis of monitoring statistics, the number of visitors in smart sustainable tourism destinations in real time should be analysed to prevent exceeding the maximum number of visitors. Major risk factors that may endanger visitors should be avoided in advance. Risk monitoring and other technologies should be applied to avoid extreme conditions, especially to avoid potential health disaster affected by COVID-19. Risk sources, current characteristics and development trends of risks, and their possible adverse impacts should be classified. By releasing risk warning information, corresponding insurance mechanisms will be established, and cross-sectoral aftercare and restoration measures will be implemented. Improving the relevant systems requires strengthening the formulation and implementation of smart sustainable tourism information regulations and systems. It also requires establishing a management mechanism conducive to the sharing and effective use of information resources. The monopoly of information among regions, enterprises and departments may be broken through a standardised coordination mechanism and sharing mechanism. It needs to improve the relevant policies and systems, give full play to the responsibilities of information supervisors of local tourism management departments. Therefore, all elements of the system operate reasonably and smoothly, and the balance of the entire tourism information management system could be maintained.

The costs of COVID-19 still impact our life. Globally, more than 600 million people have had COVID-19, and 6.5 million have

died from it, while trillions of dollars have been spent by nations to prevent their economies from collapsing, on treatment, on testing, or on vaccinations due to outbreak of the disease. However, people who got COVID-19 are continuing to experience long COVID. Spending on both health care and mental health care has sharply increased. Life expectancy has decreased and people's life of quality (LoQ) has been reduced due to the impacts of COVID-19 and long COVID. Long COVID (Alghamdi *et al.*, 2022; Grisanti *et al.*, 2022; Notare *et al.*, 2022) means the symptoms of fatigue, headaches, coughing, joint muscle and chest pain, shortness of breath or difficulty breathing, dizziness when attempting to stand, memory, concentration, sleep issues, loss of smell and taste, depression, anxiety, organ damage, and decreased life expectancy. There has been an increase in the case of constant headaches, being unable to work, being constantly depressed, or knowing the chances of dying earlier. Besides, the economic effects of COVID-19 and long COVID are yet to overcome. The real costs of COVID-19 include social, economic, and political costs. Those social costs might be losses of loved ones, care for long COVID, mental health issues, loss of faith and hope, and increased social political divisions while the economic costs include trillions in stimulus funds driving the stagflation, in debt, in lost wages, in additional health care costs and an oncoming world recession, while the political costs are millions of needless deaths, stimulus funding, mounting debts, and divided nations and the world.

The tourism sector has been severely impacted by COVID-19 and will be impacted by the long COVID in the coming years. Previously, the smart city had a vital function of promoting urbanisation of cities, and now the smart city has an additional task, which is defending public health of cities while ensuring business growth. Therefore, the core of the information management system of Riga is "value", value network, value capture, value proposition, and value creation. The emergence and popularisation of new technologies have brought more possibilities for the iterative upgrading of the tourism sector. Among them, the smart tourism construction relying on information technology has become an important engine to improve the high-quality development of the sector, especially, empowering the sector capacities and possibilities to responds to the challenges. The construction of the smart tourism city destination includes terms and definitions regarding local governance and regulations, infrastructure, tourist attractions and service facilities, public services, publicity and marketing, destination management, safety warning, and other aspects. Smart tourism cities run through the whole process of tourists before, during and after the tour. From the perspective of government, enterprises, tourists, and other subjects, they standardise and describe the content of tourism city information construction, and put forward basic technical requirements for the Internet, internet of things, cloud computing, big data, artificial intelligence and other technologies used in the guide to the construction of smart tourism cities. For example, the "infrastructure" includes network support, a data centre, video monitoring, public broadcasting, intelligent parking. Among them, the tourist distribution centre, stations and parking lots in other key tourist places should support the functions of parking space reservation, parking guidance, intelligent car search, and sensor-based payment.

5. Conclusion

The development of information management system for Riga will empower destination management and marketing for Riga as a smart sustainable tourism city destination. Destination management mainly provides reference standards for governments,

enterprises, and other management parties, including real-time monitoring, forecasting and situation deduction of passenger flow in scenic spots, characteristic cultural blocks, parks, cultural centres, and other key places through intelligent applications. The construction and operation of a smart tourism city should adopt the mode of "independent construction + integration and sharing of digital infrastructure" to connect with digital government, provincial and municipal digital platforms for cultural tourism and other data interfaces, so as to provide support services and important data sources for the creation of famous tourism counties and global tourism demonstration areas. A smart hotel may contain the door lock of the guest room supporting Bluetooth or any other door-control systems. The construction of the smart tourism city in Riga should fully reflect the basic situation and resource characteristics of tourism hotel industry of Riga city, mainly including the infrastructure, a smart hotel application system, a smart tourism hotel big data centre (smart brain), and other aspects. There are service requirements for guest rooms and public areas directly facing tourists, while public service areas should have full wireless network coverage. There are also financial management, human resource management, material procurement and inventory management, and other internal operation management aspects, such as "dynamic query of goods allocation and real-time inventory", "user-defined account query and voucher management function", which help tourism sector reduce costs and increase efficiency. It is essential to implement smart new technologies represented by 5G, enable marketing strategies and multi-dimensional service experience, and achieve sophisticated management, precision marketing and fine service of tourist hotels. The construction of the smart tourism city will open a new era of the smart tourism city and smart tourism hotels in Riga based on standardisation to lead the construction and operation, improve the degree of urban smart tourism, promote the quality and effect of smart tourism hotel construction and operation, help accelerate the digital transformation of cultural tourism, establish a comprehensive urban management system, promote the innovation of the business model, and address the challenges faced by tourism development in the post-pandemic era, and promote sustainable development at the destination.

Riga is an emerging tourism destination, with many natural resources and a rich cultural heritage. This study aims at establishing an information management system for Riga for the purposes of collecting, processing, storing, and interpreting data, creating values, and further developing Riga a smart sustainable tourism destination in the post-pandemic era of digital revolution. Therefore, this study examines the concepts and essences of smart sustainable tourism destinations. The information management system is supported by new technologies, such as, big data, Blockchain, artificial intelligence, cloud computing, the internet of things, and machine learning. Through the active perception, real-time transmission, mining analysis and operation control, the information management system timely and accurately grasps the tourism resources and tourist activity information, realize the real-time query of tourism routes, vehicle scheduling and environmental monitoring, and therefore achieve the whole process service on hand, desk, car and road, and change the passive and lagging management mode of tourism industry supervision. The information management system is supposed to enhance the autonomy and interaction of tourists in food, housing, transportation, tourism, shopping, entertainment, and other activities and provide tourists with more than the expected experience level and ubiquitous tourism services. Real time feedback should be provided. Tourism information such as catering navigation, catering reservation, hotel navigation, hotel reservation, discount reminder,

intelligent dispatching, traffic guidance, parking management, route navigation, sightseeing car positioning, attraction information and navigation, 3D tour, virtual experience, activity notice, ticket reservation, commodity information, anti-counterfeiting query, group purchase in mall, discount, entertainment navigation, entertainment reservation, music, and video should all be provided within the information management system.

The proposed information management system of Riga city will promote a holistic development of smart sustainable tourism city destination for Riga city. As shown in Figure 1, the system will be supported by ICTs, and city and tourism related data will be collected and processed in the data warehouse. The technologies with data will be applied to deal with specified managerial issues by algorithm in order to ensure destination sustainability of Riga city. Tourism data and information will be processed and used for business model innovation. Therefore, the three pillars of Riga city sustainability will be promoted, and local well-being will be ensured. Oncoming challenges of post COVID or long COVID will be met by the development of smart Riga. Riga city will achieve its urbanization in the new era.

The digital revolution provides scientific and technological guidance for the construction of smart tourism cities. First of all, big data led the construction of tourism big data centres and realised the comprehensive and in-depth application of data resources to provide decision-making and consulting services for governments, enterprises, and tourists. Secondly, through the construction of the database and the construction and integration of the overall architecture of the data resource layer, an application support layer, information service layer (presentation layer), and other platforms, a multi data platform has been built to achieve the reception and integration, mining analysis, image display of multi-source data, and support the application scenarios such as precision marketing, operation optimisation, and information query centring on the government, enterprises, and the public. It is necessary to build a hierarchical open system of the data platform, provide data information services to government departments, enterprises and institutions, and the public, realise the data sharing of tourism passenger flow, tourism consumption and tourism services, and build a development sharing system. Finally, the application level of urban informatisation has been constantly improved, and smart city construction has emerged as the times require. The smart city is a multi-dimensional project. Smart parks, smart travel, smart public security, smart communities, smart transportation, and other fields are the driving force of smart city construction. The development of smart cities is a major and comprehensive measure to promote the high-level informatisation and networking of cities in China. Building a smart city is of great significance in achieving sustainable urban development, leading the application of information technology, and improving the city's comprehensive competitiveness.

Smart tourism cities have become a key direction of urban construction, and a large number of smart tourism pilot cities have emerged in the world. However, the construction of smart tourism cities is still in an exploratory stage. Although some gratifying results have been achieved, a perfect system has not been formed after all. Through the analysis of the key elements of smart tourism city construction, it is expected to provide theoretical guidance and practical reference for the smart tourism city construction in full swing. With the progress of science and technology and the development of society, "smart tourism" has become the trend of the times, which has had a wide impact on all kinds of entities in the tourism industry. The construction of a smart tourism city covers all aspects of the whole tourism activity. The structure and construction of its system undoubtedly requires a lot of basic

preparations and research to ensure the perfection and practicality of the construction of a smart tourism city. Therefore, this paper analyses the key elements in the construction of a smart tourism city from the aspects of government support, market environment, technical conditions, human resources, and operation mode, hoping to find out the core content that needs attention in the process of building a smart tourism city.

6 Research limitations and future research

The research was based on literature review of smart sustainable city tourism destinations, combining the current tourism situation of Riga, the created model of the information management system is a model for the municipality of Riga. It will be provided as a reference for its development of smart cities and smart tourism. However, there will be suggestions and comments from stakeholders of Riga, including the tourism board, or even residents. However, the information management system of this research was based on global smart cities, which might give some insights to Riga as a smart sustainable city destination. Moreover, the information management system has not been fully examined by technical staff and has not been applied by Riga. It is necessary to identify practical issues of the information management system. Moreover, stakeholders' suggestions and comments could also be effective for the improvement and detailed design of the information management system.

In addition, it is advisable to conduct future research comprising interviews with Riga smart city project stakeholders. The feasibility of the information management system could be further discussed by involving interview results from both academic researchers and practitioners. Research about information management system from the computer science perspectives could also be added into the future research.

It is also possible to explore future research of the business model innovation. As the information management system provides real time information and suggestions for tourists and stakeholders, the innovated business model for destination marketing could serve as directions for future research. On the other hand, tourists' perceived images of Riga could also be one of the future research directions. The competitiveness of Riga due to the application of the information management system will be of interest for researchers. Quantitative research of collected data processing could serve as one direction.

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