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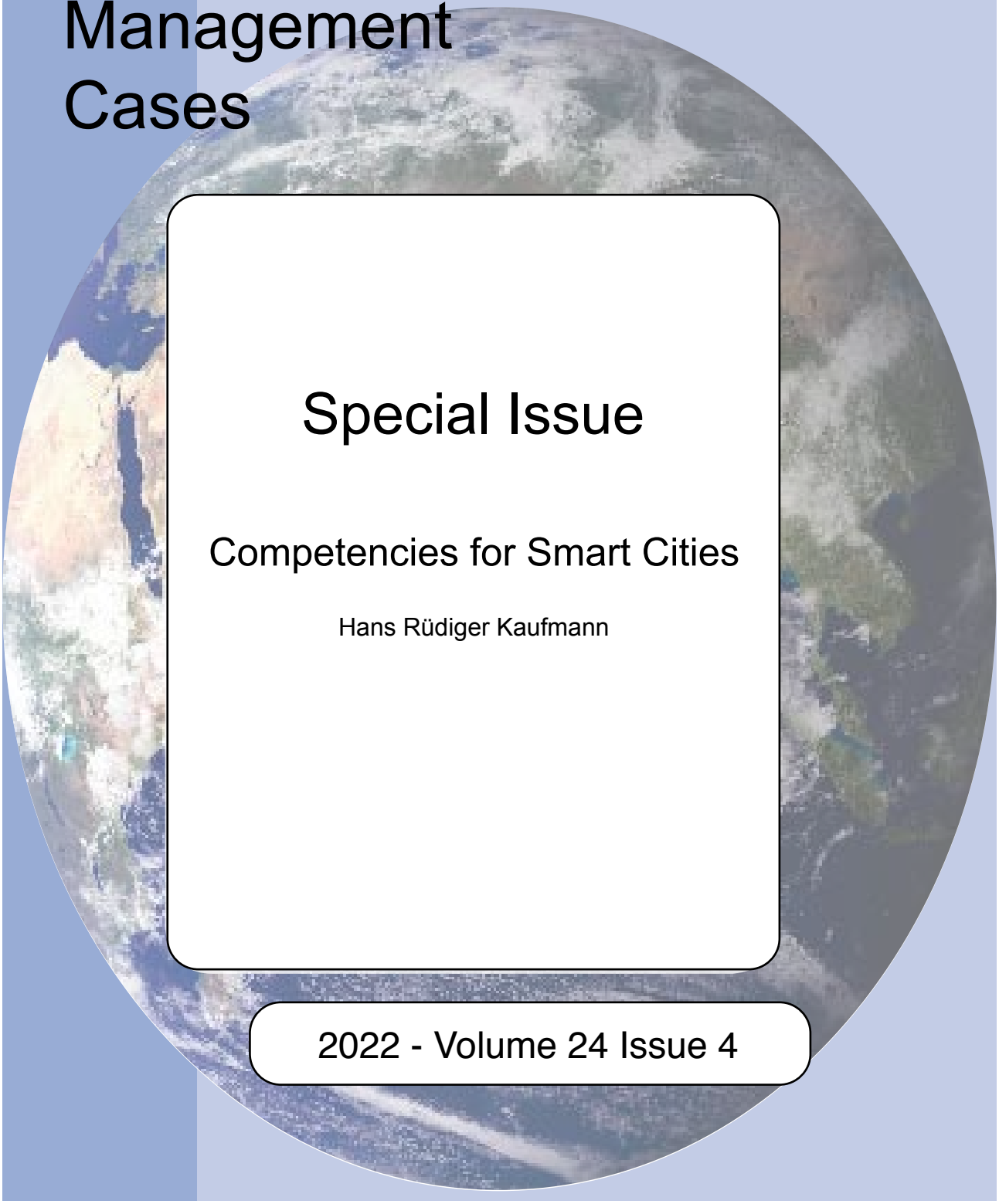

Special Issue

Competencies for Smart Cities

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Editorial

Driven by the UN 17 sustainability goals, the emergence of innovative digital technologies and the implicit re-designing of diverse systems for smart cities, a new knowledge stream is currently developed on the requirements of ever more ecologically sustainable, socially inclusive, and economically viable approaches to urban growth. This guest edition is inspired by the participation in the Erasmus + project 'DevOps Competences for Smart Cities (https://smartdevops.eu/dev/).

Even though this urbanization movement is expected to entail significant benefits such as higher levels of citizens' welfare, productivity or innovation, the flipped side of the coin cannot be avoided as it also offers overwhelming challenges. The urban growth signifies that the cities are gaining greater jurisdiction over their development, economically as well as politically. However, this edition enunciates the city's core systems' technological dependence and their interconnectivity unlocking the portal of a new stratum of intelligence. Analogously, cities are facing a wide array of challenges and threats to their intended level of sustainability. Hence, there is widespread consensus among the multidisciplinary members of the smart city's ecosystem to address its growing urbanization through 'smartly' manage urgent issues relating to mobility& transport, construction, energy provision, health, education, waste, user expectations, information and communication technologies, and, last but least environmental challenges to mention but a few. Against this backdrop, the authors of this guest edition mull over the curative marketing philosophy applied to smart cities, citizens' awareness, participation, inclusion in the cities' decision making, and leveraging social entrepreneurship for city strategies by using crowdfunding as a unified effective tool for citizen participation. The researchers in this guest edition might contribute to seize the opportunity and build sustainable affluence through "smarter" solutions.

When curative marketing is applied to smart cities, the dynamics of the smart cities are built to such a degree that it not only focuses on designing a more citizen driven environment but also integrate the intensive knowledge base and interactive systems. The main objective of the study conducted by Kaufmann, Altıntaş, and Czinkota is to determine -by a bibliometrics analysis- the major categories in the living areas of the citizens in terms of curative practices from the perspective of marketing processes and consumer relations. Hence, the focus of this study is to initiate a fruitful relationship between curative marketing and smart cities to occur. The authors approach curative marketing as a new marketing approach depicting a reformist structure to revise and improvise consumer-individual and society-market connections. The current transformation of the city and the required creativity, stakeholder logic, job creation, etc. strike more importance to consumer-citizen unification. In relation to this, the study promotes the development of a localized application which is highly customized to the society, consumers, and the citizens. The suggestions call for the marketers to take responsibility for designing a framework for the betterment of society and investing in the solutions for social and ecological problems by effectively contributing to Smart City research and design. Possible mistakes made with a non-human-centered approach can be corrected or avoided with the use of human-centered curative marketing in the Smart Cities. The themes relating to the quality of life and service quality are found to be significantly interwoven with the themes of social participation, social sustainability, and community engagement.

Concerning the quality of life, with the world's population increasing massively day by day and the increasing global population in the cities, sustainable development becomes a

central component for urban management. Particularly, waste management, being one of the fundamental services catered for by the cities, is posing major challenges as only about 30% of the waste is estimated to be recycled or reused. It is inevitable for the cities to become the epicenter of waste generation and, hence, to contemplate solutions to decrease the volume of the waste significantly. For that reason, Schäffner aimed in his paper to identify the role of Smart Cities for the transformation into a circular economy. It is apparent that waste management has a clear connection with negative environmental impacts and affects people's health and quality of life. Therefore, Schäffner concludes that a smart city clearly plays a central role in the development of the circular economy. A smart city should be an enabler for the circular economy influencing and supporting areas like technology, circular business models, and consumer behaviour. Massive opportunities can be availed with the help of technology, especially through the access of data in areas of waste and recycling as well as in using goods, generating information and processing them for predictive maintenance and improved recycling processes. Schäffner regards cities to be uniquely positioned to play a significant role in shaping the circular economy due to their proximity to citizens and businesses. Various measures are presented on how cities can have an impact, also through the careful use of data-driven technology.

Hussain's and Feucht's research aims to investigate the function and extent to which the citizens of a city should and can partake in the planning and development of smart cities. Two research objectives were formulated: to find out whether and how a smart city involves its citizens in the planning process and to investigate the impact of citizen participation on the citizens themselves. Relying on the three attributes related to humans, institutions and technology, a smart city is suggested to have a plan and a clear mission and vision that incorporates all upcoming technologies and makes use of them for further development of the cities for the betterment of its citizens' life, depending on their needs and urgencies. This could be made possible if both the governmental agencies and the citizens of a city acknowledge that new guidelines, plans, and schemes would be the prerequisites for achieving greater sustainability, advancement of the business and economic sectors, and ultimately increasing the standard of living of the people. A smart city's metamorphosis considers the opinions of their citizens to be able to achieve mutual benefits and make the citizens feel recognised in the planning of a city.

The following paper of Jadhav and Sanchez Bengoa emphasises the importance of smart Information and communication technologies in the evolution of an educational system, especially after the occurrence of the pandemic. This research investigates the role of information and communication technology (ICT) in education with the ambition to explore the factors which influence ICT integration in the teaching and learning processes in German Universities. The authors elicit the necessity of ICT training, a significant increase in the use of ICT tools available online (either free of charge or paid for), a innovative style of the teaching and learning process. Jadhav and Sanchez Bengoa also extend to the three-factor -Attitude, Use, and knowledge- interlinkage and joint performance for successful integration of ICT in the teaching and learning processes. Light is shed on the knowledge prevailing of ICT being limited to online learning which indeed is a small block of the ICT application and is used as an umbrella term for a large array of technological devices, applications, networking components, and systems. The current functioning of the classrooms is very different from the ones three, five, or ten years ago. Hence, the author recommends taking measures for correct guidance, clear communication, and training about the ICT and its efficient usage procedures.

Shukla investigates the social entrepreneurial facet of the smart city as it provides self-sustainable solutions for social purposes beyond personal wealth pursuit. Entrepreneurship is a continuously evolving concept because of the constantly arising multifaceted complex issues in modern society eventually leading to social entrepreneurship taking an effect in possibly driving the smart city movement. Unfavorably, even with the increase in societal support, social entrepreneurs often fail to acquire sufficient financial support from the capital market. As a solution to help sustain the social entrepreneurs, the emergence of crowdfunding to aid the shortage of funds has been discussed. Shukla's research aims to synthesize various factors of the different crowdfunding models to leverage social entrepreneurship and innovation. The author suggests to close the gap by designing a framework of the social entrepreneurial and crowdfunding ecosystem. Methodologically, a qualitative research case study method has been conducted. The theory of Value-Attitude-Behaviour (VAB) is used to understand the participation of the crowd funders in sustainability initiatives. The research blends social entrepreneurship and crowdfunding concepts and provides an efficient road map to address the sustainability issues emphasising specific factors recommended for each funding model. Based on these insights, future research recommendations for developing the interaction model from the perspective of intermediaries and investors are provided.

The five papers of this guest edition can only provide a limited glimpse on the vast array of smart city themes. However, they effectively zoom in important key pillars for the smart city movement: a marketing & citizen centered philosophy, IT based education of smart people, the circular economy, and social entrepreneurs significantly supporting the cities in their endeavors.

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Curative Marketing Applied for Smart City Design

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Abstract

The present study focuses on identifying and classifying the main conceptual interfaces between smart city, digitalization, and curative marketing phenomena. Smart cities are suggested to operate within the framework of the curative marketing concept supported by developments in Industry 4.0. This synthetic and interdisciplinary conceptual relationship aims to strengthen the quality of life of urban citizens and increase public value. A bibliometrics analysis was carried out in the context of the smart city relationship with keywords representing curative marketing topics in the literature. As a result of the examination of 1645 academic articles related to the co-word method, main and sub-themes as a set were elicited to categorize and typologize this network relationship providing a basis for a better with-human or on-human smart city design.

Keywords: curative marketing, smart city, bibliometric analysis

Introduction

Smart cities are considered to exert an essential curative effect in the context of bringing citizens closer together (Ranchordás, 2019). Another curative or co-creating characteristics of Smart Cities is indicated in that those who live in smart cities can be expected to contribute to power and capital if they adapt (Schneider, 2019). The mechanism of a smart city focuses on creating a more peaceful environment, while necessitating an intensive knowledge-based and interactive system. In smart cities, which utilize the Internet of Things (IoT), the requirements of the consumers and urban inhabitants are expected to be managed in a more sustainable manner regarding the resource input within the marketplace. Heitlinger and Comber (2018) stated that smart cities were shaping the lives of its citizens through knowledge, innovation, and technology within the scope of capitalism. On the other hand, in a more reformist sense, Smart cities might also be considered leaning more towards variegated capitalism (Rossi, 2016) as specific smart city applications such as eco-city applications variegate capitalism within the context of socio-regulatory transformations. The Smart City, which relates to the information society (de Jong et al., 2015), focuses mainly on relationships between personal well-being and participation (Macke, 2018) and could alter the urban perception of an individual within the context of social and ecological sustainability (Yeh, 2017). For example, it is important to provide a more productive and controllable air and climate system for the consumers based on the causality within the context of urban mobility and capitalism-climate (Clark and York, 2005) to organize the transportation preferences of, especially, the consumers and maintain sustainability (Camagni et al., 2002). The authors of this paper suggest that the philosophy of Curative Marketing should be pursued in multidisciplinary research laboratories employing like-minded

multidisciplinary scholars who apply a rich mix of methodologies, networks, and communities to new interpretations of smart city improvement. The main objective of the present study is to determine the major factor groups that could be categorized or clustered based on the living areas of the consumers and citizens in terms of social and individual curative practices and based on academic studies conducted on smart cities and from the perspective of marketing processes and consumer relations (Kaufmann et al., 2015). The restitution spirit of curative marketing to re-address the balance in case of marketing blunders (Czinkota and Kaufmann, 2017) corresponds with Raglio's and Vico's (2016) 'back to the essence' notion of being curative. Hence, the present study focuses on determining the relationship between curative marketing and smart cities as a basis for a reformist structure to emerge. Whilst social marketing represents a concept to support the sensitivity towards social problems, curative marketing is a new marketing approach representing a reformist structure by intending to revise and improve consumer-individual, society-market relations. In this current city transformation, creativity, stakeholder logic, job creation etc. attach more importance to consumer-citizen unification. Thus, curative marketing aims to introduce a new format instead of supporting an existing system with palliative practices. There are some studies and developments supporting the proposed logic (Petrescu, 2019). Curative marketing is basically a multidisciplinary structure derived from the evaluation of transformative service, ethical marketing, social marketing, social and individual identity, public value and co-creation (Kaufmann, Czinkota and Zakrzewski, 2015). Curative marketing investigates the sub-elements that will mediate the improvement of the system. It focuses on building a structure in order to generate the real value by transforming the existing structure in essence, in the case of Smart Cities, with the help of digitalization. In this context, we suggest that smart cities can create an environment that can provide a consumer-individual-citizen nexus, which is consistent with the curative marketing logic. As an innovative contribution, the paper provides the philosophical and conceptual basis for a with-human and on-human driven smart city philosophy with the consumer/citizen being center-stage. The notion of human here refers to humanity and implies to create a new human-centered format. However, curative marketing demands not only the human dimension but also the revision of the existing system to create a better model. It is examined how this re-structuring and re-balancing can be achieved with smart cities being exploratory modeled with the qualitative analysis method. Currently, more technical classifications are found in the evaluation of smart cities. These are mostly in the form of performance, index, and indicator (Lombardi et al., 2012; Shi et al., 2018; Duarte et al., 2014; Lazaroiu & Roscia, 2012; Ahvenniemi et al. 2017). These measurements are mostly about determining how a smart a city and its elements can be classified on four main factors: Individual participation and development, providing social cohesion, increasing economic efficiency and quality of city management. The theoretical background of the article includes a detailed examination of these factors. In the following, a conceptualization is made in terms of the pillars of the smart city and curative marketing phenomena. Summarizing, this paper focuses on a ‘with-human’ and ‘on-human’ perspective through the lens of the curative marketing philosophy for a smart city design. Firstly, a literature review and conceptual relationships are discussed before the qualitative methodology and analysis is explained resulting in the conceptualization and conclusions.

Literature Review

Curative features applied to smart cities

The curative concept expresses a healing, reformatting, corrective and restorative meaning. In order to define the concept of being curative or to prepare the ground for the curative marketing phenomenon, the concept must first be defined theoretically according to its spatial reflections. Curative factors specifically refer to other gamma in group therapy (Gullo et al., 2015; Bilican, 2017; Black, 2003). Especially, when considered in terms of group behavior, belonging, development, sharing and learning factors seem to be significant factors (Fuhriman et al., 1986). It supports the preventive structure in ensuring social cohesion (Naidoo and Wyk, 2003) and is used to get out of suppressive states (Rosenthal, 2003). It is the perception of the reality of the person, others and life, and its change by ensuring the trust of others by gaining individual freedom (Dick-Niederhauser, 2009). In addition, it has a feature of relaxation or improvement (McWhirter et al., 2014; Kennair et al., 2016). In the field of music, the curative phenomenon refers to focusing on returning to its essence, simplifying, and mastering the structure (Raglio and Vico, 2016). The resulting symptoms are considered to be subject to re-transformation (Cruwys et al., 2013). In terms of marketing, it can be examined as a consumer-/ individual- and/or group oriented improvement incorporated into any system, such as the eco-system of a smart city. Relating to the before mentioned smart city categories of individual participation and learning, the design of smart cities draws upon a knowledge society (Barth et al., 2017) and open innovation (Paskaleva, 2011). User-friendly applications based on an interconnected structure aim for a better quality of life for its citizens (Albino et al., 2015). Hence, smart cities must ensure congruency between needs and knowledge of citizens, social and ecological sustainability, digitalization, urban responsibility, and technology (Angelidou, 2015). Against this backdrop, sociological factors such as urban attachment or social and environmental relationships have a high impact on urban services (Belanche et al., 2016) implying a high relevance of social identity, which is an essential part of curative marketing (Czinkota and Kaufmann, 2017; Czinkota, Kaufmann, and Basile, 2014; Kaufmann, Czinkota and Zakrzewski, 2015).

IoT and city smartness

Pursuing the aim of improving the quality of life, the effective use of devices, for example, through intelligent home control systems, higher levels of efficiency in terms of energy consumption in the households or health-friendly medical monitoring, might provide for a comfortable and safe future (Jie et al., 2013). By connecting people and objects using all networks and services - always, everywhere, with everything and everyone - the Internet of Things (IoT) could be a main driver of this city transformation (Guillemin and Friess, 2009; Ashton, 2009). The IoT catalyzes the interaction of users of respective applications, i.e. via smartphones, within the living space of the user (Perera et al., 2015). This spreading of information and interactive contacts within the living space of consumers/citizens manifests itself in the management of smart cities (Zanella et al., 2014). Whilst urban planning aims to establish an infrastructure for people to enjoy better lives, individual or corporate consumption becomes an essential part of this development. The city-individual-consumption algorithm is increasingly converging triggered by mobile devices and technologies. With the introduction of Industry 4.0, smart cities can regulate a potential chaos in fields such as living areas, waste, and transportation in large

metropolitan areas. It can be expected that this would reduce the criticism on the negative impact of capitalism on consumerism and distribution of the resources, or it might be argued that capitalism could play a regulatory role. Lefebvre (1969) emphasized that it was urbanization, not industry that provided causality for capitalism. Implicitly, problems of capitalism are observed in urban areas highlighting 'everyday life' as a central theme. It can be suggested that smart cities - against the critical view that everyday life could disappear due to urbanization (Kipfer, 2002) - could alleviate this problem by accessing personal information and constructing 'everyday life' tailored to its requirements. Indeed, the IoT technology is described as a service delivery system to the users with the services being delivered through tangible intelligent products as mentioned above (Al-Fuqaha et al., 2015). Basically, IoT encompasses city information modelling (Atzori et al., 2010) via a structure that includes transportation, infrastructure services, citizens, and companies (Gubbi et al., 2013). In this respect, IoT could be considered to provide benefits for consumers as a way of social innovation. In this context, Nakano, Kim and Tratz- Ryan (2015) suggest a cycle for smart city technologies and solutions running consecutively through the following stages with different time horizons to mainstream adoption: innovation trigger, peak of expectations, trough of disillusionment, slope of enlightenment and plateau of productivity.

Smartness is an essential element (Garbrys, 2014) and value for a city (Anttiroiko, 2014), in which citizens are not only living in but become co-creators of social wellbeing. In this context, the function of citizens in smart cities will be paramount (Joss, 2017) comparable to their co-creation function in brand leadership development. In terms of urban planning, one of the elements related to curative marketing is the human and social development dimension (Angelidou, 2017). Hence, the linking of the area, functions and city-building processes with the human factor needs to be established (Komninos et al., 2015). It will be an important point to consider which elements to be integrated in planning the smart city (Krivý, 2018). As a public sphere, the conceptualization of smart cities as a structure that considers management as a participant with convergent elements (Oliveira and Campolargo, 2015; Ramirez et al., 2017) can be considered as a curative marketing practice. This will necessitate the expansion of participatory planning and a target towards a livable society (Staffan and Horelli, 2014).

Transformative human-centered economy

In the marketing literature, the transformative perspective is examined from various vantage points. While some express the need for an awareness-raising infrastructure in consumers, for example in environmentalism (Polosnky, 2011), others suggest that a radical marketing understanding should be provided that creates value and welfare beyond marketing over-defining consumers in terms of materialism (Varey, 2010). Varey (2008) stated that this transformation can be achieved with an interaction-based welfare marketing. Lefebvre (2012) stated that this can be engineered as a transformation in a holistic sense highlighting the joint production of value. Varadarajan (2018), on the other hand, emphasized that rapid transformation will affect the transformation of technology entailing more detailed consumer analysis. At this point, it becomes apparent that smart cities will be the means and motor of this transformation and that the service-dominant logic (Vargo and Lusch, 2008), which focuses on the creation of value by producing the service together, will be supported by smart systems (Vargo and Lusch, 2017).

The concept of curative is synonymous with the concept of transformative treatment in the medical realm (Faulkner, 2019). In this context, curative marketing is closely related to the concept of transformative service. Transformative service research (TSR) is basically service research that centers on creating uplifting changes and improvements in the well-being of individuals (consumers and employees), families, social networks, communities, cities, nations, collectives, and ecosystems" (Anderson et al. 2011, p .3). One of its goals is to increase the interaction-based well being of consumers (Black and Gallan, 2015). At this point, it is known that curative marketing calls to eliminate its own mistakes based on individual responsibility and renews the system (Czinkota, 2012). In other words, it refers to how to improve the negative interactions of the consumer with the marketing of the society and companies. Therefore, it demands to create real value to improve humanitarian society and calls to economically and sociologically acting together (Obaze, 2019- not in references). It is suggested that smart cities will be more beneficial if they create value by pursueing a citizen-focused smart City strategy driven by co-creation and systemic co-existence rather than merely creating consumers (Cardullo and Kitchin, 2018). In the context of politics, this refers to the reformist concept in some sources (Roy, 2016). Relating exemplarily to identity, Arnett's, German's, and Hunt's (2003) pioneering work calls for providing additional social benefits to customers, beyond a merely economic exchange relationship, as a logical consequence of the integration of the sociological identity theory into Marketing. Identity, a central component of the Curative Marketing Philosophy, as it focuses on the human factor in a conceptual and methodological context, is regarded as both, a desirable finality (i.e. social identity or livelihoods of smart cities) and a mechanism to achieve it, as the central internal and external communication platform to achieve it (Balmer, 2008). This emphasis on human centered themes when designing smart cities is suggested a guiding star and map for technologies to be developed to put these human centered themes into practice.

Social Marketing and Social Innovation

Establishing social relationships by marketing is mostly examined in the literature in terms of social marketing.Traditionally, social marketing focused on non-profit institutions to engage members of the society in socially desired and curing behavior (Dann, 2010; Stumpf and Teufl, 2014; Gromberg, 2006; Russell-Bennett et al., 2019). Due to an increased nexus between social organizations and private companies to achieve social goals, other authors (Stumpf and Teufl, 2014; Kotler and Lee, 2008, Leuser, 2008) suggested integrating Cause Related Marketing into the concept of Social Marketing embracing a social objective besides an economic one. Going beyond this expanded Social Marketing connotation, the authors of the present paper call for a new Curative Marketing philosophy that subordinates economic objectives to human, society or ecology centered system stabilization and innovation. Furthermore, whilst Social Marketing has a mainly external focus, the new paradigm of Curative Marketing most importantly has an internal focus and suggests, a priori, a self-critical approach to past errors and mistakes inflicted by government, municipalities, national or international corporate marketing and supply chains that would be addressed by a spirit of restitution. Based on an in-depth understanding of and empathy for local conditions, any damages to the various system actors must be avoided or, if occurred, restituted. Furthermore, this new paradigm attributes a more prominent role to marketers in developing and setting societal objectives towards improvements in the quality of life. In line with Loewenstein (2013), the authors of this

paper are convinced that new global problems require innovative global solutions informed by an interplay of disciplines. The social innovation concept is a construct based on criteria such as innovation, development, processes intending to meet social needs through entrepreneurial activities and to reach a social impact (Krlev et al., 2014). In this light, the core of the social innovation indicators relate to the process of producing knowledge for turning social problems into a kind of social contribution (Unceta et al., 2016) mirroring the spirit of Curative Marketing and Social Entrepreneurship as one of the philosophy's components. The role of the city administration in the smart city movement is essentially one to facilitate and develop practices aimed at increasing the quality of life of its citizens as individuals and a community, with respect to horizontal and vertical development (Gil-Garcia et al., 2016; Khan et al., 2014). This change management is suggested to be led by a transformational leader with the ability to motivate and co-ordinate the diverse smart city stakeholders towards the common smart city objective and vision (Antonakis, 2006; Kaufmann and Durst, 2008; Kaufmann, 2012).

Participation and mutual interaction

In the process of rapid and innovative decision-making in the management of smart cities, citizens' participation in the city (Meijer and Bolívar, 2016) will enable them to go beyond their consuming function to one contributing to renewal or regeneration of the city. Thus, this new function will provide support for social welfare, especially in the context of social justice, crime, energy consumption and time creation. Moreover, individuals will also, at least indirectly, contribute to the lives of other individuals. The elements of smart cities include not only physical but also social and administrative foci (Gil-Garcia et al., 2015). The physical infrastructure will also enable the opening of the vital sub-areas in the context of social interaction and enable individuals to spend more quality time in the city. Smart cities, on the other hand, will realise and meet the needs of citizens more effectively to better manage resource constraints. In this respect, the effective establishment and deployment of smart city applications can support the slowdown of social inequality. As a civilian actor, citizens will form higher levels of social cohesion (Lazaroiu and Roscia, 2012) and a more humanistic system, which, in a sense, means a reduction of social barriers (Miklian and Hoelscher, 2017). In the context of the establishment of an infrastructure for citizens as service consumers, city administrations establish a mutual interaction by creating ideal service areas related to vital expectations (Cosgrave et el., 2014; Nam and Pardo, 2011). This mutual interaction approach results in the creation of public value (Fontana, 2014) at higher levels of efficiency (de Waal and Dignum, 2017), while managing the complex consumer segments within the social framework. Thus, the created value that improves the living areas of the consumer, was produced together, like the co-creation approach in consumer engagement marketing, and, beyond life issues evolving towards an ecological system design (Meijer et al., 2016). This reflects a resource efficiency that eliminated physicality to a large extent (Kramers et al., 2014). Abovementioned conceptualization of joint value creation, with more curative content, renders the dissemination of a more consistent and interactive environmental and social consciousness (Gabrys, 2014) through providing a service approach which is compatible with individual values of the consumers and citizens (Liu et al., 2014) and through focusing on the concept of smart living as a marketplace (Batty et al., 2012).

Citizen-oriented value and co-creation

Some sub-applications regarding citizen-oriented services need to be clarified in terms of smart city logic, including administration, transportation, public health, environment, crises and disaster prevention, facility management, education, cultural activities, and work (Lee and Lee, 2014). City governance should focus on institutional, physical, social, and economic infrastructure and should be integrated with social marketing (Kalra et al., 2016) and, especially, Curative Marketing. The opportunity to transparently access all types of information could support or, at least, provide guidance to achieving the goal of reducing the social distance between people with a more socio-ideological logic emphasized by the critical urban theory (Brenner, 2009; Brenner et al., 2009). Thus, the urban production system could provide a development in the concept of agglomeration (Scott and Storper, 2014), which emphasizes the flow of information by connecting the trade information beyond the mere consumption mechanism of the individuals. Hence, a development could be triggered in holistic awareness about the city, belongingness (Angelidou, 2014), environment and vital awareness (Caragliu et al., 2011). Importantly and repeatedly, the bond between the citizens and the other stakeholder would be strengthened (Fernandez-Anez et al., 2018). When viewing the smart city technologies in the context of IoT, the logic of co-producing and collaborative use of knowledge comes repeatedly to the fore. This is consistent with the concept of co-creation value (Shams and Kaufmann, 2016; Ranjan and Read, 2016; Balaji and Roy, 2017; Mejtoft, 2011) that refers to the interactive use and mutual value-oriented sharing of information necessitating a system where this sharing is considered as an open and collaborative innovation (Lee et al., 2012). Product development and collaboration dimensions utilized in the co-creation could be used to improve the content and quality of the services provided to the citizens with smart city systems (Alves et al., 2016). The co-created value reinforces the basis for a more human view and care for citizens and consumers (Denhart and Denhart, 2000) by synergizing the impact of phenomena such as sharing information, adaptation to the consumer, more efficient use of resources and by ensuring that more specific needs are satisfied (Pereria et al., 2017). Furthermore, this is the basis for a more cosmopolitan structure (Vanolo, 2016) and a sense of belonging that is based on accessibility and openness (Kudo and Granier, 2016).

Bibliometric Analysis

A bibliometric analysis was conducted to identify the themes with transformation of the subject based on keywords that reflect the curative marketing perspective of smart cities. The main object of using bibliometric analysis in this stage is to position the sub-groups determined in the text-mining stage. Bibliometric analysis has been used effectively as a methodology to elicit and visualize academic development, interactions, and factor relationships within a knowledge stream. The data obtained via bibliometric analysis facilitates the identification of field development potential and expectations. The ability to determine the change, transformation and focus in fields and sub-fields requires that the dataset should relate to a specific period (Cobo et al., 2009) since the recentness of the subject leads to the employment of a single period where all studies are examined as a single dataset. Indeed, the essential motive is the identification of mutual relationships in the context of specific criteria (Ahlgren and Colliander, 2009) and the reduction of data into themes that are embedded in the study, particularly through word-based processing and normalization that aim to determine thematic networks (Martinez et al., 2015). The analysis is basically a

content analysis (Munoz-Levia et al., 2012). Using this analytical method makes it possible to form and conceptualize main clusters (Khasseh et al., 2017). Herein, especially in word-based analyses, standardization of the singular context is required for the similarity-dissimilarity model to work (Whittaker, 1989; van Raan, 2014; Ravikumar et al., 2015; Su and Lee, 2010). Thus, the co-occurrence mechanism allows the establishment of structural relationships (Assefa and Rorissa, 2013), the determination of the focal content (Dehdarirad et al., 2014) and the identification of sub-network elements and their internal mobilizations (Callon and Laville, 1991) based on the logic of clustering (Cho, 2014). The analysis in the present study was conducted with Scimat software using the four main steps proposed by Cobo et al. (2012): collection of the data (period selection, unit of analysis, data reduction), creating the network, selecting the algorithm and generating the map. The process of co-word analysis is mainly based on creating a matrix (Rokaya et al., 2008) and maps of inclusion and proximity indexes by retrieving data from the database, later identifying the strengths of the connections with inner and outer clusters based on density and centrality (He, 1999) and, consequently, providing a template for the area (Peng et al., 2012) that captures a thematic zone (Topalli and Ivanaj, 2016).

Bibliometrics in Smart City

In the literature, several bibliometric analyses related to the smart city phenomenon were carried out. Some studies include the investigation of technical issues such as IOT, wireless systems, networks, and information in the context of co-word analysis (Guo et al., 2019). Mora et al. (2017) stated that in the bibliometric studies for smart cities, there is a techno-focus perspective focused on smart cities calling to add literature on the humanitarian system. Ojo et al. (2016), on the other hand, researched the characteristics, policy, governance and implementation dimensions of smart cities with the scientometric method. Some bibliometric studies examined the relationship between smart city and sustainability (Tregua et al., 2015). Ricciardi and Za (2015) who conducted studies with social network analysis, stated that there was a concentration in the interdisciplinary distribution of publications related to smart cities in the fields of social sciences, humanities, health professionalism and electrical engineering & computer science. De Jong et al. (2015) conducted a bibliometric study focussing on sustainability. Bibliometric studies on urban issues confirm that the concept of smart city has recently gained momentum (Fu and Zhang, 2017). In this article, themes of the bibliometric analysis related to curative marketing and its interfaces with the smart city concept clustering a transformative view from a marketing perspective. Thus, in this study, keyword and co-word analysis are employed to explore the research themes and thematic evolution of the smart city from a curative marketing perspective.

Methodology

Data Collection

The present study consists of two basic steps: conducting a content analysis of the words gathered from articles, which are indexed in the Web of Science' SSCI by Thomson Reuters to create categorized themes based on pre-determined keywords. The content of 1645 academic articles include the keywords in the WOS (web of science) were analyzed in the period of 1999-2020 by the SciMAT program (Cobo et al., 2012) as topic search. The main reason for collecting the data during this big time span is that such an interface study has not been conducted before.The data were

analyzed with SciMAT software, which enables users to conduct analyses through bibliometric network designs. The software includes various bibliometric measurements such as co-occurrence, coupling, and direct linkage and provides information on different themes covered in the research field (Cobo et al., 2012). SciMAT is an open source software tool developed for science mapping analysis in a longitudinal or cross-sectional study. We have preferred the cross-sectional analysis type by accepting all years as one period (1975-2020) due to the high level of innovativeness of the subject.

Selecting the keywords

Since there is no study in the literature on curative marketing and its adaptability to smart cities, this literature-based examination investigates how the cases in the context of smart cities represent the potential curative marketing perspective. A content classification based on the literature sources is considered as the main research outcome. As mentioned in the theoretical conceptualization, the following keywords can be specified as the interface between curative marketing and smart cities. In the literature, it is concluded that the connection between the human phenomenon and smart cities is reflected by a human (citizen) centric / centered context (Oliveria et al., 2014; de Oliveira, 2016; Marsh et al., 2016; Kempin, 2019). The keywords used for the review of the literature are as follows:

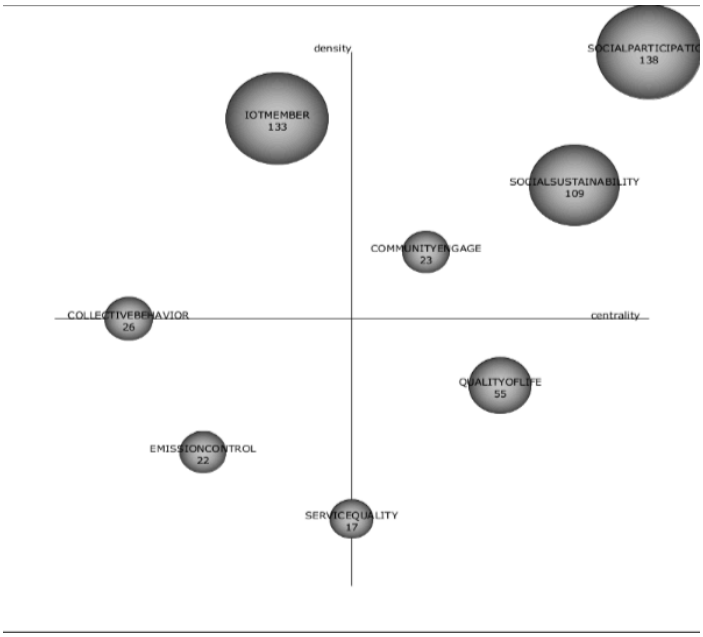
- "social welfare" smart city
- "human centered" smart city
- "quality of life" smart city
- "social well-being" smart city
- "social participation" smart city
- "social equity" smart city
- "public value" smart city
- "social cohesion" smart city
- "ethics smart" city

Data Analysis

At this stage, the research agenda suggested to focus on dimensions of the smart city and curative marketing interface perspective. Keywords reflect a specific aspect of the topic when included in a study title. In total, 1645 articles by 4993 authors, published in 1056 academic journals were identified. As a result of the analysis, based on the similarity realized in the context of co-words in academic articles in the literature, groupings were made according to the frequency and meaning of each word. There was a qualitative assignment of analyzed texts to super-ordinate and sub-ordinate semantic dimensions. The basic dimensions are shown below in table 1. Totally, 2051 items (words) were analyzed and grouped in this process. Before initiating the bibliometric analysis, the obtained themes based on keywords were subjectively grouped by the authors to provide a general outlook and guidance. First, all singular

words are combined under certain themes according to their similarities and meanings. As a result of this preliminary analysis, 66 themes were identified (See Table 1).

Table 1. Themes : Curative Marketing and Smart City Interface (Own Elaboration)

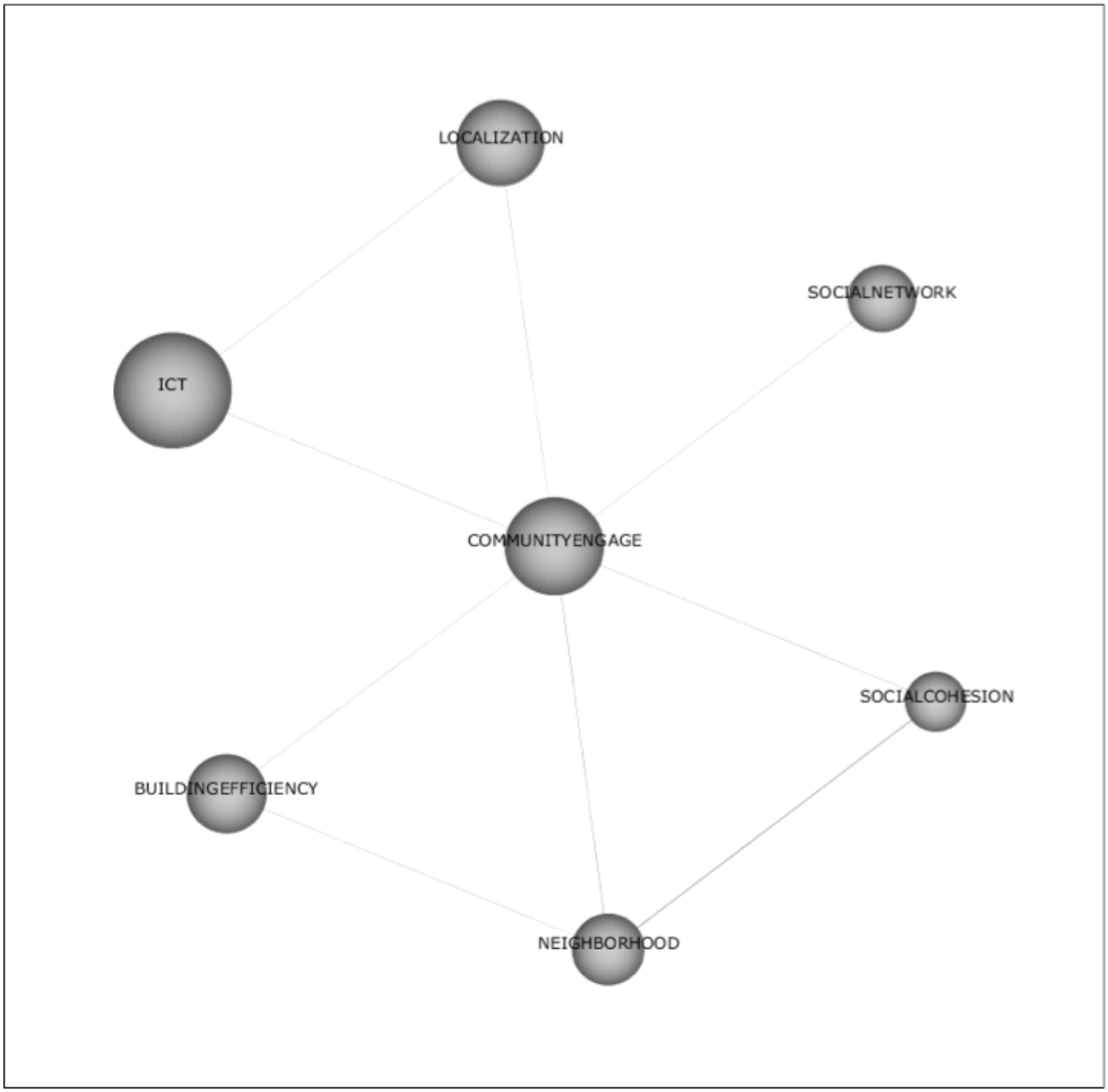


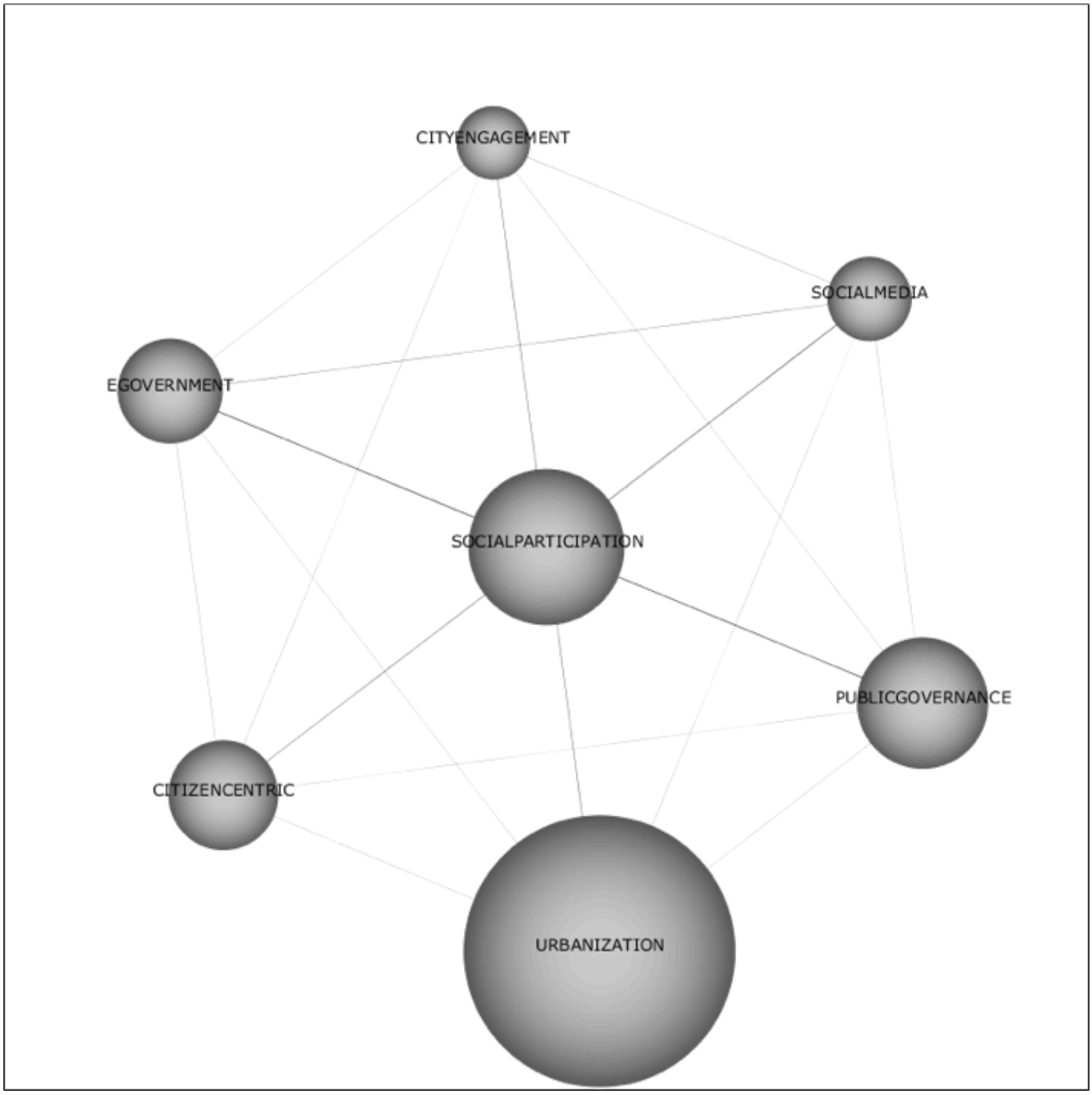
Clustering the Themes

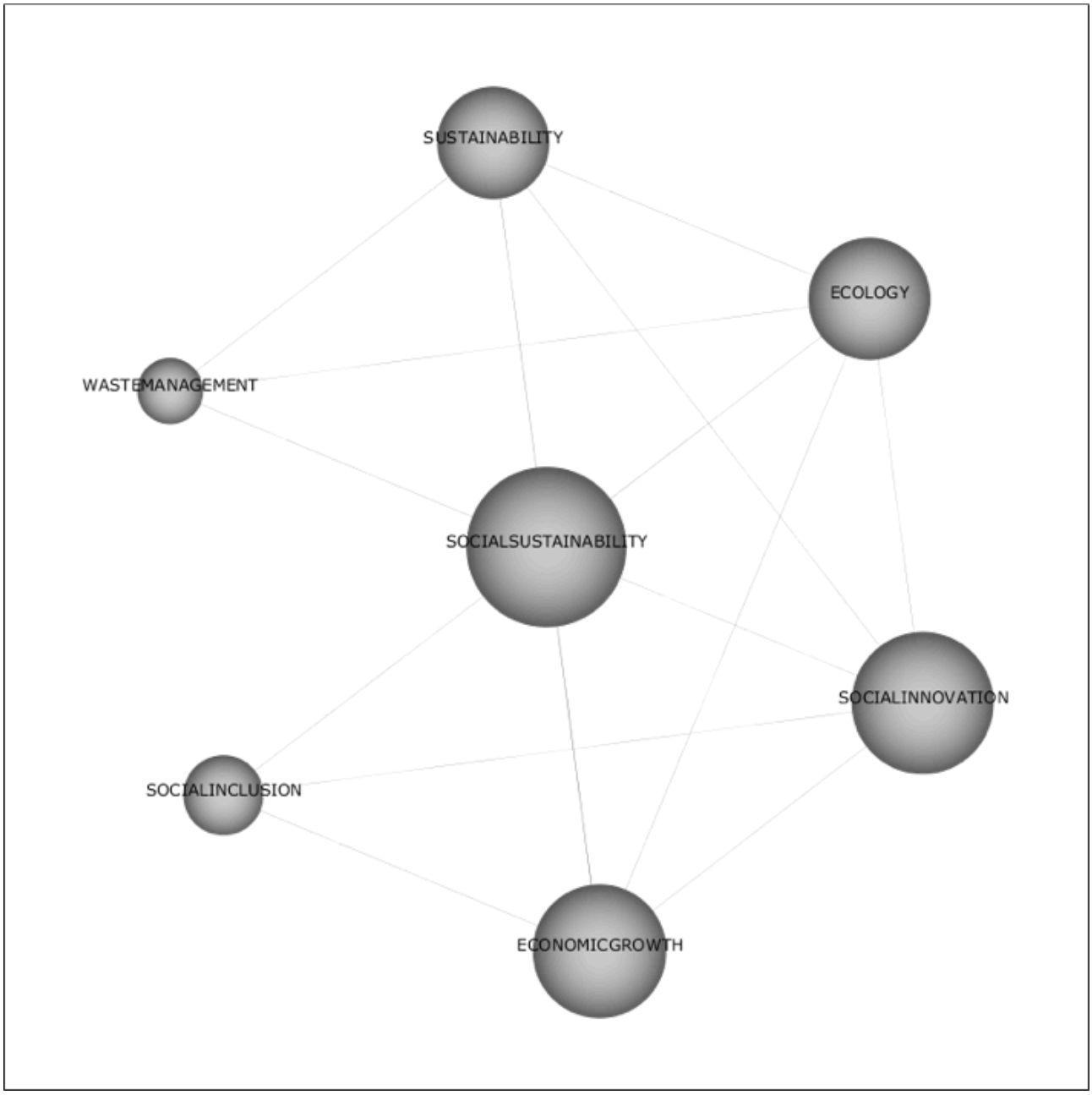
During the clustering process, simple center algorithm (Coulter et al., 1998) and h-index, cum citations were used (Hirsch, 2005). The position of the groups in the diagram was determined based on density and centrality values as previously mentioned (Cobo et al., 2011). High centrality values include strong interactions with other clusters (Ding et al., 2001), and similarly, density values indicate inter-theme relationships (An and Wu, 2011). The network was constructed via the co-occurrence matrix (Leydesdorff and Vaughan, 2006). After the clustering, logic analysis was conducted based on the above-mentioned criteria, the visualization phase was initiated (Figure 1). Figure 1 demonstrates the factors that establish the relationship between curative marketing based smart city keywords. The study resulted in 22 main dimensions that have 66 network members. These classifications were designed by the authors based on words shown by the software program. There are four cells in the diagram (see figure 1) depicting highly developed but isolated themes, motor themes, emerging or declining themes and basic and transversal themes (Cobo et al., 2011). Then these themes are mapped and depicted as a diagram to see the respective positioning of the clusters. There are four cells in the strategic diagram (Figure 1). The right-upper cell consists of motor themes (most developed and important). Themes of social participation, social sustainability, and community engagement are included here. The upper left cell expresses highly developed and isolated themes. This section includes the themes of IOT member and partially collective behavior. The left-bottom cell describes emerging or declining themes. These refer to elements of emission control and partially service quality and collective behavior. Finally, the lower right cell describes general and transversal, basic themes. Themes in this context are quality of life and partially service quality. The centrality and density values of the relevant themes (sets) are as follows: Social

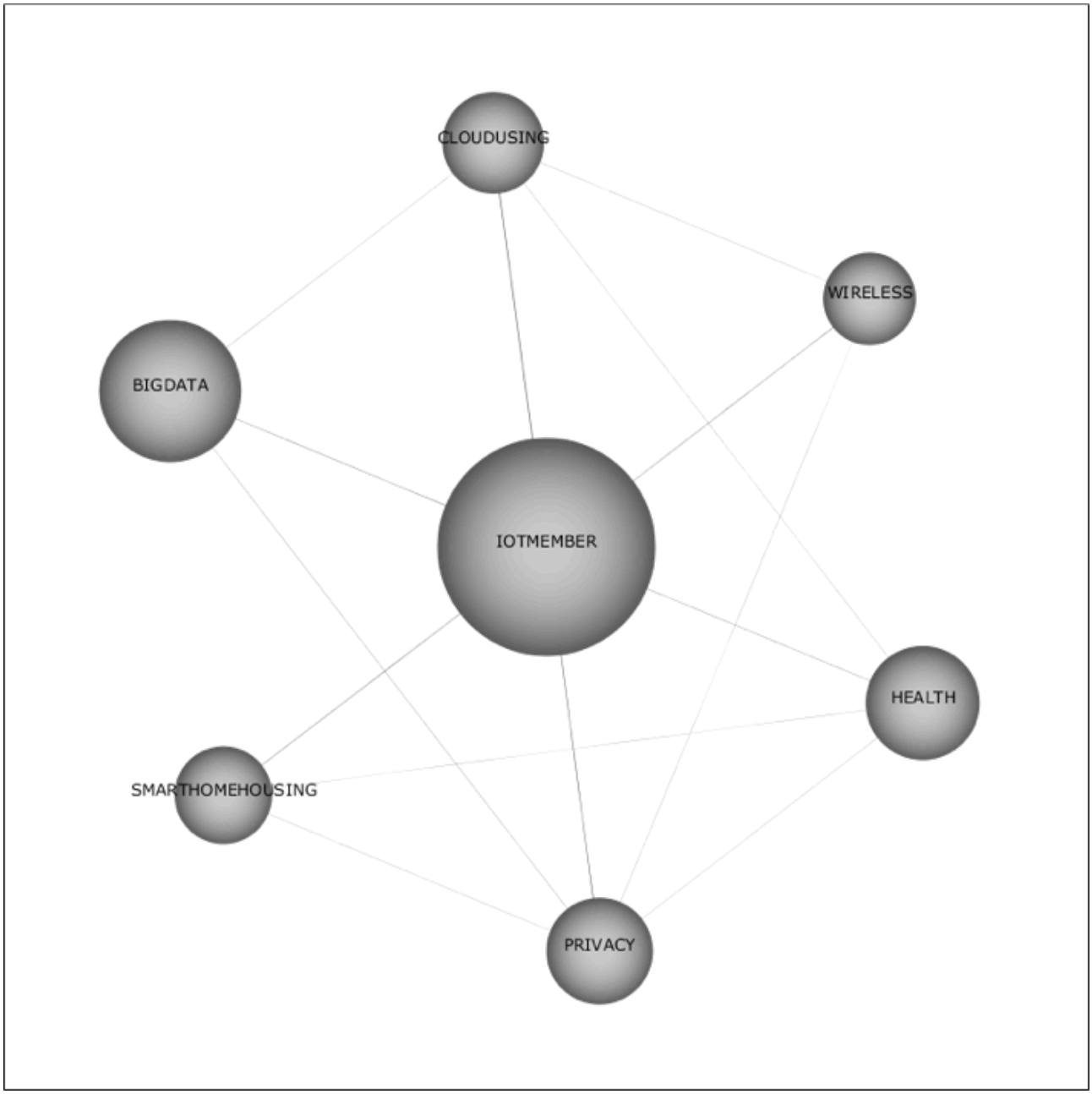
participation (19.32; 8.76); IOT membership (7.25; 4.99); Social Sustainability (15.13; 3.44); Collective behavior (6.62; 2); Quality of Life (11.72; 1.59); Emission Control (6.89; 1.01); Community Engagement (8.97; 2.33) and Service Quality (8.36; 0.66). In mapping, core documents and cum citation in the literature are discussed.The centrality and density values should be interpreted here. What are the conclusions or implications from these findings? We should expand on the conclusions and implications

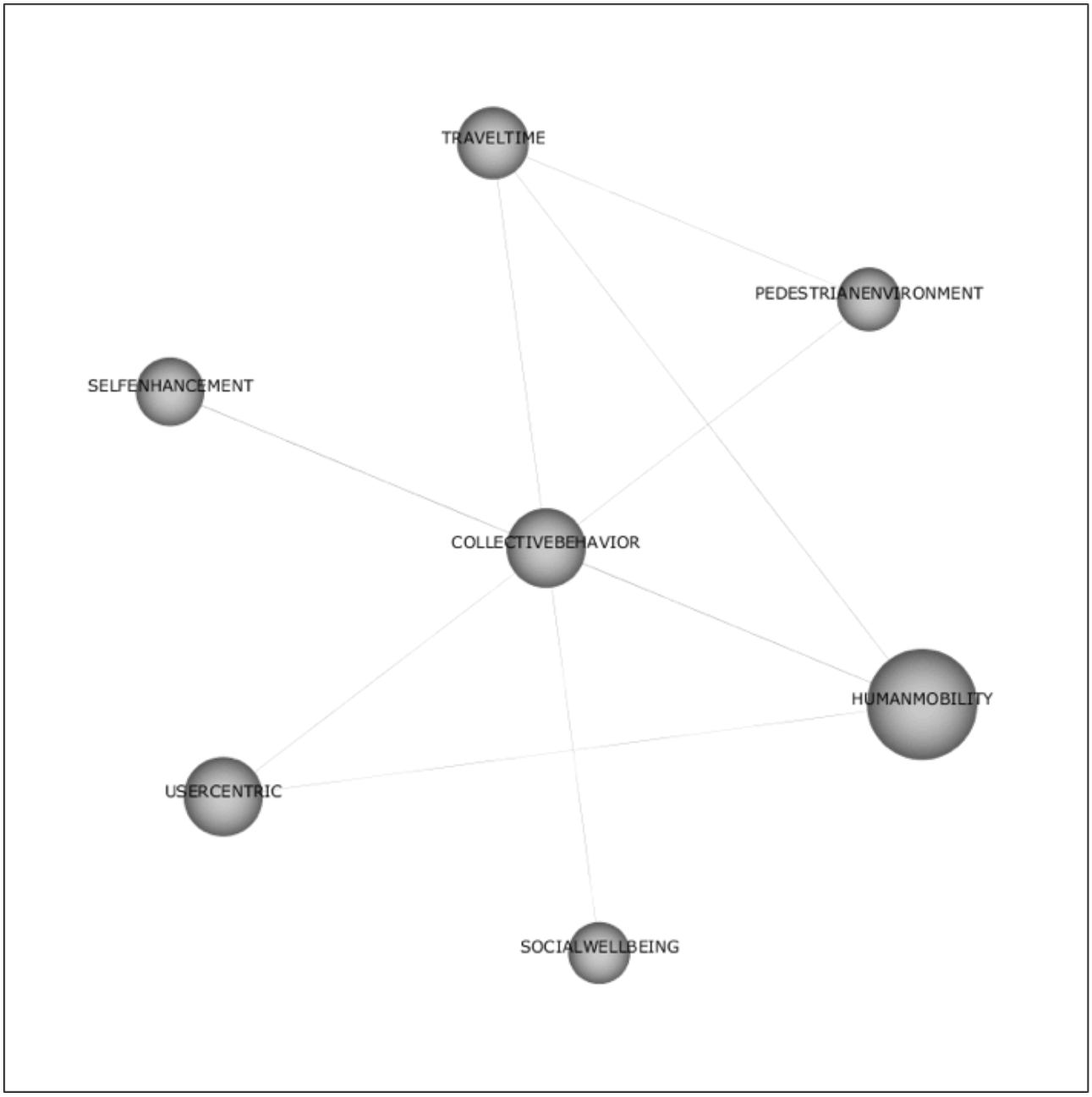
Figure 1: Visualization of the Smart City themes based on curative marketing

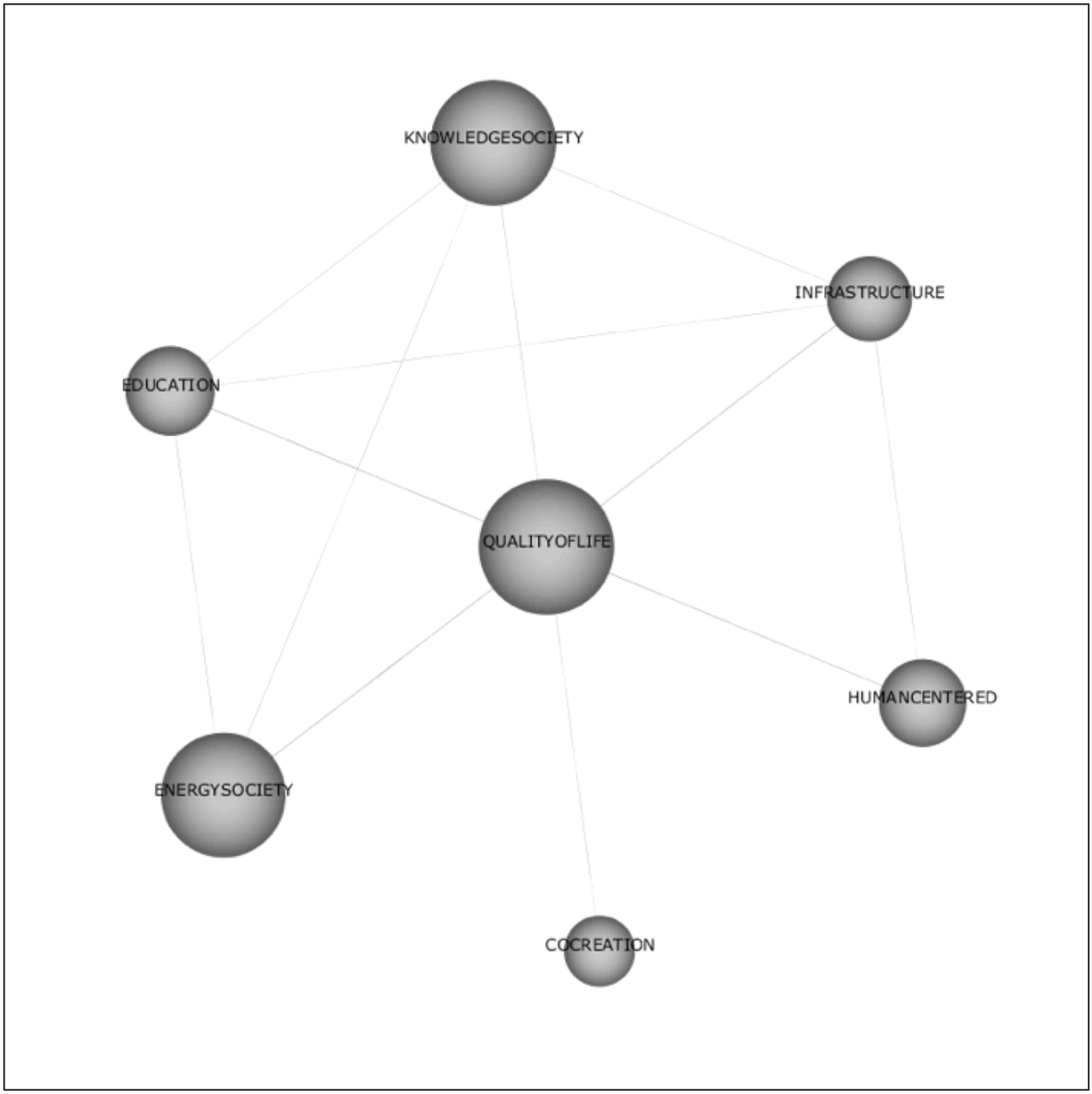


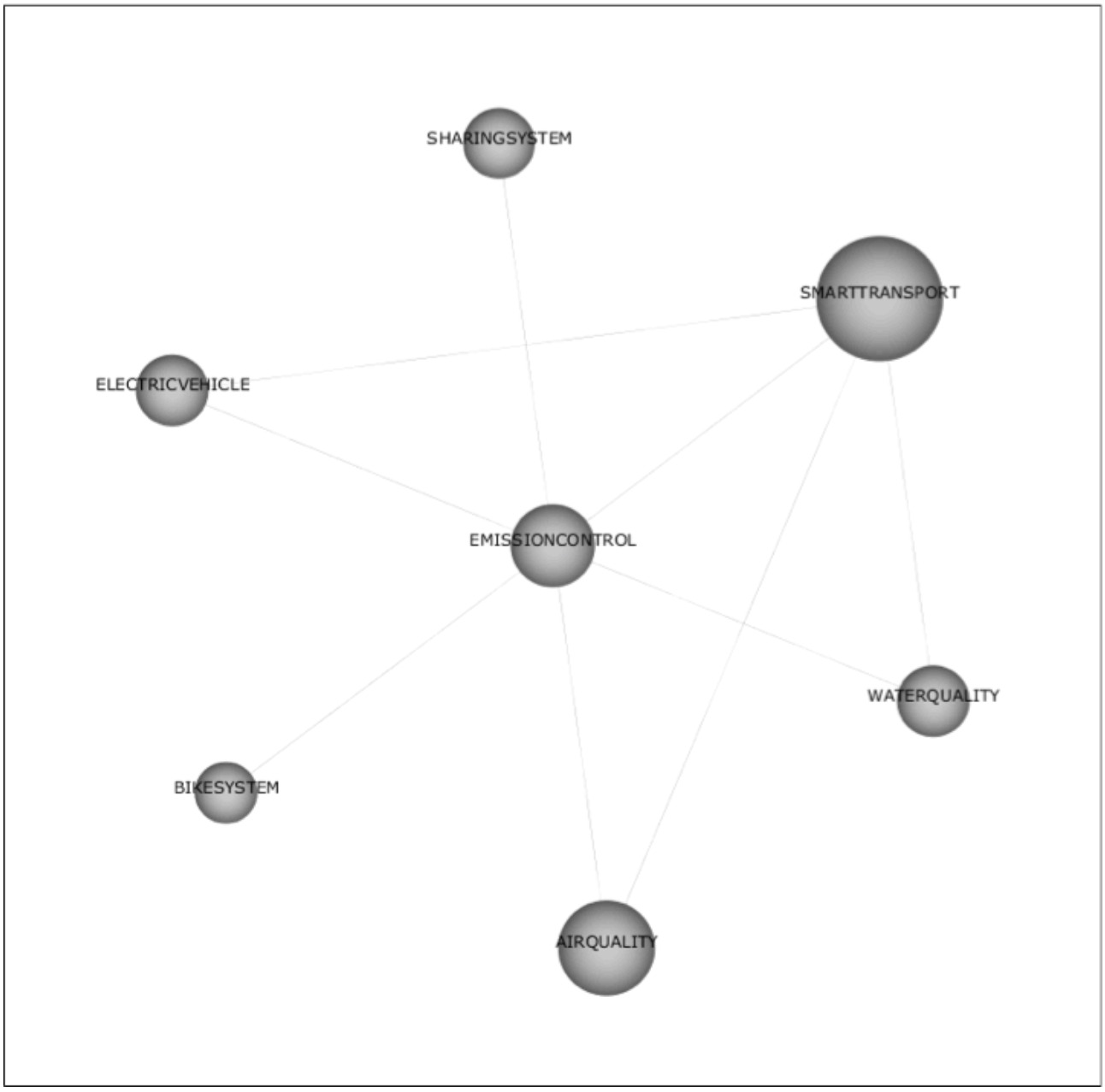

CITYENGAGEMENT
SOCIALMEDIA
EGOVERNMENT
SOCIALPARTICIPATION
PUBLICGOVERNANCE
CITIZENCENTRIC
URBANIZATION

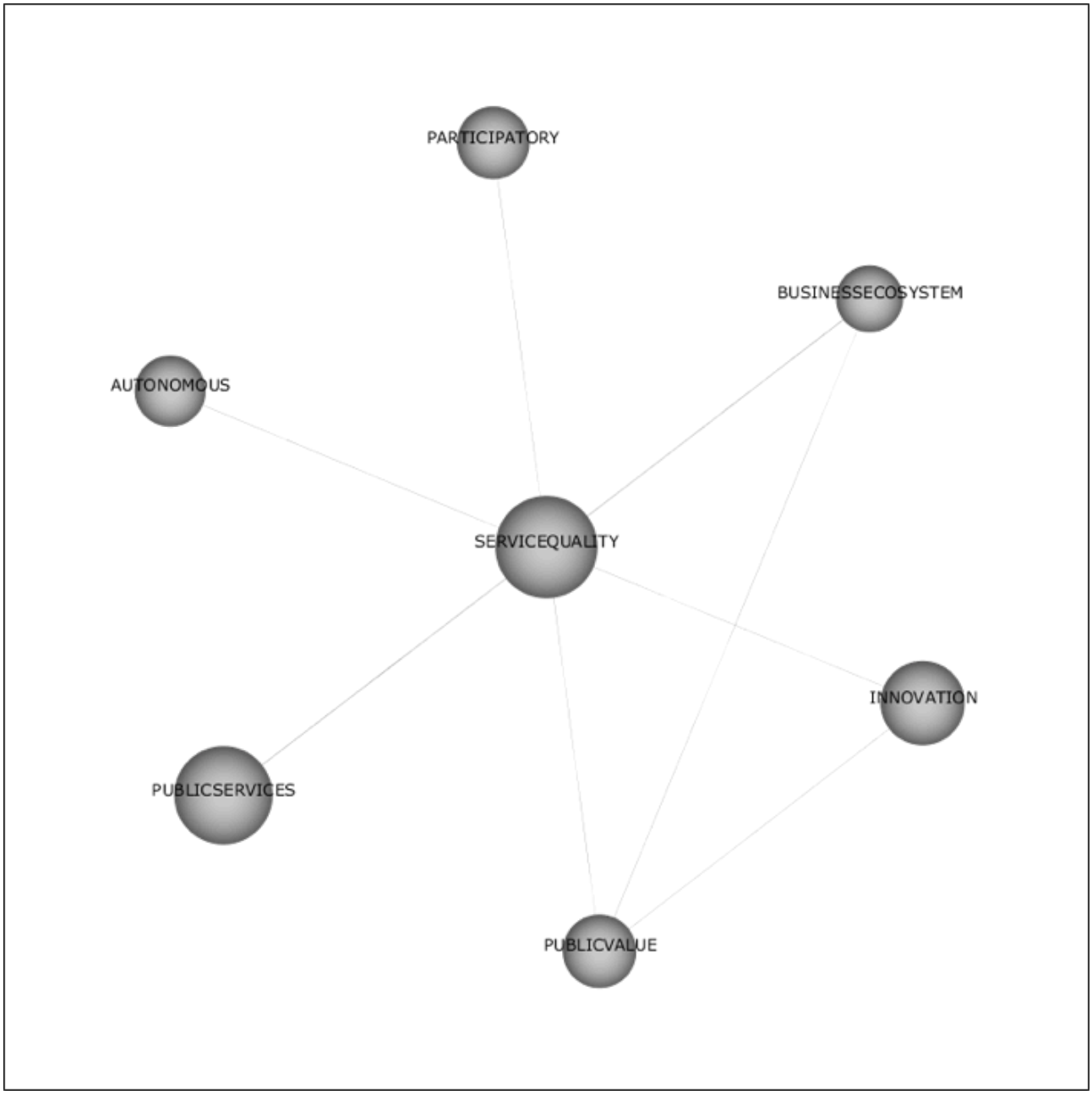

SUSTAINABILITY
ECOLOGY
WASTEMANAGEMENT
SOCIALSUSTAINABILITY
SOCIALINNOVATION
SOCIALINCLUSION
ECONOMICGROWTH


CLOUDUSING
WIRELESS
BIGDATA
IOTMEMBER
HEALTH
SMARTHOMEHOUSING
PRIVACY


TRAVELTIME
PEDESTRIANENVIRONMENT
SELFENHANCEMENT
COLLECTIVEBEHAVIOR
HUMANMOBILITY
USERCENTRIC
SOCIALWELLBEING


KNOWLEDGESOCIETY
INFRASTRUCTURE
EDUCATION
QUALITYOFLIFE
HUMANCENTERED
ENERGYSOCIETY
COCREATION


SHARINGSYSTEM
SMARTTRANSPORT
ELECTRICVEHICLE
EMISSIONCONTROL
WATERQUALITY
BIKESYSTEM
AIRQUALITY



Source: SciMAT – Own Elaboration. (core documents;SumCitations)

Co-Word Network

The network system of the related main themes has also been examined. It will be a guide to examine these elements considered to be the main cases of curative marketing. Social participation is seen as a motor theme in terms of smart city and curative marketing. Network members of social participation are city engagement, social media, e-government, public governance, citizen centric and urbanization. As can be seen, it has a strong relationship with urbanization. Citizens' participation in smart city practices can be used as an input for decision-making beyond the creation of citizenship (Stratigea, 2015). In this context, the primary factor for curative marketing is to increase the social participation of consumers in smart city strategies and activities. IOT membership network members are identified as cloud using,

wireless systems, big data, health, smart homes and privacy. The strongest relationship network is big data. Network members of social sustainability are sustainability, ecology, waste management, social innovation, social inclusion and economic growth. Since smart city planning is naturally linked to the IoT (Van Zoonen, 2016), an effective analysis of data sets within the smart city is required (Rathore, 2017). Consumers will feel a sense of association and connectedness with IOT membership as individuals. Being part of a factor will benefit consumers. Collective behavior has been associated with travel time, pedestrian environment, self enhancement, user centric and human mobility. In addition to allowing the individuals to achieve a better life, smart cities are the protagonists of a process based on more skilled thinking, communication and participation, and social inclusion. This will have a positive bearing on the ability to act together within the context of an individual and consumer-related relationship within smart cities and increase the awareness of others. This, in turn, would allow for the mobilization of the internal dynamics of the cities and of its inhabitants (Hollands, 2008), the establishment of a collective bond (Coe et al., 2001), the creation of individual and social values (Neirotti et al., 2014) and identities. The main theme of Quality of Life is a link with knowledge society, infrastructure, human centeredness, energy society and co-creation. Smart cities emerge as a movement entailing knowledge-based solutions on vital, interrelated, and complex issues. As perceived by urban administrative bodies, dense and rapid urbanization would create a more prosperous area for urban residents or for service consumers by increasing the quality of life and the quality of offered services (Cugurollo, 2017). Smart cities can be expected to increase the quality of life not only in technological but also in emotional terms. Emission control is related to sharing system, smart transport, electrical vehicle, water quality, bike systems and air quality. Smart cities require an urban pattern that includes economic, social, environmental contexts driven by sustainability objectives (Ahvenniemi et al., 2017). It can be considered that the consumer system and air quality along with the walkability point of view will render a cleaner environment, especially within the framework of sustainability. The community engagement theme is networked with localization, ICT, social network, neighborhood and building efficiency and social cohesion. Latter point might also be conducive to support a sharing economy (Bull et al., 2019). The service quality theme connects with participatory, business eco system, autonomous, innovation, public services and public value. In this context, an envisioned detailed democratic environment for the protection of the digital rights of citizens (Calzada, 2019) will protect the democratic rights regarding service quality.

Discussion

The main objective of the present study was to investigate the conceptualization of curative marketing applications within a smart city planning context through a bibliometric study that included a content analysis on Smart City Web of Science literature. The data obtained by considering all previous studies as a single period was scrutinized and visualized and the determined themes classified. The study intended to demonstrate the development in area applications based on the society, consumer and the citizen. In summary, the authors suggest that the marketers should take greater responsibility in designing a model for a better society and should invest in the solutions for social problems (Czinkota and Kaufmann, 2017) by effectively contributing to Smart City research and design. The results obtained provide implications, both theoretically and practically. The overarching result is that smart

cities in tandem with a human-centered Curative Marketing can be beneficial for citizens/consumers striving for avoiding and/or solving mistakes otherwise made with non- human-centered approaches. Hence, the linking of the area, functions and city-building processes with the human factor needs to be established (Komninos et al., 2015). It will be an important point to consider which elements and who will be integrated in planning the smart city (Krivý, 2018). As a public sphere, the conceptualization of smart cities as a structure that considers management as a participant with convergent elements (Oliveira and Campolargo, 2015; Ramirez et al., 2017) can be considered as a curative marketing practice. This will necessitate the expansion of participatory planning and a target towards a livable society (Staffan and Horelli, 2014). Product development and collaboration dimensions utilized in the co-creation could be used to improve the content and quality of the services provided to the citizens with smart city systems (Alves et al., 2016). The co-created value reinforces the basis for a more humanview and care for citizens and consumers (Denhart and Denhart, 2000) by synergizing the impact of phenomena such as sharing information, adaptation to the consumer, more efficient use of resources and by ensuring that more specific needs are satisfied (Pereria et al., 2017). Furthermore, this is the basis for a more cosmopolitan structure (Vanolo, 2016) and a sense of belonging that is based on accessibility and openness (Kudo and Granier, 2016).

Conclusions and Implications

The study findings are consistent with the concept of the smart sustainable city concept that includes seven elements for curative marketing based Smart Cities: Sustainability, economy, environment, government, living, mobility and people (Bifulco et al., 2016; Bibri and Krogstie, 2017). When analyzed from a curative marketing perspective, the wellness level of the individual can be improved by, especially, increasing the quality of consumer services, contribution of technologies to life, acquisition of an identity within developing technologies, participation in or observation of urban management, more effective control of business and domestic life and living in a better urban landscape. The ability of the individual to acquire identity by adapting to social developments would provide happiness for the individual and strengthen awareness and equality perceptions. Enterprises, social enterprises/entrepreneurs and for-profit companies can contribute to this improved social welfare objective by data driven Curative Marketing relevant business models relating, for example, to: smart education, social services (i.e. residential care for elderly), sustainable consumption (second hand shops), ethnic employee diversity, employment of youth as well as disabled and unemployed people, energy-water nexus for smart buildings, schedule optimization for public transport, optimization of traffic flows, or predictive maintenance for public lighting. marketing-based applications to achieve higher levels of social and economic well-being. Based on the obtained data and the analysis of the themes, central themes were determined. It is suggested that social participation, social sustainability and community engagement should be regarded as primary motor themes to be interlinked with similar basic themes relating to quality of life and service quality. In future, these themes should be better intertwined with currently still isolated IoT membership and collective behavior themes. Specific attention needs to be drawn to emerging themes relating to social and ecological sustainability themes such as water quality, indoor quality, age friendly system, livability and education. The main limitation of the study is based on the determined keywords. Since there is no strong body of literature on the correlation between curative marketing and smart city, future studies could analyze the

correlations between capitalism (including social entrepreneurship) curative marketing and smart city. Social and economic values should be produced in collaboration of all stakeholders based on healthy macro, meso and micro relationships mediated by transformational leaders from city administration and/or education.

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The Role of Smart Cities for the Circular Economy

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Abstract

Cities are the centre of global production and consumption and therefore the main source of waste of all kinds. Against the backdrop of the urbanisation trend and further population growth, dealing with the expected masses of waste will be a major challenge for the city of the future. Solutions to this issue are currently being discussed in the context of the smart city movement. However, it has become apparent that the literature on smart waste management, has largely been limited to waste collection rather than addressing the root of the problem, which is our linear economic system. This view is widely debated separated, within the research on circular economy. Nevertheless, overlaps can be found in the areas of technology consumer behaviour and circular business models. In order to overcome the further isolation of both research streams, this paper aimed to identify the role of Smart Cities for the transformation into a circular economy. Based on a qualitative research design, seven semi-structured interviews with circular economy experts were conducted and analysed by means of qualitative content structuring analysis. The results showed that cities are uniquely positioned to play a significant role in shaping this development, particularly through their proximity to citizens and businesses. In order to take advantage of this opportunity, various measures are presented on how cities can have an impact, also through the careful use of data-driven technology.

Key Words:

Smart City, Circular Economy, Smart Waste Management, information gap, circular business model

Introduction

It is estimated that the world population will grow by 33 % until 2050. It is estimated that 70 % of people will then live in cities (Lundin et al., 2017). The increasing concentration of global population in cities implies that they are highly relevant when it comes to sustainable development. Particularly, waste management as a fundamental service for citizens will pose major challenges. In 2019, the absolute amount of waste generated worldwide was between 7-10 billion tonnes. Only about 30 % are recycled or reused (Zeller et al., 2019). This

makes cities the epicentre of waste generation. Poorly managed waste pollutes the world's oceans, clogs up drains and causes flooding, transmits diseases, harms animals that unknowingly consume waste, and affects economic development, for example through reduced tourism. (PWC, 2019). Therefore, management of waste has a clear connection with negative environmental impacts and affects people's health and quality of life (Anagnostopoulos et al., 2017). Many cities have recognized this problem and developed their own objectives based on the 17 Sustainable Development Goals of the UN. One of them is the city of Mannheim in the heart of the Rhine-Neckar metropolitan region, which is one of the most important industrial areas in Germany. According to the Mannheim Vision 2030, the volume of waste is to be significantly reduced and plastic waste and disposable packaging is to disappear completely from the cityscape (Stadt Mannheim, 2019). A hot discussed topic that deals with the solution of such problems and tries to improve urban life, is the Smart City Movement (Angelidou et al., 2018). As one of the six smart city services Smart Environment includes Waste management (Giffinger et al., 2007). Mannheim`s bitkom 2019 smart city score for smart environment (27/100) shows that there is still a lot of room for improvement (bitkom, 2019). The literature on waste management in smart cities has mainly focused on smart bins to make waste collection more efficient. But smart waste management should go far beyond collection, since the best way to deal with waste is to avoid it. Therefore, the smart city movement also requires a rethink from outdated linear economic thinking to a circular economy (Esmaeilian et al., 2018). Cities generate 85% of global GDP and are responsible for 75% of global consumption. This proximity to production and demand could give cities an important role in this systemic transformation (Sukhdev et al., 2018; Zeller et al., 2019). For this reason, the aim of this contribution is to identify the role of smart cities for the circular economy and give recommendations for action.

Smart Waste Management

Zangh et al. (2019) defines smart waste management as utilizing smart enabling technologies for more efficient, effective and sustainable operations of waste management. Even though smart waste management is highly relevant for every city, literature on this topic is rare. The focus is on collecting waste (Zangh et al., 2019). In particular, two alternatives are distinguished, pneumatic systems and smart bins (Teerioja et al., 2012; Popa et al., 2017). The use of intelligent waste containers is by far the most popular application in smart waste management (Zanella et al., 2014). In this case either an intelligent bin is installed, or a sensor is attached to an existing bin. The sensor measures various data such as filling level or waste type. Once a bin is full, a sensor transmits data to the responsible agency. Based on data optimization software, processes determine optimal management of the collector truck fleet. This system has major advantages over a traditional waste collection system. It can provide real time data for garbage collection and avoids overflooding of trash cans, whereby health issues are reduced. Furthermore, cost reduction due efficient use of resources and manpower and less CO2 pollution are additional benefits (Ali et al. 2020; Anagnostopoulos et al., 2017). Four major streams of literature can be identified within the so-called "Internet of bins" movement (Keerthana et al., 2017; Hannan et al., 2015). Literature about sensors, communication technologies, route optimization and field experiments can be

found (Hannan et al., 2015). Due to the fact that smart bins are implemented by only a fraction of the cities, some studies focus on scaling and cost-effective implementation (Lundin et al., 2017; Marchiori 2017). Reviewing the literature on the smart waste management shows that the discussion is heavily influenced by technology-driven issues (Zhang et al., 2019). Considering the hierarchy of waste management, optimization of collection processes has the least influence on the core problem of waste. Considering sustainable resource usage as the main goals, focus should lay on avoidance and reduction of waste (Esmaeilian et al., 2018; Zeller et al., 2019). As one of the first articles drawing attention to this issue in the smart city context, Del Borghi, et al. (2014) advised that waste management in smart cities should be carried out more extensively and transformation to a circular economy is necessary.

Circular Economy

The circular economy is the counterpart to the traditional linear “make-take-waste” economy. The circular economy is a model of production and consumption in which existing materials and products are shared, leased, reused, repaired, refurbished and recycled as long as possible. It reduces waste drastically, protects resources and reduces production cost leading to enhanced competitiveness and creates new jobs, which enables economic growth (Esmaeilian et al., 2018; Torres and Parini, 2019; Larsson and Lindfred, 2020). The path towards a circular economy is unfortunately not free from obstacles. Zhang et al. (2019) identified the lack of regulatory pressures, the lack of environmental education and culture of environmental protection, and the lack of market pressures and demands as the three main barriers.

Technology

Although these previously mentioned barriers persist, the development of smart technologies could make a contribution to the transformation to a circular economy (Zhang et al., 2019). Wilts and Berg (2017) describe the introduction of the CE as a fundamental information problem. The authors argue that the lack of information availability, high search cost and the perception of inferior quality prevent the trade of secondary raw materials. The challenge in this regard is to generate, collect, process and make the amount of information available to enable reuse. Although digitization has in the past accelerated our current economic system and fueled the vicious circle of consumption and waste, digitization is assigned a crucial role (Larsson & Lindfred, 2019; Wilts and Berg, 2017; Williams, 2019). Digital platforms could give access to information about product-specific data, resource consumption, resource flows and transactions and improve communication between supply and demand (Berg and Wilts, 2019; Larsson and Lindfred 2019; Antikainen et al, 2018). Efforts in context of smart cities focus on construction and demolition waste in the sense of urban mining. Vrijhoef (2018) proposes 3D modelling of cities and integration of BIM and GIS data in one platform to enable reuse of materials and improve resource flows in urban areas. Although the focus of these applications is on availability, location and demand for building materials, the author does not rule out the possibility of adding further data sets. In Esmaeilian, et al. (2018) authors describe the vision of a platform that makes complete product cycles of various products feasible. From an ecological perspective, life cycle describes the period from birth to death of a product

(Esmaeilian et al., 2018; Tóth Szita, 2017; Larsson and Lindfred 2019). This time frame contains large amounts of information such as use, condition and material input data, which could help to extend the product lifecycle. In this context it is particularly important to know which data is needed, in which phase it should be collected and who should collect it (Esmaeilian, et al. 2018; Tóth Szita, 2017). When it comes to the subject of data, questions of ownership, intellectual property, sharing and access arise (Berg and Wilts, 2019; Antikainen et al., 2018, Williams, 2019). For technology to establish itself in the market, new business models are required (Sarc et al. 2019; Antikainen et al., 2018)

Circular Business Models

Another important pillar of the circular economy are companies, which embrace this concept (Wilts, 2016). Contobelli et al. (2020) distinguishes four types of circular business models. Namely, product as a service, product life extension, resource recovery model and circular supplies. A circular orientation of business models brings several advantages to companies. (Wilts, 2016). Independence from natural resources in a context of growing demand makes these companies resilient to external shocks and an early positioning is rewarded by increased brand attractiveness. Already a number of companies set a good example and have partly or even completely built their business on it (PWC, 2019; Esmaeilian, et al., 2018; McKinsey, 2016). Many articles are about sharing models and startups (Han and Jin, 2018). But there are also positive examples from industry like the biggest employer of the metropolitan region Rhine-Neckar, BASF SE. BASF is pursuing circular economy by applying patterns of industrial symbiosis and the production of biodegradable plastics. Furthermore, in the past few years great progress has been made in chemical recycling (Dittrich-Krämer et al., 2018). But despite all the euphoria, it should not be forgotten that path dependencies and lock-ins prevent market entry of CE innovations. To achieve this change, existing structures, organizational cultures and routines must be broken through (Korhonen et al., 2018). Another challenge identified by Antikainen et al. (2018) is collaboration. For transition towards CE forming partnerships is considered to be particularly important (McKinsey, 2016; Balkau & Bezama, 2019). Organizing collaboration between different partners and defining shared processes is difficult. Therefore, it is key to create an environment that supports and encourages such companies (McKinsey, 2016; Balkau & Bezama, 2019; Antikainen et al., 2018). Due to the given conditions, municipalities are in a good position to influence this development (EllenMacarthurFoundation, 2017). First support programs are in place in the cities of Genova, London and Brussels. Liguria Circular is a permanent forum on the circular economy, with the aim of bringing together companies, public institutions and the world of research. The main objective of Liguria Circular is to promote, disseminate and giving participants the opportunity to discuss and gain insight into the topic. (Del Borghi et al., 2014). The city of Brussels and London are doing similar programs. Brussels initiative is called “Be Circular” and was launched in 2016, to take advantage of the opportunities of a circular economy, including compatibility of environmental and economic goals. In addition to training programs, other available measures ranging from financial support to a business incubator are provided (Ellen MacArthur Foundation, 2019a/b). Future research should aim to expand the concept of smart cities to create new patterns that combine innovation and entrepreneurship for economic

growth and taking inspiration from existing experiences in the area of circular economy (Del Borghi et al., 2014).

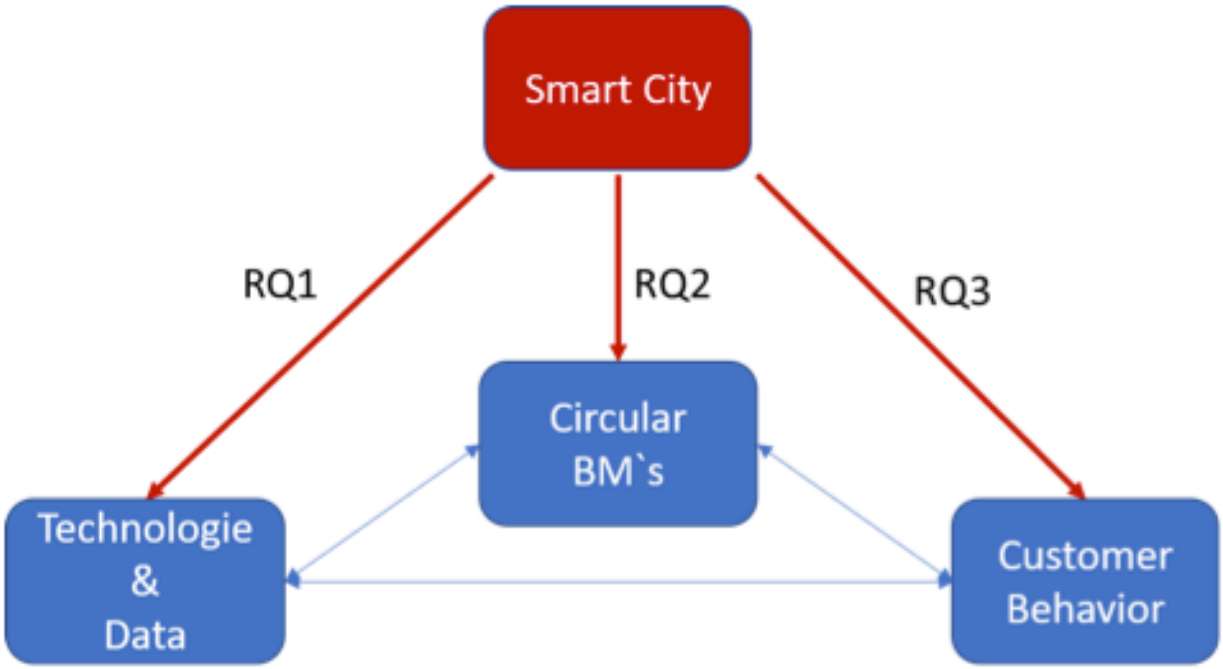
Customer Behaviour

Circular economy also brings advantages for consumers. It is assumed that in addition to new jobs, prices for food, mobility and housing can fall by 25 % by 2030 (McKinsey, 2016). But on the other side, circular business models can only be successful if consumers change their demand behaviour and understand the benefits (Tóth Szita, 2017; Wilts, 2016). If the widespread homo economicus theory, were true, it would not be a problem. Then people would immediately understand that owning a car, which is driven 2 hours a day or a drill, which is only used for 25 minutes over the entire product life is disadvantageous from an economic point of view (Planing, 2015; Esmaeilian et al., 2018). However, human behaviour is influenced by many other factors such as cultural values, norms, social practices and lifestyle. In addition, materialism, individualism and lack of reference to natural environment, which is particularly pronounced among urban population, promote continued existence of the throwaway society (Williams, 2019). Even if it is a conviction that we must act sustainably, a change is still a bigger step, because the behaviour takes place subconsciously through automated routines. This phenomenon is called attitude-behaviour gap in research. Humans act according to routines and these changes more slowly than attitudes (Esmaeilian et al., 2018). As a result, pure information about ecological and economic rationality of switching to a circular economy business model will not be sufficient to change long-learned habits of consumers (Planing, 2015). Nevertheless, possible strategies include educational programs or economic incentives, but it is still unclear exactly how these should be applied (Wilts, 2016). Widespread are apps for information purposes, like zero waste maps and waste calendars (Mannheim, 2012; Hamburg, 2019). At the bottom-line great importance is still attached to inclusion of externalities in decision-making (Williams, 2019). Therefore, we need innovative solutions to inform about external effects and include them in the price, which could make sustainable consumption more attractive (Wilts & Berg, 2017).

Research method

The literature review has shown that discussion on waste management in smart cities is almost exclusively concerned with intelligent garbage cans. Only few articles have voiced criticism and called for a more comprehensive shift towards a circular economy. The role of the smart city in this regard can only be assumed. The following figure illustrates how this will be investigated.

Figure 1: Relationship structure



Source: own illustration

Due to exploratory character of this study, a qualitative research design has been conducted. In order to achieve this objective this paper raises three research questions derived from existing literature. Those three questions are built up on major barriers identified by previous research. For data collection a semi-structured interview guideline was generated. Interviews were held face to face, via video-chat or on the phone. All respondents were interviewed from 15th of July 2020 to 24th of August 2020. The interviews were then transcribed using software. Each interview lasted about 15-30 minutes. For selection of interviewees, it was precondition that they deal professionally with topic of circular economy and have a general understanding for the concept of smart cities. Collected material was evaluated according to qualitative content analysis. This work follows the methodology described in Kuckartz (2018 p. 100). Firstly, main categories were determined deductive. Afterwards, subcategories were developed inductive on the material. With resulting category system, the entire material was coded in the second coding process. To support this process, MaxQDA was used. Table 1 provides a detailed overview of the formulated research questions, the resulting interview questions and the underlying key literature.

Table 1: Research Questions

Objective	Research Question	Interview Question	Source
O1: Identify the role of smart cities for the circular economy	RQ1: How can technology and data contribute to circular economy development?	IQ1: Which role plays technology and digitization for the CE? IQ2: Do you think in a smart city data relevant to CE can be collected? If yes IQ2.1: Which data should be collected? IQ2.2: Who should collect and store the data?	(Williams, 2019) (Esmaeilian et al., 2018) (Zhang et al., 2019) (Vrijhoef, 2018)
	RQ2: How can smart cities support circular business models?	IQ3: If circular business models are profitable, why so many companies don`t apply the concept? IQ4: How can smart cities support the rise of circular business models? IQ5: How can smart cities enable the linkage of stakeholders from different sectors?	(Del Borghi et al., 2014) (Esmaeilian et al., 2018) (Zhang et al., 2019) (Antikainen et al., 2018)
	RQ3: How can smart cities motivate citizens to accept and participate in the new movement?	IQ6: How can a smart city influence citizens engagement? IQ7: How can smart cities influence citizens behaviour regarding circular resource use?	(Williams 2019) (Esmaeilian et al., 2018) (Zhang et al., 2019)

Source: own illustration

Presentation of Findings

In this section results of the data collected through interviews are presented. Extracted categories are summarized and backed up with quotations from interviews. The category system is provided in appendix.

Technology and Data

In order to unite idea of the circular economy with technology-driven concept of smart city, this main category aims to clarify dichotomy between technology and use of natural resources stated in review. The first subcategory is named “essential role” to emphasize predominant opinion of the respondents (R1, R2, R4, R5, R6, R7). As always when it comes to digitization, innovation or technology, terms such as optimization and improvement resonate (R1, R2, R3). In addition, resulting potential for overcoming hurdles outlined in literature section was also described in concrete terms by the respondents (R1, R4, R5, R7). According to R5 and R7 recycling, which is one aspect of CE, is nothing new. It is already well established for paper or metal, but it is not in for plastic and construction waste yet because, “what is missing is a technology that manages to recover the substances in a cheap way” (R5). In this context R7 describes “So this starts with plastic recyclates that simply don't meet the requirements or can compete with Virgin Material Plastics because of contamination.” In top of that, R4 describes the before mentioned information asymmetries and lack of transparency as serious obstacles. “That means circular economy does not come about because information is not available, and communication does not take place. So when it comes to collecting, forwarding, analyzing and of course communicating data, we are actually at the point, where digital technologies plays a major role among other things” (R4). The statement of R1 “especially in the circular economy, is to bring together technology and organization” highlights relationship already identified in the review. Organization in sense of changing behavior within companies and households. From an economic point of view, changes in behavior go hand in hand with the right incentives. Technology and digitization can help, but only if the overall context is considered (R1, R3). This view is further reinforced by the expression “But a smart garbage can alone does not make it” (R1). The data that can be collected within cities is manifold. In order to summarize the mentioned examples of useful data, two categories "waste and recycling" and “in use goods” were formed inductively. As already mentioned, topic of circular economy is still in its infancy in Germany (R3, R4, R5). For this reason, besides probably obvious information on type, quantity and location of waste already discussed above, great attention is being paid to how to recycle discarded products completely if possible and how to reintroduce recovered materials into the market. For recycling, it is increasingly important to have detailed information about substances processed in a good and where it was manufactured (R1, R2, R3). To transfer this information microchips or watermarks are possible solutions (R1, R6). After recycling, quality and quantity of the recyclates must also be determined. This is important “to build a bridge between waste management and manufacturing industry” as there is often a surplus on supply (R6). Furthermore the urban mine is full of resources and goods that are still in use. An important point here is the construction sector. In urban infrastructure, such as buildings, bridges and roads, huge amounts of material are tied up by not being used optimally on the one hand and on the

other hand only a fraction is reused. In this context, it is of interest how much of which building material, in what condition and where in the urban mine exist (R3, R4, R7). This also raises questions such as “when will something be available again and where can it go?” (R4). Building Information systems can support this (R4). It is also necessary to collect data on what services are available for sharing and what is inside the buildings. Information on usage and condition provides opportunities for predictive maintenance and optimization (R1, R4, R5, R7). Especially in this context R5 points out, “it’s important to collect the data as to how often it was used, how long does it take to repair it and so on. So, this is the data which plays an important role”. What stands out in this question is R3's attitude that the majority of municipalities lack the necessary sensitivity and competence to collect such data streams. And it is more likely that this will be introduced into the market by private actors (R3). Moreover, data remains a sensitive topic. It raises many questions about storage, sharing and misuse. The general opinion of respondents was summarized under the category “data issues”. Nowadays, data has also become a valuable resource (R5). It is essential that access to it not only given to a few privileged parties. To prevent data monopolies, a right to transparency should be guaranteed. But sometimes it is difficult to determine exactly to whom the data belongs (R4, R5). For data on waste, R2 explained data belongs to the city. At other points this question is still unanswered. Especially, when it comes to predictive maintenance, manufacturer should be granted access (R1). Usage data on goods used by a large number of people are probably less critical than goods in private ownership (R1). Whenever personal data is involved, special care must be taken (R4)

Circular BM: Major Hurdles and supporting actions

Literature shows that circular business models bring clear advantages for companies and are compatible with the pursuit of profit. However, only a fraction of companies are active. Therefore, the categories “reasons for not applying” and “possible actions of local authorities” aim to clarify why this is the case and how a city can counteract. Out of seven respondents, six see “economic reasons” as the main barrier why so few companies build on circular business models (R1, R2, R4, R5, R6, R7). Some companies make this change out of pure conviction, others because customers demand it or because public or regulatory pressure becomes too strong (R4). But at the end of the day, all companies are interested in making profits. As long as there is no urgency and nothing pushes, they stick to linear concept because it promises a cheaper alternative (R1, R4, R5). Investment is an important issue in two respects. On one hand, investments are still being made in linear system, which must be amortized first. On the other hand, investments in a circular economy vary greatly from one sector to another (R5, R7). While service sector is generally more resource conserving, necessary investments in capital-intensive sectors, such as manufacturing industry, are higher (R5, R7). Consequently “(…) that is of course a much bigger step to take” (R7). In addition, CE in Germany has not made much progress yet. As a result, investments in this area entail an increased risk for companies. Especially considering current market situation, which is characterized by uncertainty (R5, R7). “Lack of knowledge” has been identified as a second major hurdle (R2, R3, R6, R7). While subject of the circular economy has already reached companies, which are generally under

greater pressure from public. Knowledge deficit can be seen in small and medium-sized enterprises in particular (R7). For many actors it is still understood as recycling and even if they know what it is, they lack the knowledge how to apply it to their own concrete case. Often, they watch and wait what others do and then remain in linear system. R3 describes this phenomenon as learned helplessness. The “change” towards a circular economy is a revolution (R3, R5, R7). No matter how urgent something is, radical changes are not possible from one day to the next. “A change in mindsets, as I said earlier, takes a very long time” (R3). The older you are the harder it is to break out of these routines. Transferred to companies, this is an important factor. In average older people are the decision-makers and therefore have a multiplier effect. This means fresh ideas of young people are not carried by power and therefore do not come in.

Possible actions of local authorities

Under category “supporting actions”, possibilities for supporting companies that pursue the idea of circularity were summarized. For this purpose, subcategories "strengthening collaboration" and circular “public procurement" were inductively aggregated. A very important lever is “public procurement” (R2, R4, R5, R6, R7). The purchasing power of a city should not be underestimated. It can have a huge impact if it is properly regulated. On one part, the city could act as a role model and on the other, it provides a strong impulse for companies (R2, R5, R7). Although green procurement policy is nothing new and has been an issue for some time now, there is still a lot of work to be done, especially regarding circular economy. (R2, R6). This means that specifications must be made for the own purchasing department which comply with principles of circularity (R4, R5). Then, these criteria can be adapted for office supplies up to construction of buildings, which is an important area as described above (R5, R7). Another important point, as mentioned in the literature, are activities which strengthen cooperation between various actors (R1, R2, R3, R4). Several different formats are conceivable for this purpose. Events such as meetings, conferences, action weeks or discussion groups like the round table which already exists in Mannheim are possible. “The most important thing is simply that people come together physically” R1. By sharing, you can see what the others are doing and where you can do something together.” as R1 mentioned. When setting up such partnerships, “(…) it makes sense to use existing networks, (…) in many cases the local companies just don't necessarily know each other with regard to circular economy” (R4). With respect to industrial symbiosis, it can also be helpful to analyze natural links between companies. These can also be considered in development and planning of commercial areas (R4). One additional point raised by R3 is that circular economy is not only a local issue. Networking must take place beyond municipal boundaries and local authoritarian thinking must be dropped.

Possibilities to influence Citizen behavior

The majority of experts advice some form of “communication” (R1, R2, R3, R4, R5, R6, R7). In general, it is possible to draw public attention to topic through advertisements and campaigns. Care should be taken that communication is not too dry and the human herd behavior is addressed (R2). Apart from raising of awareness, there should be a concrete transfer of knowledge as well.

Possible approaches for educational programs are information events or integrating topic into school education by means of excursions (R1, R4, R5, R7). Of course, information provided by waste advisory can be expanded and supported by use of apps (R4, R6). However, communication should not take place only in one direction, the city should listen to its citizens, where action is needed. This requires reaching out to citizens and showing openness towards small initiatives (R1, R4). Furthermore, it is important to support sustainable behavior by creating “enabling conditions” (R4, R5, R6, R7). The city should take care that resource-saving behavior and consumption are not prevented by additional hurdles. The worst-case scenario is when someone has really developed awareness and drive, but unnecessary barriers prevent it (R4, R5). In this respect, R5 declares following statement. “So, you have to also get rid of those obstacles to changes on a daily level for people already want to adapt their behavior.” Creating enabling conditions starts on a small scale by providing tools such as rubbish sacks or gloves for voluntary waste collectors free of charge, as it is already done in Berlin (R4). This is of course also transferable by building up necessary infrastructure for mobility and sharing offers (R1, R5, R7). Food waste is another major point for urban areas (R1, R3, R4, R7). Cities can easily be of great help here when it comes to expanding existing distribution networks (R1, R4). In this regard R4 mentions a city could “keep space available or enable communication”. “Rather stick than carrot” The title of this category is used to illustrate motivation strategies. Carrot means, you get a reward when you behave right and stick means, you get punishment if you do not (R3). It was noticeable that all respondents indicated in some way promising tools for influencing citizens are punishment and regulations (R1 R2, R3, R4, R5, R6, R7). Approaches are of course bound by law. As Waste management is the responsibility of the municipalities the measures are limited to this area (R1, R2, R3, R4, R6). One possible solution is to apply a new pricing system based on how often a rubbish bin emptied. The frequency of emptying could be counted using simple chip technology (R2). Here incentive would be given directly through the own wallet (R2, R7). “Unfortunately, in the end, this is really the only effective measure I have to say” (R2). Furthermore, R2 and R6 recommended an approach which is easy to implement and already being used in the first municipalities to control compliance with waste separation regulations. Some municipalities and towns that have equipped their refuse collection vehicles with automatic recognition at the back, so a beeping noise is heard when there are metallic objects in the bio bin. Then the bin is left standing and the household responsible has to sort it out again (R6). Interviewees agree that possibilities of issuing regulations are of course limited by legal framework. While giving examples R6 wishes that municipalities show more courage and are not always too careful.

Discussion and practical Implications

The results have shown that a smart city clearly plays a central role in development towards a CE. A smart city can be key enabler for circular economy, due to its proximity and possibility, to influence and support in areas like technology, circular business models and consumer behavior. The use of technology can support the transition, but alone it will not work (R1, R2). Access to data in areas of waste and recycling as well as in use goods is of great importance. Information generated by collection and processing of such data can help to improve trade of secondary raw materials, optimized product use, opens opportunities for predictive maintenance and improves recycling processes. However, one must not lose sight of what is possible according to the current situation (R4). An open data platform that bundles all this data and processes it into information would be optimal, but it is important to remain realistic. It is difficult to judge how a city can contribute to this at all. High investments in infrastructure and competence would be required (R3). Furthermore, best practice examples only exist in form of pilot projects (Vrijhoef, 2018). Presence of a great variety of resources in combination with a large number of people in a small area make cities by nature a good prerequisite for companies that want to make use of CE principles. While in literature the compatibility of profit-oriented corporate management and sustainability is communicated as a decisive advantage of concept, economic factors are still main reason for restraint (Esmaeilian et al., 2018). As the examples have shown, financial support for start-ups be an incentive. However, investments needed in the manufacturing sector are considerable (R5, R7). This is where future research must start. We still need innovative business models, not only in terms of services. We need to develop strategies for moving established companies from linear to circular models (Centobelli et al., 2020). Furthermore, just like described in Korhonen, et al. (2018), it could be shown that path dependencies and routines are one of the biggest hurdles. Del Borghi, et al. (2014) has already pointed out, it is particularly important to strengthen cooperation between companies and to share knowledge (R1, R3, R7). A good starting point is to use already existing networks and introduce CE into them. However, companies will move much faster when demand changes (R1, R3, R6). Therefore, demand behavior of cities must change as well. This gives cities a great leverage and shows a clear commitment. Concrete specifications must be made for all areas of procurement. Since consumption always has a spatial reference, municipalities are in a good position to control it through their proximity to citizens. As already recommended by Wilts (2016), cities always can draw attention to a topic and raise awareness (R1, R2, R3, R4, R5, R7). In the analysis of interviews, creation of enabling conditions also turned out to be an important measure. This includes, of course, setup of infrastructure. Food sharing is currently a trend and expansion of existing food sharing schemes could also have a major impact (R1, R3, R7). As the state of research already shows, there is still a big difference between developing awareness for a problem and taking real action (Esmaeilian et al., 2018). For this motive, cities must make use of possibilities available to them in such a way that resource - saving consumption becomes desirable. Especially, measures based on punishment and regulation promise a stronger effect (R2, R3, R6, R7). Possibilities are redesign of pricing systems for waste and separation controls

that can be implemented through simple technological applications (R2, R6). The question remains how exactly such a pricing system can be designed in a way that it really has an impact and does not contribute to increasing pollution.

Limitations and Conclusion

This work is far from complete due to limited time frame. In the future research in this still young and open field should be carried out more detailed. Qualitative research lives from interaction of people. In the current situation a personal meeting was not possible in many cases. Nevertheless, this work has shown that smart cities can play a central role in circular economy and thus contribute far more to solve global waste problem on a local basis. A rough selection of possibilities was shown which can be implemented by using simple technological solutions, which considers regulatory framework of a German city. The practical implementation and effectiveness must be further researched. Also, measures for priority areas such as construction and food need to be specified. Overall, CE means change and therefore measures that directly bring about change in behavior seem to be most effective.

Appendix

Category System

Name	Procedure	Definition	Anchor example
essential role	deductive	All text passages explaining the role of technology in the circular economy.	R4:" For us, technology is a key issue, especially in digital technologies. This is because in many areas of circular economy, information asymmetries, lack of transparency, lack of information are one of the serious obstacles. That means circular economy does not come about because information is not available, and communication does not take place."
Relevant Data	deductive	All text passages mentioning that relevant data can be collected, giving example or explain application.	R4: "Yes, basically of course, yes. Consumption data, reference data certainly."
SC_waste and recycling	inductive	All text passages including information on data in the context of waste and recycling.	R4: "For example, it could be the generated waste, it could be questions of availability, as I said, of sharing products, think of car sharing, bike sharing. When do I have which vehicle available?"

SC_goods in use	inductive	All text passages including information on data in the context of goods which are still used.	R5: “Depending on the quality, some gadgets can be repaired, so here it’s important to collect the data as to how often it was used, how long does it take to repair it and so on. So, this is the data which plays an important role.”
Data security	deductive	All text passages which indicate issues with the collection of data.	R6: “I mean, which, of course, should normally come as a counter-argument on the part of the marketers, the producers of packaging or products, that they naturally want to maintain their data protection or their trade secrets, so to speak, so that the competition does not see, okay, how do they produce, what materials do they use and so on.”
Reason for not applying	deductive	All text passages which mention reasons why companies do not build up on CE	R1: “First of all, it costs something and brings no immediate benefit to the company, especially if it is only small steps. If I build a business model on that, I can make a business case out of it.”
SC_economic reasons	inductive	All text passages mention economic reasons.	R4: “Accordingly, one can of course deduce if no one is pushing, if you don't want to, if the linear system is cheaper and even if there are no laws that force you, I don't have to deal with it. Then maybe I will stay stuck in a linear system simply because it's cheaper.”
SC_lack of knowledge	inductive	All text passages referring to knowledge gaps in the context of CE	R3: “Companies don't even understand what circular economy is.”
SC_Change	inductive	All text passages that point to causes that inhibit change.	R5: “And this takes time, it’s not done overnight. Over the decade the consumer behaviour meant wanting to have more and more, and to change something like that will surely require a lot of time.”

Supporting actions	deductive	All text passages that provide information on how a city can support companies in the process of change.	R7: “try to get into general discussions with the management there first or introduce the topic first, if it is not yet known. Perhaps even to present approaches, ideas, plans, what can be done in cities and how this relates to the company, for example. In other words, to enter into dialogue more often, at city level.”
SC_strengthening collaboration	inductive	All the text passages proposing activities aimed at strengthening the cooperation of different actors.	R1: “Suitable formats would be events, conferences or even an action week. The most important thing is simply that people come together physically, even if it is more difficult in these times. By sharing, you can see what the others are doing and where you can do something together.”
SC_public procurement	inductive	All text passages which propose a change in public procurement policy as a supportive action.	R4: “Of course, there is procurement, so what does the city actually buy itself? It is important to ensure that what you buy also meets circular economy criteria. Then you can of course make appropriate specifications.”
Influencing citizens behaviour	deductive	All text passages outline the options how a city can stimulate resource-saving consumption behaviour.	R2: “Public awareness campaigns. Public relations are always part of it.”
SC_communication	Inductive	All text passages suggest ways of attracting the attention of the public as well as enabling the mutual transfer of knowledge.	R4: “Then of course there is the question of how can I communicate more broadly in order to enable citizens to behave in a way that conserves resources? “
SC_enabling conditions	Inductive	All text passages indicating that the necessary framework conditions should be created, and hurdles should be removed.	R5: “So, you have to also get rid of those obstacles to changes on a daily level for people already want to adapt their behaviour.”

SC_rather stick than carrot	Inductive	All passages in the text indicate the measures which are based on the principle of punishment and regulation.	R2: “This gives incentives to avoid waste with the wallet. Unfortunately, in the end, this is really the only effective measure I have to say.”

Source: own illustration

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Smart cities: Engagement and Participation

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Abstract

This research aims to investigate the function and extent to which the citizens of a city should and can partake in the planning and development of smart cities. Two research objectives were formulated: to find out whether and how a smart city involves its citizens in the planning process and to investigate the impact of citizen participation on the citizens themselves. The research questions relate to the level of awareness and engagement of citizens in smart city programs and to the perceived need to participate in such initiatives.

The research design followed an exploratory and descriptive approach. The qualitative research method of a case study applied the research technique of semi-structured interviews (14) with citizens from the city of Mannheim/Germany aged between 25 and 30.

Initially, a gap between the literature on citizen participation and the real extent to which it was present in smart cities today was discovered. Despite knowing the advantages of smart cities, citizens seem oblivious about such smart initiatives. Arnstein's ladder of citizen participation was used as a reference model replicated and critiqued amongst others by Gaber (2019), Cardullo and Kitchin (2018), Gershman (2013) and Tritter and McCallum (2006).

Through content analysis several categories could be identified: self-awareness, importance of citizens' opinions by participating, views towards citizens' input in co-creation, usage of smart city applications in daily lives, privacy concerns, level of awareness among citizens in Mannheim, techniques that could be adopted to promote smart cities, benefits and drawbacks of citizen participation, need for authorities to provide incentives and the values that could be gained by public participation.

This research could potentially expand current knowledge on developing smart cities and specifically on citizen participation. It reflects the citizens' mindset regarding smart initiatives, their understanding and current integration in the growth of smart cities. It points to a greater need for the authorities to better involve citizens when designing smart city programs.

Key words: 'citizen participation', 'engagement', 'smart or e-governance', 'ICT's', 'co-creation', 'smart cities'

Introduction

Smart City as a notion is one that is known throughout the world although, disguised under diverse names. The use of this term today is not consistent and as a result, there can be no universal definition or application of smart cities as it would require a tailored approach for each city (Nam and Pardo, 2011). Moreover, in conjunction with (Schaffers et.al ,2011), they argue that smart cities today tend to prioritize technology over the

citizens themselves. Despite further iterating that smart cities rely on three attributes-human, institution and technology. Lately, we have seen a flux of rapid urbanization, which consequently has impacted the standard of living of the city inhabitants at various stages (Angelidou, Karachaliou and Styliandis, 2017). Smart City projects and innovations with the help of ICT's have made it possible to reduce the gap between the average citizens of a city and the authorities when it comes to identifying and finding resolutions for common problems (Criado and Gil-Garcia, 2019). As a result, this shift over a period calls for increased transparency and responsibility towards the citizens (Bonsón in Viale Pereira et.al., 2018).

As a citizen who would interact with the city and its functions daily, the communication of data from them in certain circumstances would be considered more of use, as compared to artificial intelligence (AI). Previous research suggests that participation by citizens can be classified into two kinds. One, is where the authorities themselves have included this concept while planning smart cities and the second is the existing role played by citizens in active participation (Granier and Kudo, 2016).

Literature Review

Smart Cities

With the rise of Internet of Things (IoT), we have been able to access immense amount of information, which is then made public to the citizens, that is being used to improve city functions and increase sustainability. Our cities currently need to have a tactical plan and a clear mission and vision that incorporates all upcoming technologies and makes use of them for further development of the cities for the betterment of its citizens, depending on their needs and urgencies (Angelidou, 2016). This could be made possible if both the governmental agencies and the citizens of a city acknowledge that new guidelines, plans and schemes would be the prerequisites for achieving greater sustainability, advancement of the business and economic sectors and ultimately the standard of living of the people itself. (Hollands, 2014) rightly so, puts across his argument that a city could only be as smart as its citizens, in the sense of their capabilities to access such ubiquitous information and ultimately adapt to new technologies being introduced.

This chart is used as the framework that adds structure to this thesis. In the center, lie the Authorities and the Citizens, the two components being discussed with regard to smart cities and citizen participation. In the outer circles present are firstly, the presence of ICT's and other technological infrastructures considered to be the enablers of such participation and also an integral part of smart cities. The role of the citizens begins as being recipients of information, which they receive from the authorities. Citizens as consultants signifies the ability of the citizens to voice their opinions to the concerned authorities. They are not yet in a position to influence the decisions and policies but merely a channel to put their thoughts across. The stage where citizens have an actual impact and form partnerships with the authorities for various projects undertaken is where they become "co-creators". A mutually beneficial relationship which allows the authorities to get constant feedback from the citizens and better understand their wants in order to avoid risks and errors while formulating new initiatives and policies.

Chart 1: Shows the roles of citizens and city (Administration) along with facilitators and external factors influencing them.

What role do citizens play in Smart Cities?

Participation is achievable when there is a certain benefit involved for both the citizens as well as the authorities concerned. Furthermore, it requires an open channel that could facilitate such participation (Sanoff, 2000). Applying the conventional top-down approach of prioritizing technology first, as has been happening in the planning of most smart cities, does not take into contemplation the opinions and requests of the citizens as investigated by Sherry Arnstein (Cardullo and Kitchin,2018). In recent years, this approach has found to be ineffectual as the awareness of the citizens has increased along with their desire to be included (Delli Carpini and R. Jacobs, 2004). The bottom-up approach prioritizes citizens as the building blocks as they gradually move up the hierarchical chain. It is possible to summarize that citizens play two distinct roles in smart cities- as recipients who benefit from the strategies and innovations introduced in such smart cities and additionally, whose participation could help influence the decision-making processes for the Authorities (Brand, 2007 and Vanolo, 2014 in Castelnova, 2016).

How do citizens participate?

Depending on the initiative and the circumstances being undertaken, there are different methods of citizen participation. In a democratic world, citizens usually participate implicitly via voting (Meijer and Bolivar, 2015). The authorities would have to implement a structure of smart governance to enable the participation of citizens in smart decision-making practices. Drawing from aforementioned research, we can classify citizen participation into three types- contributing to the planning of smart cities by being recipients of information, actively contributing opinions and suggestions throughout the planning of city functions or services and actively engaging in the participation by having an impact on the decisions taken by the authorities (co-creation) (Gramberger, 2001). Employing the assistance of ICT's to mobilize and communicate feedback and real time information to the authorities (Simonofski, Asensio and Wautelet, 2019). The extent of engagement and influence of the citizens increases progressively in the three channels (Gramberger, 2001) which is also pointed out by (Kudo and Granier in 2016). There does exist a subtle difference between the participation and engagement of citizens. Participation refers to their power to impact decisions taken by the authorities, also known as direct democracy. Whereas engagement facilitates the citizens to voice their opinions and difficulties (Cogan and Sharpe, 1986).

What does it mean for a citizen to be a Co-creator?

The documented four classifications of citizen participation are - citizens who purely play the role of a customer, citizens as co-creators, citizens who are in a position to influence the decisions of the authorities and citizens in just a civic sense (Cowley, Dayot and Joss,2017). This in addition, is complemented by (Castelnovo in 2016) where he states that by empowering citizens to be co-creators it further integrates them in the method of decision-making to an extent where they play an important role in helping the authorities frame city initiatives. Smart cities empower citizens to be more engaged by being able to contribute their opinions and requirements to the development process. It creates an environment which provides a clear picture to the citizens about the policies and various projects embarked on by the city that could do better with citizen participation.

The model of "Living Labs" complements the idea of citizens being co-creators. Citizens opt to collaborate in co-creation when they see some value in it either for themselves or to help contribute to their society by way of knowledge sharing or application of their expertise in general (Ramakrishna Reddy and Baskaran, 2019). (Pallot et al. 2011) have found uses for living labs in smart cities specifically in the domains of health, transportation, energy and sustainable environment. In order to efficiently play the role of co-creators, there have to be open channels that allow the citizens to communicate and engage with the authorities at several levels. Additionally, upon reviewing the literature, looking for gaps, it was observed that there is a gap between the literature available on citizen participation and the extent to which it is found in smart cities. Even after knowing the advantages it brings along with it, the citizens of smart cities are usually unaware of such initiatives, let alone be involved (Thomas et al. 2016).

How can ICT's help in amplifying the citizen interaction?

Internet and Communication Technologies includes the infrastructure of real-time sensors and Internet of Things (IoT). These sensors make use of modern-day wireless technology to help collect data, interpret it and to transform our environment (Friedewald and Raabe, 2011). ICT's step in to help reduce the costs and to streamline

the procedure of citizen participation by additionally making use of online participation. As investigated by Gourville, 2004 in (Castelnovo, 2016), there seems to be a mis proportion between what developers assume users would want as opposed to what they really want in the ratio of nine to one. The employment of ICT's poses the issue of segregating the citizens into different groups based on their socio-economic status, as not everyone would have either access to such technology or the know-how which could defeat their purpose of enriching all citizens' lives (King-sing Chan and Anderson, 2015). Many a times citizens inertly participate in providing data which is later gathered and distributed explicitly by these administrative bodies (Capdevila and Zarlenga, 2015) which has either been inaccessible or difficult to obtain for the common citizen (Walravens, 2012). Open data does not facilitate citizen participation, as it merely makes large amounts of data sets about various domains in the city, available to the citizens. It does both increase the level of transparency between the authorities and citizens and also gives the citizens a greater sense of empowerment.

Why must citizens participate?

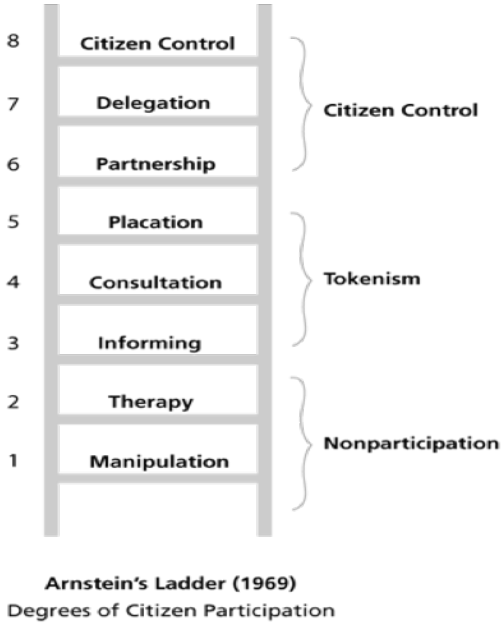
Citizens should participate as it provides them with a means to reasonably fulfill their individual and community requirements. The introduction of any new technology or initiative brought forth by the authorities has the power to enhance the life of the citizens however, it demands adjustment or getting used to a certain extent from the citizens' perspective (Castelnovo, 2016). When the citizens are actively involved in the planning of city functions from which they are going to gain, it instills a sense of trust and empowerment between them as it allows them further insight into the way the authorities function. With having access to data that they would not necessarily have previously and with the opportunity to work together with the Government, citizens acquire more knowledge regarding their communities, resulting in enhanced quality of projects undertaken (Stern, Gudes and Svoray, 2009). Gains from the participation of citizens are visible in four aspects- for the citizens themselves, the authorities, resident governments and the projects accepted. It requires a system that is adequately backed both financially as well as infrastructurally.

Categorizations of Citizen Participation

It was the 1960's that sparked the initial need to look into the aspect of citizen participation which led to one of the most prominent works of literature coming from Sherry Arnstein in 1969 in this field. She devised the model of "Ladder of Citizen Participation" which has over the years been replicated, investigated and critiqued in several pieces of academic study (Gaber, 2019).

The ladder of citizen participation has been around for half a decade and in the duration of that has lost a bit of its relevance. Nevertheless, throughout the course of available literature, it has been used as a foundation to understand the level of citizen participation in the planning of cities. However, it has been subject to criticism by several authors. The entire ladder is developed around the model of citizens being able to gain enough power and influence to place themselves in a position where they have total control over the authorities' decisions (Tritter and McCallum, 2006). Arnstein´s ladder has been recognized to have a rather general perception of what it means to have citizens included in participation. Authors like (Wilcox, 1994) have taken this model as a foundation and built on it, to increase the number of categories to five instead of three.

Fig 1. Arnstein's Ladder of Citizen Participation



Source: https://www.citizenshandbook.org/arnsteinsladder.html

An important aspect not included by Arnstein, was the presence of feedback systems or loops integrated within the model which would grant the citizens the ability to voice their opinions. An interesting observation is that Arnstein herself has acknowledged the absence of feedback loops as cited by (Debra-Gershman, 2013). The ladder mainly focuses on the level of power the citizens have at any given stage, with complete power to the citizens being the end goal. However, it fails to mention how the citizens should be involved from the start. Most of this model (Non-participation and Tokenism) hints at citizens playing a more passive role in the entire process. This must not be considered a conclusion but rather a suggestion to improve the engagement of citizens.

Citizen participation in Mannheim

This case study takes into account the city of Mannheim, the third largest city in the state of Baden-Württemberg (Germany) as an illustration to help further investigate the research objectives and questions. Findings from the most recent census (City Population, 2019) reveal that it is home to approximately 311,000 citizens. In the year 2019, the province of Baden-Württemberg recorded a gross domestic product (GDP) of €513,438 billion euros as per a framework prepared by the Census and Economic Information Center (CEIC, 2019). It has an ambitious plan in association with the United Nation for its sustainable development, which it has catalogued in the form of seventeen goals (Mannheim,2030). One of the reasons for selecting Mannheim as an example for this study was that it has theoretically already started carrying out smart city initiatives looking to enhance citizen participation. Moreover, it has an openly recorded and freely accessible smart city plan that makes it easier to retrieve consistent information on the topic being investigated. Mannheim smart city plan outlines its goals over the next ten years. The plan incorporates several of its initiatives into seven strategic goals that it aims to achieve over the years. These are the following seven strategic goals laid down by the city of Mannheim- educational equality and tackling poverty, better quality of life and health of its citizens, to promote gender equality and diversity within the city, increased transparency to engage citizens via participation and foster a strong

partnership with them, to progress in the field of digitalization and equipping the city with skills required for the future (both for the citizens and organizations), to set an example for eco-friendly green cities and lastly, to think global and act local simultaneously, enhancing its international relations. The administration of Mannheim has also introduced the facility of a citizen portal that serves as a communication medium between the administration and the citizens. The administration recognizes the significance of democracy in the daily life of citizens. Transparency is regarded as a key essential for gaining the trust of the citizens which would in turn promote increased participation (Mannheim, 2030).

Table 1: Co-relation between Research Objectives, Research Questions and Int. Qs.

Research Objectives (RO´s)	Research Questions (RQ´s)	Interview Questions (IQ´s)	Sources
Research Objective 1 (RO1): To find out how and whether a smart city involves its citizens in the planning process. Research Objective 2 (RO2): To investigate the impact of citizen participation on the citizens themselves?	Research Question 1 (RQ1): How aware of and engaged are the citizens in smart city programs? Research Question 2 (RQ2): Do citizens feel the need to participate in such initiatives?	Q1. Do you know about any smart city initiatives taken up by the city of Mannheim? (IF so which one?) Q2. Why should the opinions of citizens be heard when – (give them an example of a smart city initiative) developing smart cities? Q3. How do you think co-creation could help in the development of smart cities? (If the respondent does not know what co-creation is, give a brief explanation). Q4. Do you currently use any smart city applications or participate in any initiative? (Give an example for each). Q5. Is privacy ever a concern when you share personal information on applications? Q6. Do you think there is sufficient awareness among citizens about such smart city initiatives Q7. How do you think the city of Mannheim could promote itself being a smart city? smart cities?	(Simonofski et al. 2018) (Cardullo and Kitchin, 2018) (Albino, Maria-Dangelico and Berardi, 2015) (Berntzen and Rohde-Johannessen, 2016) (Phang and Kankanhalli, 2008) (Roeder et al. 2005) (Stern, Gudes and Svoray, 2009) (Komninos, Schaffers and Pallot, 2011) (Johannessen, 2010) (Lines, Ikechi and S.Hone, 2007) (Johannessen and Berntzen, 2016) (Jackson, 2003) (Bladel, 2019) Benouaret, Valliyur-Ramalingam and Charoy, 2013. Ignacio Criado and Ramon Gil-Garcia, 2019. Kudo and Granier, 2016. Kitchin, 2019. Castelnovo, 2016. Uglijanin, 2020.

Methodology and Research Design

This section bridges the gap between the research gap and objectives along with the literature of this case study. So as to achieve information that was only of relevance, the articles taken into consideration contained at the minimum one or the following terms: 'citizen participation', 'engagement', 'smart or e-governance', 'ICT's' and 'co-creation'. These terms were searched both independently and accompanied with the term 'smart cities'. This case study follows the path of a qualitative research design with a descriptive pattern, whereby as would be seen, new classifications would be framed from the findings in the next section. In this case, 'inductive category development' (Mayring, 2014, p.12) was followed as it enables the researcher to form certain premises based on the literature along with the research objectives and questions that can be further categorized. For the above-mentioned research questions, the research design followed a descriptive path which would later help in articulating different categories from the results obtained from the interviews (Mayring, 2014), as will be expressed in detail in the next section.

Non-probability was selected as the technique to decide the sample population. Furthermore, by means of purposive sampling, the judgement of the researcher would play a crucial role in the choice of sample selection. Purposive sampling allows for the voluntary selection of respondents who are well-educated about the topic being investigated and could contribute to the research questions being further explored as such. By interviewing the respondents, it is possible for the researcher to completely immerse themselves in the observation, allowing the researcher to pick up on body language and other subtle cues that may not have been possible otherwise (Rahman, 2017 and Saunders et.al., 2019). The minimum qualification deemed necessary for the sample size was having a bachelor´s degree at the least. The case study took into consideration a sample size consisting of fourteen respondents, all from the city of Mannheim, Germany. The respondents (R1 to R14) were considered young citizens between the ages of twenty-five and thirty.

The interviews were formatted in a semi-structured manner. In order to adequately process the results obtained from the above-mentioned interviews, a software tool, 'MaxQDA Plus' would be employed in order to produce more reliable results. It facilitates the formulation of further categories from such transcriptions, allowing the researcher to identify patterns and re-occurrences which could further be analyzed in order to efficiently obtain results from the qualitative interviews (M and U. Kuckartz, 2014).

All of the respondents were either contacted via Facebook or Instant Messaging to arrange virtual face to face interviews. They were asked eleven interview questions (refer Table 1). With the help of 'MaxQDA Plus 2020', every response from the respondents has been categorized into one category for each question and three different assessments for each – positive, negative, and neutral based on the software's open coding functionality.

The above figure shows an excerpt of one interview conducted. It shows the line numbers the interview is split into and on the left you can observe the code that has been designated to specific paragraphs. For instance, in the above image, in lines 28 and 29 the respondent was asked about how co-creation could help in the development of smart cities for which a 'co-creation' category was then created to highlight the information and later assessed to be 'positive'.

Fig 2: Research design of the case study

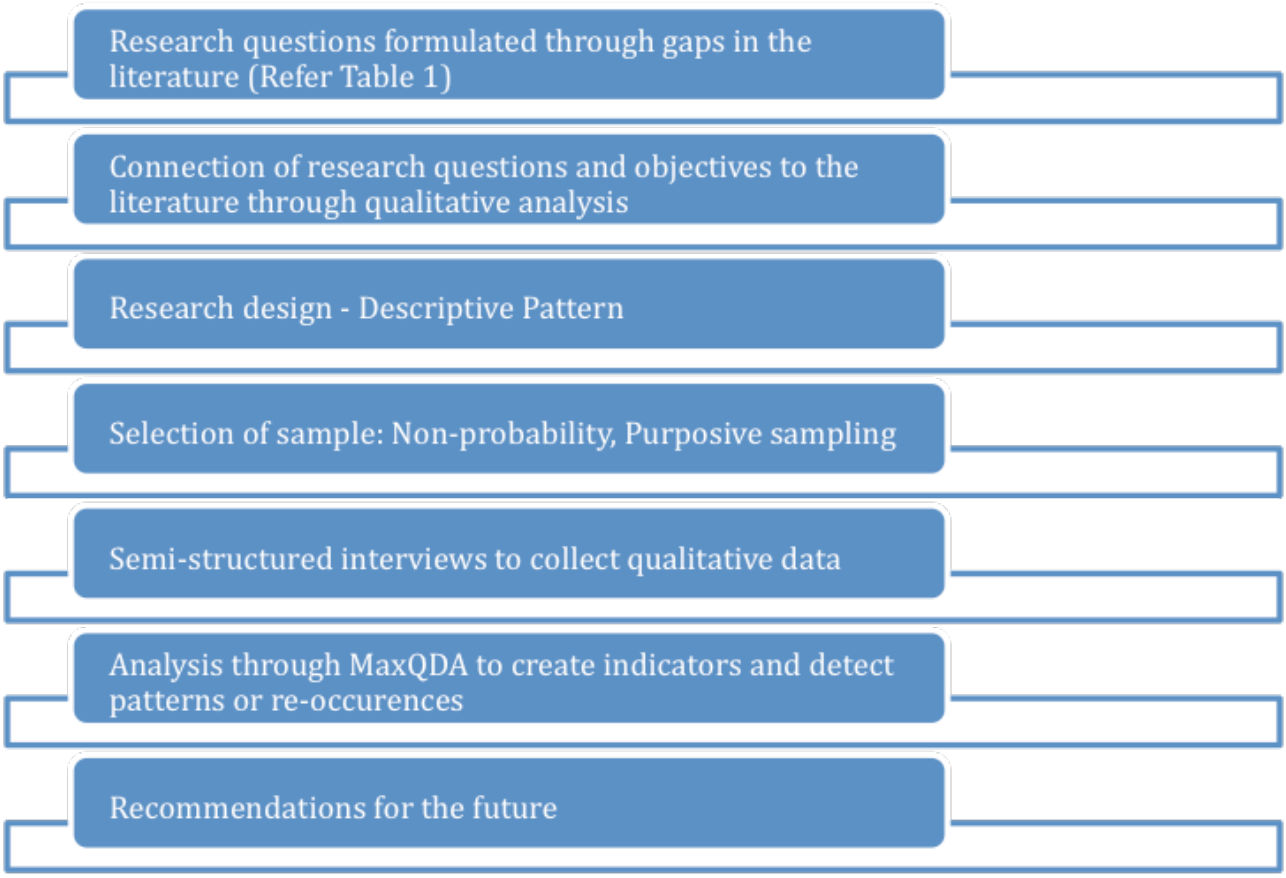
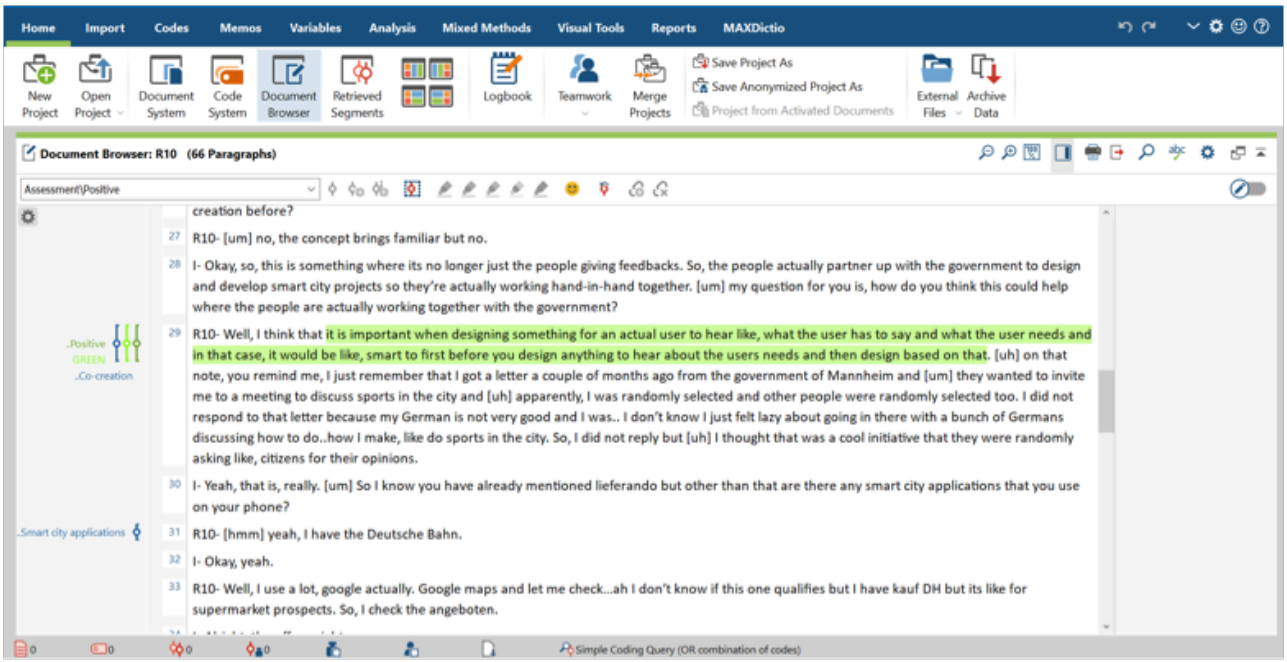


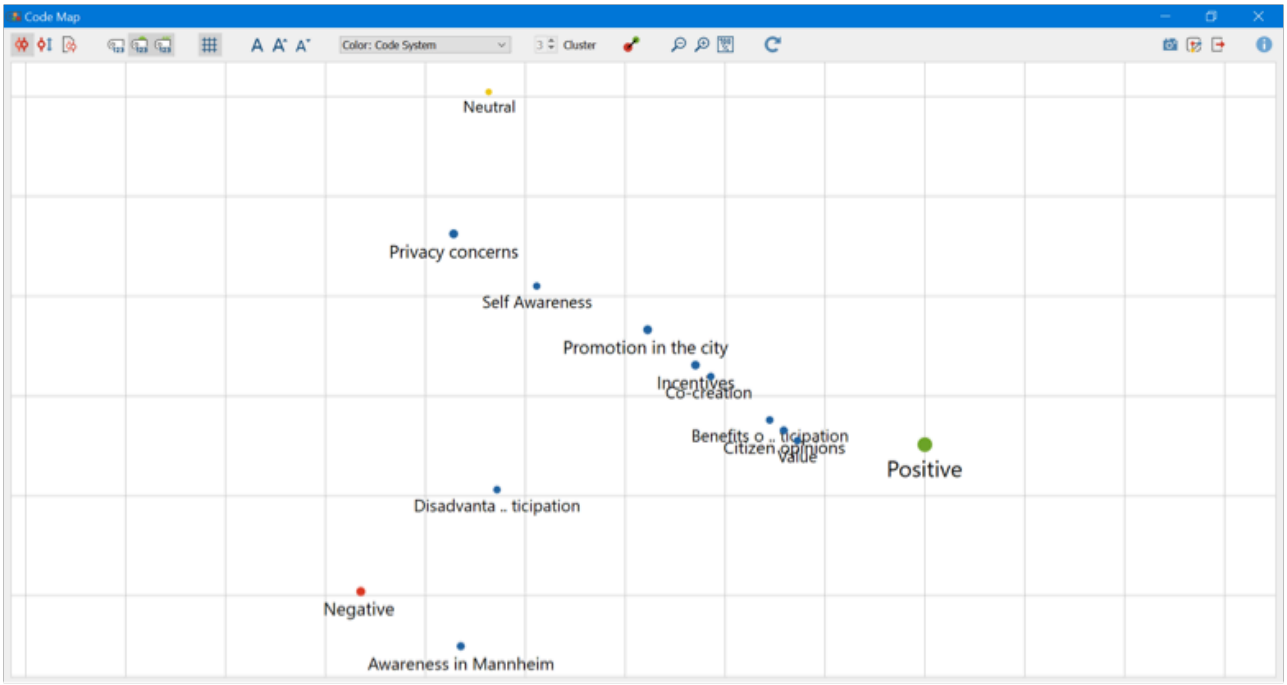
Figure 3: Example of coding parts of interviews from MaxQDA Plus (2020).



Results and Analysis

The purpose of this case study was to answer two research questions, 'How aware of and engaged are the citizens in Smart City programs?' and 'Do citizens feel the need to participate in such initiatives?', to which this paper has weighed in on to some degree.

Figure 4: Visual Analysis through MaxQDA Plus, 2020



The above figure is an example of the visualization tools employed through MaxQDA for qualitative analysis of this paper. Based on the results section, to answer the first research question (Table 1), one could observe that the self-awareness in Mannheim about smart cities in general and specifically about the smart city initiatives in Mannheim itself is neither positive nor negative and gravitates more towards being neutral. However, on examining the responses relating to the general awareness in the entire city, for the entire sample size was in the negative. The results of the self-awareness aspect could nevertheless be inaccurately portrayed as neutral as in the case for most respondents, that they were oblivious to what would in fact be considered a part of smart cities or initiatives despite consuming them in their daily lives. Conversely, the lack of awareness in Mannheim, based on the results could be on account the absence of any widespread promotion within the city, improper planning or not completely including this topic within education centers. As pointed out by the respondents, the probability of the people who either directly work with or study about smart cities to know about it is more when compared to the average citizen who would have to educate themselves personally. As stated by R3, R5 and R14, 'I think apart from the students who are doing a project like that and when you're made aware about things because most people are just so in their lives'. The need for taking into consideration the opinions of the citizens was highly positive and it does take place in Mannheim. 'You should rather listen to the people who are living in the city and what their needs actually are rather than investing in something they might not need' said R4. This is being done currently with the help of random surveys or invitations to gatherings sent out by the city

on various issues and secondly with the help of the citizen portal (Refer 2.3.5). Then again due to the absence of large-scale promotions and awareness in the city about such initiatives, the city would be able to tap into only that section of the demographic that has individually researched and is aware of such a platform.

The results from the interviews conducted regarding the next research question (Table 1) indicated that the citizens would be willing to participate as they recognize the benefits of it in the planning and development of smart city programs and simultaneously acknowledge that there would be many different values that they would gain out of it. (Fig 4) above is a representation of this, as 'Benefits' and 'Value' ranked highly positive, which have also been highlighted in (Refer 3.1). R13 expressed, 'Public participation will bring in new ideas and comments' and when asked about the value, R1 stated, 'I think it's about the feeling of belonging together for one' which was a sentiment shared by many other respondents. Yet, there are also certain disadvantages associated with citizen participation in that, it would not be both feasible and realistic to be able to acquire the opinions and contributions from the entire demographic. One of them is stated by R2, 'If they only create like the benefit for their group rather than the general society or Mannheim. It could be super hard to involve people from lower income societies'. The method by which they would have to carry out such an operation would have to be systemically structured and planned to include close-ended and specific questions (Refer 3.1) to the public that would allow them to be efficient and avoid unproductivity. Despite recognizing the benefits, 65% of the sample size believed that due to the dearth of awareness, the city would need to provide some form of incentive to be able to get people involved in such participation. These incentives could be in the form of merely knowledge and informing the citizens about the specific benefit(s) that they would achieve from a particular feedback or something tangible. The remainder of the sample size believed that if the people were actively observant and keen to improve their city, they would participate irrespective of an incentive.

Limitations

The questionnaire contained same questions for each respondent interviewed for the purpose of this case study until the researcher had reached data saturation. This implies that after a certain point, there is a lack of new themes and data that could be explored further by the researcher (Guest et al., in Fusch and Ness, 2015). Such saturation is not necessarily dependent on the sample size but rather on the quality and repeatability of the data acquired. Caution was given to the bias from the researcher's point of view on the topic being investigated in relation to the data gathered from interviews. (Bernard, 2012 in Fusch and Ness, 2015) points towards a suggestion to use a sample population for the interviews that one would typically not regard in order to achieve data saturation. This is both a justification as well as a limitation, as the sample population chosen to answer the research questions of this case study were the average citizens aged between 25 and 30 in the city of Mannheim in order to give a raw, better understanding of the awareness levels among people about smart city initiatives and their role in participation in Mannheim as compared to interviewing professionals working within these programs, who in all probable sense would have a better understanding and knowledge of the topic.

Recommendations for the future

The first recommendation would be to design an efficient public participation platform building on the existing online portal created (Refer 2.3.5) that extends its influence on a larger portion of the population. Promoting and advertising current projects undertaken,

and their progress would be a complementary aspect of this recommendation. Secondly, this move to smart cities is not just an incremental progression and would even require a change in the mindset regarding smart cities to be able to embrace these upcoming changes which will help citizens adapt faster. This would be made possible by introducing educational courses not just at higher levels of education such as Bachelor's and Master's but implementing it right from primary schools, teaching kids about the benefits, possibilities and opportunities that could be created by developing smart cities. Education is a crucial element as it would eliminate any negative fears in the minds of the people which seems to be prevalent due to the lack of current knowledge and awareness.

Conclusion

After adopting a qualitative analysis approach this paper highlights certain important attributes regarding the role of citizen participation in the development of smart cities. It has been documented previously before, for a city to be truly smart, it would have to amalgamate all three of its resources – human, institutions and technologies (Schaffers et.al ,2011) while not neglecting either. Yet, we have not seen a perfect example for the following. Categorization of citizen participation could be split into four aspects. Playing the role of a recipient of information, a consultant, a co-creator and how the use of ICT's and infrastructure can enhance such participation. It touches upon why citizens must participate and how it would benefit not them alone but the city as well. Using Arnstein's ladder of citizen participation as a reference framework for the various categorizations of citizen participation for both comparisons and also to aid in detecting gaps in the literature when it came to the level of citizen participation in reality in smart cities compared to theoretically. Further drawing attention to the level of citizen participation, specifically in Mannheim. Speaking about the city's agenda, strategic goals, vision and as well as the smart city initiatives already in place.

Findings imply that an increasing number of citizens feel that there is a need for cities to consider the opinions of its citizens to be able to achieve mutual benefit and make the citizens feel recognized in the planning of a city. Furthermore, they realize the possible advantages and values of both participating in and co-creating smart city initiatives. The results also indicate that most citizens were ambivalent about any privacy concerns as long as the city administration were transparent in the way their data would be utilized and to what extent. The only aspect that you could consider negative from this analysis was the lack of awareness among citizens in Mannheim about what a smart city and its initiatives comprised of and the obliviousness to the progress of Mannheim as a smart city. This aligns perfectly with the gaps found in the literature and something that has been previously explored by researchers (Refer 2.3.1). Moreover, there were applications and services they were availing of in their daily lives without consciously recognizing them as "smart". After analyzing the data acquired, the city of Mannheim appears to be on its path to achieve its 2030 mission. An aspect to be taken away from this paper, would be for the administration to pay careful consideration to its respective channels for citizen participation and to design efficient and productive means of including the citizens in the planning process to achieve reciprocal value in building a truly smart city.

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Appendix

Excerpt from the Interviews conducted:

I- The first question is, do you know about any smart city initiatives in Mannheim? And if you want I can give you an example for that.

R10- Oh please do.

I- Alright. So, something very basic is the TIER app that we have, the e-scooters that we can use or [um] even things like, I'm not sure if this was the same for you but when I first moved to Mannheim I had to go and get myself registered with the city. So, for example if you have to go K7, so all the services that you get over there come under these smart city services. So, anything along these lines, do you know of any initiatives?

R10- Actually, no, I don't think I understood the first one you mentioned. What was it with the…

I- Oh, that was TIER. You know the TIER app with the…

R10- Ahh, yeah, yeah. I did not know that was an initiative from the city itself actually.

I- That's the thing actually I've been facing. There are so many applications that people use in their daily lives but they don't realize its actually connected to smart cities.

R10- Yeah, exactly.

I- Yeah, so like, even if you have, I don't know smart lights at home or something like Alexa, even that comes under smart cities.

R10- Okay and would something like the Lieferando app come under…

I- Yeah, yeah, of course. The food delivery app.

R10- That is also a part of it. [uh] Okay, then I would say I am familiar with that, the TIER app, then [um] what else? Well, I don't know if this qualifies for smart cities but [uh] are you familiar with the geocaching app?

I- [uh] no, I don't think so. What's that about?

R10- So, its an app that its for, like playing actually. You download it and it has like [uh] like a map from where you are and you can see [uh] little things that have been hidden by people and you can see them like pointed in the map and the idea is that you set yourself out on a hunt for these items and it can be anywhere in the city. It works actually all around the world. In Mannheim apparently at some point it was very popular because [uh] the app is just full of little treasures and you use the app to get closer to them and at some point, you know, the app can only get so close, so you know [um] you see like almost like google maps that you're close or you are next to it and you have to find the item itself and [um] its funny. We used it with my boyfriend, we ended up in a park looking for like the tiniest box ever but you don't know what you're looking for until you find it.

I- What did you find in it?

R10- [um] well, actually you're supposed to find a little object and then replace it with an object yourself for the next person that uses the app. But [uh] in ours we found nothing just [uh] empty Tupperware with a little book that is supposed to be registering who finds the Tupperware [chuckles].

I- [chuckles].

R10- Yeah, but [uh] I mean the activity its about the experience in itself. Its not about what you find but more like, its about finding it and the interaction with the map. I think its actually pretty cool and it may qualify as like a smart city activity.

I- Well, I wish, I really wish this could be a smart city initiative because this seems super cool and really fascinating and I really want to check it out now. But [uh]…

R10- Well, I can write to you down the name [uh] in the messenger.

I- Oh, that would be perfect.

R10- Yeah, yeah, yeah. I can, don't worry.

I- But, yeah, see, every day you get to learn something. Alright, so what do you think or why do you think a citizens' opinion should be heard in the development of smart cities?

R10- Well [um] cities are actually made for the citizens, you know. Sometimes, governments forget that. But, the cities are not about the governments and more the citizens themselves. So, I think the city should serve the citizens and not the other way round and that's why we need more things that makes the citizens' lives easier.

I- Fair enough. Alright, so when we speak about citizen participation, the highest form of participation is co-creation. So, have you heard of co-creation before?

R10- [um] no, the concept brings familiar but no.

I- Okay, so, this is something where its no longer just the people giving feedbacks. So, the people actually partner up with the government to design and develop smart city projects so they're actually working hand-in-hand together. [um] my question for you is, how do you think this could help where the people are actually working together with the government?

R10- Well, I think that it is important when designing something for an actual user to hear like, what the user has to say and what the user needs and in that case, it would be like, smart to first before you design anything to hear about the users needs and then design based on that. [uh] on that note, you remind me, I just remember that I got a letter a couple of months ago from the government of Mannheim and [um] they wanted to invite me to a meeting to discuss sports in the city and [uh] apparently, I was randomly selected and other people were randomly selected too. I did not respond to that letter because my German is not very good and I was.. I don't know I just felt lazy about going in there with a bunch of Germans discussing how to do..how I make, like do sports in the city. So, I did not reply but [uh] I thought that was a cool initiative that they were randomly asking like, citizens for their opinions.

I- Yeah, that is, really. [um] So I know you have already mentioned lieferando but other than that are there any smart city applications that you use on your phone?

R10- [hmm] yeah, I have the Deutsche Bahn.

I- Okay, yeah.

R10- Well, I use a lot, google actually. Google maps and let me check…ah I don't know if this one qualifies but I have kauf DH but its like for supermarket prospects. So, I check the angeboten.

I- Alright, the offers, right.

R10- Hmm?

I- The offers, right?

R10- Yeah, exactly, exactly. Every week they have different ones. So, I check them there before I go to the supermarket.

I- Alright, that's pretty cool. My next questions is, is privacy ever a concern for you when you share personal information using a phone application. Like, does security ever cross your mind or is that fine for you?

R10- Well, [chuckles], I don't want to be a basic person here but [um] its [uh] everything is fine as long as there's no money involved, you know, like, I know that Facebook, Google, they all have my data already so I don't mind someone else having it, like my name or picture but [uh] I do get pretty [hmm] like skeptical when it comes to entering your account number and your card number and all that.

I- Alright, do you there's enough awareness in Mannheim about it being a smart city and also smart cities in general?

R10- [hmm] Well, if I had to guess because this is out of pure ignorance, I would say no. Mannheim, in particular is not a very, like, globalized city. I mean it's multicultural, yes but not many people speak English for example and in comparison to other German

cities, its not full of young people. [um] But that's just my opinion, compared to Heidelberg for instance. In Heidelberg everyone's like a uni student and they all speak English and here I find it more, yeah, more difficult to find that sort of community.

I- Alright, so, this would be a follow up question then. How do you think the city could promote it being a smart city or even advertise? What would you suggest?

R10- [hmm] Well, it would be a good idea to promote their own apps, if they do have them. Like, [uh] for instance Deutsche Bahn promotes their own app and I actually follow the Mannheim stadt on Instagram and there, like I found like a new way of communication they had. Like, I did not know at all that they had it. I also don't read newspapers or anything so, at this moment, it's the one thing that's keeping me updated with the news.

I- So, what's this new way of communication?

R10- [um] Their Instagram account actually. [chuckles]

I- Oh, alright. [chuckles]

I- So far, we've been talking about everything from the citizens' perspective and how it would help the people but how do you think it would actually benefit a city, if the city became smart, you know or people start working towards making a city smart. How do you think the city benefits from it?

R10- Well, [uh] on the one hand with the means of transport [uh] have you heard of waze?

I- Yeah, yeah, of course.

R10- Yeah, well that's the prime example, I think. It's the app, like, localizing their own users and telling them like, okay right now there are a lot of cars there because they can see that many people are using the app there [chuckles]. So, that benefits the users themselves so that they know where there is an agglomeration of vehicles and [uh] it benefits the city as well because it makes it work better.

I- Alright, do you [um] do you think there would be any disadvantages of people participating in smart cities?

R10- Yeah, the only concern I would have is [uh] about the users that is not trusting technology that much. Because when you think about all this technologies of course, you're not thinking about the senioren…how do you call them [um]. I'm sorry..about the.

I- About the elderly people?

R10- Yeah, exactly. So, I don't think they are as active using apps or trust…they don't trust them as much as the rest of the users.

I- Alright, so according to you that would be the only disadvantage, like not getting all of them on board.

R10- Yeah, that would be a point.

I- Okay, do you think the city would need to provide people with some sort of incentive to participate, for example, in smart city programs or do you think people would just do it anyway?

R10- Well, I think the benefit should come from the action itself, like, [um] it should be more like a tool for the citizens and not just a way for the city to just gather data. There should be an immediate advantage for the user.

I- So, would you think the city would need to offer people something other than the program that they're using or…

R10- No, no I think if the tool is good enough, that should be enough. Like the waze example. So, its good enough.

I- So, the application speaks for itself.

R10- [hmm hmm]

I- Okay, so this is my last question for you and yeah, what do you think is the value that people get out of such smart city programs in general?

R10- Well, I think that [um] everyone now is very used to everything there very effective and very fast and everything answering when they need it to and [uh] some things that used to be maybe slower in cities and especially when it has to do with like, citizen government communication, for example, [uh] this could be a benefit like for everyone to be connected then we would get things done faster and better possibly.

I- Alright, well thank you so much for taking the time out to participate in this interview.

R10- You're welcome.

The role of Information and communication technology (ICT) in German Higher Education: Teacher's and student's perspective

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Abstract

ICT (information and technology) plays a key role in the current digital world. Its use in various sectors like Medicine, Agriculture, Defense, Transport, E-banking, E-governance, Education shows the importance it has in our daily life. The pandemic (covid-19) has changed the landscape of the education sector which has shown us the importance of ICTs which cannot be ignored. Today's global social and organizational structure are interconnected through various information networks which are only possible due to the use of ICTs. ICTs in education are being used for few years but their real value has been found during the pandemic (covid-19). ICT use in education enhances and promotes different types of learning such as blended learning, hybrid learning, E-learning, open and distance learning. Today's student-centric demand for education has urged us to use ICTs in their full capacity. There are many factors which either influence or enhances the integration of ICT in today's education. This work aims to study the role of ICT in education with the objective of exploring the factors which influence ICT integration in the teaching and learning process in German universities. This work used a qualitative research design approach with a case study research method and semi-structured interviews as the research technique. The sample member of this work were professors and students from various German universities. The results were analyzed using the qualitative content analysis method. The main findings of this work highlighted few positive and negative points which need to be considered for a successful ICT integration in the teaching and learning process. The positive points were that most of the technical German universities are using ICTs successfully in their curriculum and are aware of the advantages ICT brings. The negative points were the need of improvement in ICT use by having efficient and effective ICT training especially in situations like covid-19. It also showed that how a positive attitude towards ICT can influence ICT integration. The study concluded the relationship between three main factors i.e., Attitude, Knowledge, and ICT, and highlighted that the three interlinked factors need to be addressed in a proper way to attain the best results from ICT.

Keywords: Information and Communication Technology (ICT), Digital education, ICT integration, Covid-19, education and technology

Introduction

This chapter explains the background, research gap, purpose, and scope of this research study. It will give a clear picture and vision of the study.

Background

The world is changing at an alarming rate due to the transformation in digital technologies and it is also changing the landscape of how people live, study and work in Europe. The ongoing digital transformation is impacting numerous parts of

our daily life, from the integration of digital technologies in all economic sectors to the integration of emerging technologies like Artificial Intelligence (AI) in our societies.

Digital technologies helped in business continuity for most of the sectors including the education and training sector by supporting the individuals and organizations in the daily tasks during the COVID-19 crisis. The current biggest challenge of the development of digital technology use in the education system still needs to be addressed. Nowadays society under the digital era demands a teaching body that has adequate digital knowledge and skills which they can share with the students of any age and educational stage. Specifically, the immersion of adults in the digital prospect who never interacted much with the technology from an early age is more complicated than the others (Pervez et al., 2018).

The teaching and learning process are offering many opportunities like the possibility of having a more diverse group of learners, increased flexibility, personalized and inclusive study, communication, and cooperation of an engaging and interactive form, if the digital technologies used are properly planned and designed. Information and communication technologies (ICT) are regarded as the new approach of improving the spread of information which helps in overcoming the challenges like unwillingness to change from traditional teaching approaches, shifting from traditional to technology-based learning, etc in the new and enhanced teaching and learning process (Eryansyah et al., 2019 in Habibi et al., 2020). Information and communication technology (ICT) integration in education is referred to as the incorporation of computer-based communication that is used for the purpose of instructional process in daily classroom activities (Ghavifekr & Rosdy, 2015). Even though there is no universal definition of ICT but in general it can be summed as the integration of all devices, applications, networking components, and systems that allow organizations and people to communicate and interact with each other in the digital world (Sarkar, 2018). The student's attitude towards technology, competencies, and academic excellence can be improved with the integration of ICT in education (Vesudevan, 2021).

Research gap, purpose, and scope of the thesis

There are many studies that focused on the integration of ICT in education, but they worked independently on one factor at a time either from a teacher's perspective or a student's perspective (Mynaˇríková & Novotný, 2021; Gómez-Trigueros et al., 2019; Benali et al., 2018). European universities also face the same challenge for the integration of ICT in education (OECD, 2018). This work will aim at the comprehensive study of the role of ICT in the teaching and learning process. It will focus jointly on the three major factors: Attitude, Use, and knowledge and their influence on ICT integration in German higher education. To fulfil the aim two research objectives and three research questions were derived which are as follows:

O1: To critically explore the factors influencing ICT integration in the teaching process?

O2: To critically explore the factors influencing ICT integration in the learning process?

RQ1: How does attitude towards technology use influence the integration of ICT in the teaching process?

RQ2: How does technology Knowledge influence the integration of ICT in the teaching process?

RQ3: How technology use influences the integration of ICT in the teaching process?

Furthermore, it will also identify the key components of Attitude, Use, and knowledge at the end of this work which influences the ICT integration in German higher education.

Literature Review

This chapter explains the current and previous studies on ICT in education in Europe and Germany. For finding the relevant literature various online databases were used such as google scholar, EBSCO, Academia, Research gate, Springer with keywords like ICT in education, challenges of ICT integration in education, Covid-19 impact on education, etc.

Technology role in Education

The 21st century is often regarded as the century of technology (Raja & Nagasubramani, 2018). It plays a vital role in everyone's daily life and plays a critical role in economic growth being the basis of economic growth (Raja & Nagasubramani, 2018). In the education sector, many higher education systems have replaced the old and traditional teaching and learning process with new and emerging teaching and learning processes with technology inclusion in one or the other way (Lortie, 2021). It was revealed recently in a study that modern students claim that the use of modern technology equipment and/or tools enhances their learning and interactivity (Raja & Nagasubramani, 2018). They think that using technology wherever possible makes knowledge transfer much more easy, effective, and convenient.

Today's classrooms function differently compared to the ones three, five or ten years ago. The days of desktop computers are gone and now are the day of Interactive Flat panel displays (IFPDs), laptops, tablets, smartphones that are seamlessly connected via Wi-Fi or Bluetooth and which can support a range of cloud-based software and applications. There are four ways in which technology has changed the landscape of education (Lortie, 2021):

1. Simplifies lesson preparation
2. Technology-Aided assessments
3. Studies anytime anywhere (breaking the boundaries)
4. Collaborative classes

With the increasing participation of students in classrooms, the need for more student-centric educational practices is also increasing. One of them is the potential use of ICTs to achieve results which will be beneficial from the teachers as well as student's context. It will help the students for getting ready for the outside digitalized world which is rapidly moving towards industry 4.0. In the upcoming sections we will the role of ICT in education and the challenges and benefits following the integration of ICT.

ICT role in education

Information and communication technology (ICT) plays an important role in most of the virtual aspects of our daily lives (PISA, 2019). Technology has transformed people's professional and personal life and has changed the way of how people interact, communicate, share and retrieve information in the 21st century. In the

digital era, learning experiences help and assists the student in adopting the cultural, social, cognitive, and technological skills and competencies to fully function as a responsible adult in the 21st century (Forkosh-Baruch & Avidov-Ungar, 2019). For this to happen the effective involvement of ICT is becoming important and key in the education sector.

ICT helps in numerous aspects of instruction, for example, it gives new freedoms to understudies to learn outside the school, helps instructors in their educational methodologies, and inspires the learning experience for the understudies in schools and universities. Education systems nowadays are increasingly using digital technologies which are helping in embedding digital competencies in their curriculum. Below is a basic and simple explanation of ICT:

'ICT is a huge umbrella term. Though there is no universal definition, so ICT be generally referred to all the applications, devices, networking components, systems that can facilitate interaction in the digital world. It is a more comprehensive word, which includes all the components related to computers and digital technologies' (Eye on Tech, 2020).

The effective utilization and inevitable involvement of ICT are required in educational institutions to prepare students as young functioning adults of the 21st century. To assist students in the cognitive, cultural, social, technological skills and competencies, ICT will play a major role (Forkosh-Baruch & Avidov-Ungar, 2019). Gressardand Loyd (1985) in Meena (2020) claimed that the main factor in successful ICT integration in education is the attitude teachers have towards technology use.

Practical Benefits of ICT:

There are multiple benefits and challenges of integrating ICT in education. First, we will discuss a few of the benefits of ICT integration. Tinno (2002) in Raja & Nagasubramani (2018) had some interesting insights about ICT integration in education. Tinno (2002) asserted in Raja & Nagasubramani (2018) that ICT helps a lot in terms of absorption and acquisition of knowledge, and it also promotes the following:

- Active learning
- Collaborative and Cooperative learning
- Creative learning
- Integrative learning

Rabah (2015) concluded some perceived benefits of ICT integration. As per the study by Rabah (2015), there are three main benefits which were presented in the study:

- Higher learner engagement levels
- Globalization in 21st-century education
- Learning process Enhancements

Practical Challenges of ICT

Software integration and educational technology equipment integration in educational institutes are not being utilized till their best potential. If done properly it can improve the education and instruction in the educational institutes (Rabah,

2015). Following are some perceived challenges mentioned by the participants in Rabah's study:

- Lack of Support
- Investments in infrastructure, equipment, resource and appropriate funding
- Professional development and support

All the above-mentioned challenges should be taken care of by the concerned authorities and educational institutes for preparing students for the digitalized and advance outside world. The successful integration of ICT majorly depends on teacher's ability to structuring an effective and efficient learning environment (Hernandez, 2017). Still, some major hurdles need to be considered and worked upon for taking the "leap forward" and "breaking the traditional formulas" to achieve teamwork-based learning.

ICT in teacher's education

With regards to a digital world, the societal demands of having a teaching body with enough digital skills which can be taught to the students at any given educational stage are increasing (Garzon Artacho, et al., 2020). As per Garzon Artacho, et al. (2020), teacher's training in digital competence is an important aspect and it should be taken into consideration if the real change needs to be achieved in the teaching and learning process. The existing ICT training for the teachers needs improvement to attain the desired teacher digital competence. Garzon Artacho, et al. (2020) observed in the study that many teachers who were analyzed in the study did not go through or received any previous ICT training which shall not be the case in a world where technology's role is increased drastically. Continuous teacher training in digital competence is required which can meet the student's demands in the 21st-century digital era (Garzon Artacho, et al., 2020).

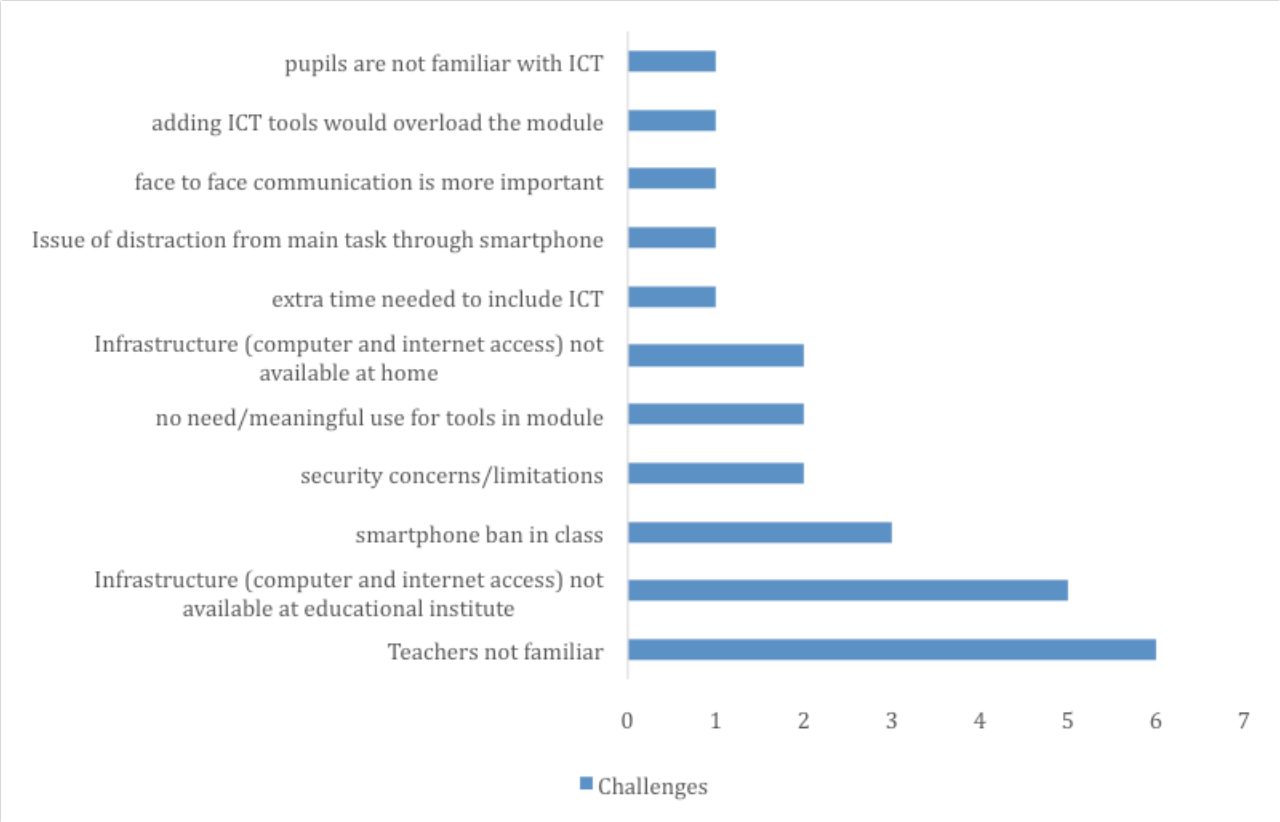
For the first time in history a variety of educational technologies supply is available for use which are chosen by the students which is the good news for educational institutions such as smart mobile phones, learning applications (Apple store, google play etc.), open educational resources MOOCS, khan academy, iTunes U etc.), networking software (Skype, teams etc.) and collaborative learning tools (wikis, blogs, knowledge building software etc.) (Bidarra & Rusman, 2017). Therefore, the combination of real-world learning resources and digital world learning resources has become a topic of research for science educators to develop educational activities for students (Bidarra & Rusman, 2017). Mirete, et al. (2020) concluded in the study that external motivation for the inclusion of ICTs by teachers can be altered, incentivized and modified but the intrinsic motivation should be present to guide the teachers towards more sorted and transformative teaching and learning experience.

ICT use in the European education system

ICT tools like Web 2.0, apps and programs are part of the 21st century's modern society. Schools and higher education institutions across Europe are using and adopting these essential ICT tools, but the adoption rate in some countries is rather slow compared to others (Kampschulte & Eilert, 2016). Due to the growing trend of "Tablet classes" at the education institutes, the rate of tablets and smartphones from lower grades has also increased.

There are different difficulties and challenges which are being confronted when integrating ICT in teaching which ranges from teacher's ICT qualification to meaningful educational incorporation to questions regarding technical parameter to infrastructures. Under the IRRESISTIBLE project, a survey was conducted to find out the challenges of ICT integration in teaching which is shown in the below figure (Kampschulte & Eilert, 2016):

Figure 1: Challenges of ICT integration (Kampschulte & Eilert, 2016)



Based on the teaching module developed under the IRRESISTIBLE project and experience a wide range for selection of ICT tools were offered.

Four main factors of successful integration of ICT tools in education mentioned by Kampschulte & Eilert (2016) are as follows:

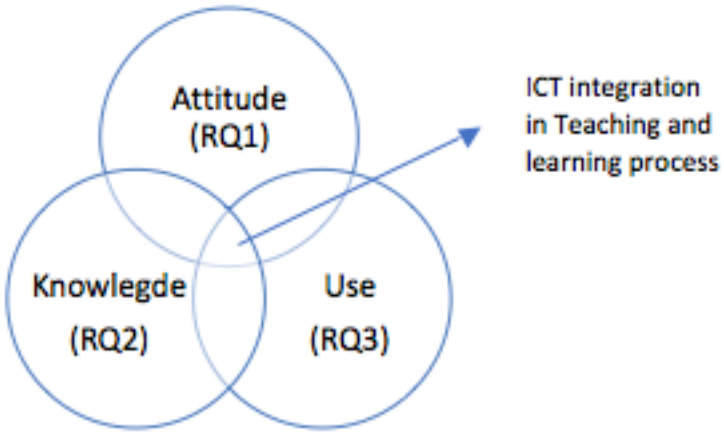
- Right tool (ease of use, perfect fit etc)
- Proper integration (collaborative, adding extra value etc)
- Proper infrastructure
- Required ICT skills of teachers

Theoretical framework

Most of the research is exclusively carried out on the topic of ICT use in the education system but very rarely talks about the combined effect of the three major factors (attitude, technology use and technology knowledge) on the integration of ICT in the higher education system. Few articles have criticized ICTs not being used to their full potential in the education sector because of numerous hurdles like

insufficient ICT training, lack of attitude to use ICT and lack of infrastructure to support. For this purpose, a theoretical framework is outlined for understanding the influence of factors like attitude, technology use and technology knowledge in the integration of ICT with the teaching and learning process.

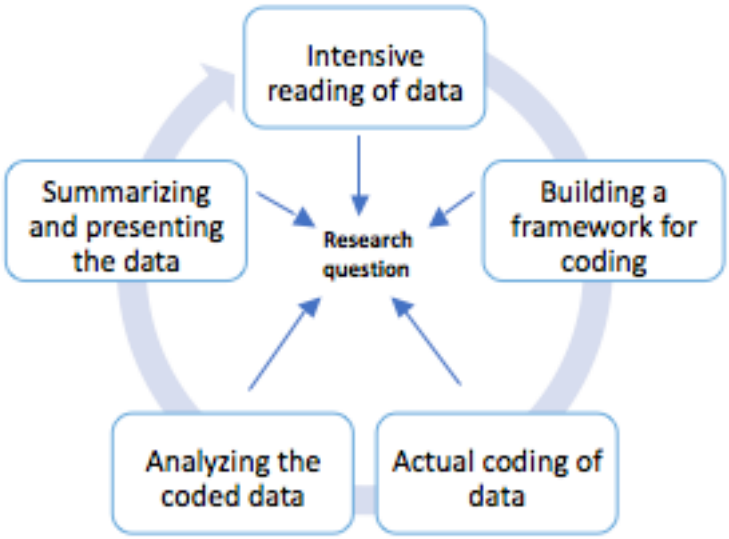
Figure 2: Initial ICT framework (Self illustration)



Research Method

This chapter presents the research method used in this work. The explorative nature of the topic i.e., understanding the use of ICT from different perceptions has led to the decision of using the Qualitative case study approach for this work (Baxter & Jack, 2008). The research gaps, aim and the objective was obtained from the existing literature. Based on the research objective, research questions and interview questions were derived. In this work, semi-structured interviews were conducted due to their nature of flexibility and as the subject chosen required a deeper level of understanding from a personal viewpoint. A set of open-ended questions were used, and the questions slightly differed based on the initial response to a set of questions. Purposive sampling technique is used for this work. The aim of using purposive sampling in this work was the information richness which is provided by the participants for the in-depth study of the subject matter. Participants were pre-selected based on prior knowledge about ICT and who belonged to the education sector i.e., teachers and students from German universities. The participants were contacted through social media and networking mediums like LinkedIn, Facebook, Xing etc. A critical mass was contacted for each category (teachers and students). The main essence of data analysis in the qualitative method is to understand, explain and interpret the collected data through interviews, focus groups etc. For this work, the content analysis method was used as it allows work to be rule-base and keeps the individuality intact for a simplified analysis to achieve the result (Kuckartz, 2019). Figure 7 shows the different phases of the quality content analysis by Kuckartz (2019) which is followed in this work. MAXQDA was used for the categorization of data with the help of an automated coding style.

Figure 3: Qualitative content analysis phases (Kuckartz, 2019)



Findings

This chapter presents a summary of the main findings of this work. Findings are divided into categories. Categories are further summarized into sub-categories and backed up with direct quotes from interviews.

Factors influencing Attitude towards ICTs

The most common motivational factor from the teacher's perspective was the Covid-19 pandemic (P1, P2, P3, P4, P5). From the student's perspective, it was the ease of using ICT and the flexibility it gave during the pandemic (P1, P2, P3, P4, P5). Due to the restriction of physical contact, the ICTs have become a savior for all the sectors including the education sector. P1 quotes "*ICT is very important because it allows me to have an experience that would be otherwise impossible*". P2 adds saying that ICT helps in finding better solutions. P1 gave an interesting example of how ICTs ignite curiosity and out-of-the-box thinking in students. He told a story where a student used the Minecraft game for showcasing the Roman empire which was not needed but was a creative approach. P3 says that for her word of mouth is the biggest motivation to try any new ICT tool available in the market and thinks that too much of anything is not good and it also goes with the technology use. P5 thinks that what matters for a good teaching and learning process is the pedagogical approach used (Collaborative learning, blended learning, flipped classroom, hybrid learning etc.). An interactive and collaborative style can be achieved with the use of ICTs (P4). Moreover, the communication between peers becomes easier and we can always organize our work (P7). Some practical things need ICTs assistance and cannot be done manually and cause less human error (P6). Like P1, P9 also thinks that ICT gives that flexibility of doing something which is not possible manually such as coding to automate something. P8 and P10 think that ICTs provide applications that can be used from anywhere with a broadband connection which increases the connectivity and flexibility i.e., anyone can be connected from anywhere and still the job can be done such as group works, assignments etc.

Figure 4: Word cloud (MAXQDA)

Importance of ICT in teaching and learning

P1 sees better effects on most of his students when he uses ICT in his teaching. P2 also sees much more potential in using ICT tools in lectures which he quotes by saying: "*In my subject digitization in product engineering I teach how the tools can be used to improve the engineering process. I feel ICT is important for today's teaching and learning process"*. P3 thinks that we can make learning much more interesting and fun by adding the ICTs. P5 has a different opinion about ICT benefits. P5 feels that ICTs cannot be used everywhere and has limited scope when it comes to theoretical subjects. There is always a scope of using ICTs in each subject if carefully measured and used (P10). According to P7, ICT in education improves engagement and knowledge retention. P9 says that demonstrating some learning parts with the help of ICT applications such as online video tutorials make it easy to grasp the knowledge. P8 says that with the use of ICTs it is much simpler to learn something at your own pace without disturbing your peers such as information videos, slides which can be referred to later, asking professors through different communication technologies about the doubts you have, etc.

Perceived use of ICT

The most common ICT tools currently used for communication and online teaching in the current situation (Covid-19) are channels like Microsoft teams, big blue button, and Zoom call (P1, P2, P3, P4, P5, P6, P7, P8, P9, P10). Two aspects were discussed during the interview regarding the usage of ICT tools in the education system. The first was before Covid-19 and the second was during Covid-19. Before Covid-19 only LMS (learning management system) tools like Moodle or data sharing tools like OneNote were used for uploading learning materials and sharing them (P3, P10). One thing which was highlighted in this section was that most of the universities were advanced in using ICT tools available online even before Covid-19 and some started using it as a solution to the Covid-19 situation. P2 mentioned that he uses tools like CAD systems for his teaching which is a cloud-based tool for

teaching subjects like digitization in product engineering which deals with the ICTs used in practical scenarios in the industries. P2 also uses “bwsync and share” which is an online storage service for students at universities in Baden – Württemberg. Artificial intelligence is used by P1 in his classes. “*We are interested in making a case of explainable AI, where the AI is not only doing its job but if a user asks AI, what did you do? or why did you do that? It gives answers*” (P1). P3 mentioned that TUM was traditional in terms of teaching and learning but before Covid-19 it had adapted the ICTs in its teaching and learning process. According to P4 and P5, Covid-19 gave a good nudge to use ICT tools and applications available online for teaching purposes, due to which the studies became much more flexible. Rocket chat, slack, PeerGrade, Eduflow, MIRO are a few more tools that are currently being used at TUM (P6). Google docs is one of the software used by P7 for uploading and sharing documents with peers and teachers.

ICT Knowledge and training

There is a lot of improvement scope in this area. Most of the participants did not go through any specific ICT training (P1, P2, P4, P5, P6, P7, P8, P9, P10). P3 is an instructor who takes online courses for teachers to improve their pedagogical approaches by efficiently using ICTs, says that when I went through some ICT-related courses, I saw an improvement in my teaching standards which was a great achievement. Lack of ICT tools knowledge impacts some of the study areas which can be enhanced and taught differently by integrating ICT tools (P1, P2, P3, P4). P9 mentioned there was a MOOC course which he pursued had lacked a good pedagogical approach and efficient technology integration. Even though the topic of the MOOC program was interesting, but the teaching style was old and traditional where the teacher read the slides, and only 15 minutes of the window was given to ask the question which was not that effective.

Improvement areas

Improvement areas for using ICT and having a positive attitude towards ICT are very much important for digitalizing the education system in Germany. Planning and applications are the two key points that need to be worked upon (P1, P2, P3, P4, P5). “*Combining different technologies from time to time can be beneficial in many cases”* (P4). ICT Training for using ICTs effectively and efficiently with the blend of good pedagogical practices is important (P1, P2, P3, P4, P5). As we are living in a more digitalized world, people need to accept this fact and become familiar with technologies. They need to exploit the potential of ICTs (P1). They should consider this as a usual situation (Technology integration like ICTs) and not something unusual which they can escape (P4). We can teach better with technology rather than without (P3). “*I think ICT will continue to be important moving forward, as education becomes more flexible and more supportive of the individual needs of the students*” (P5). Designing a good blended or online course that gives support to student's needs and which is solid pedagogically is the need of the hour (P2). Creativity and enthusiasm can provoke students to do something out of the box by using it. Due to Covid-19 and online learning which uses ICT has given more flexibility where hybrid classes can take place without being physically together anymore. (P5). P6 believes that there are improvement areas when it comes to the professor's use of it. Professors should be willing to use ICT application wherever it fits best to the curriculum (P8). More practical teaching can be done if proper ICT tools are used by the university administration and teachers (P7, P9, P10).

Discussion

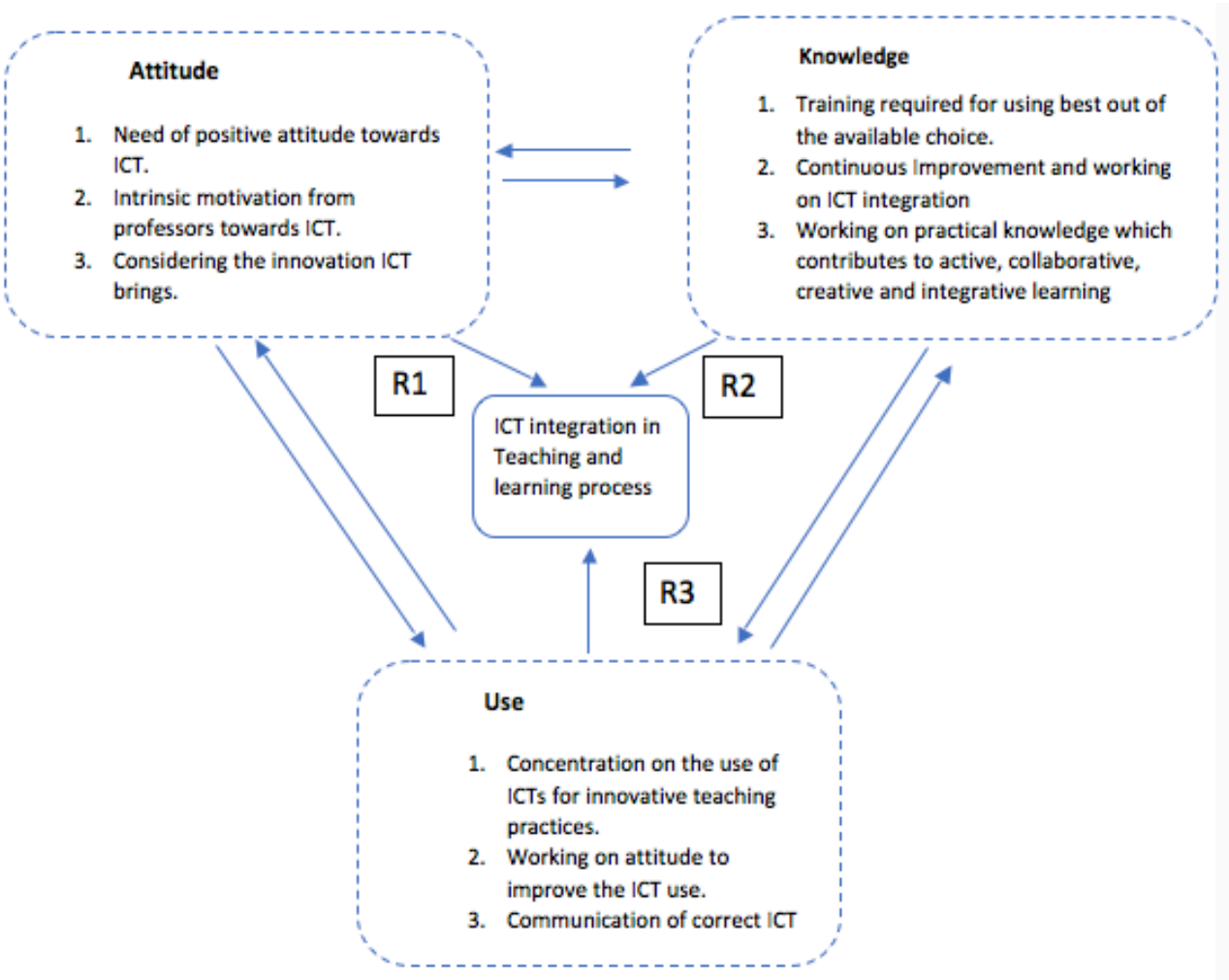
This chapter summarizes the similarities between the key findings and the literature. It also presents a modified framework based on the key findings.

Digital technology knowledge is important and is much needed in today's time (Rusydiyah, et al., 2020). Cognitive and technological skills are required to fully function as a responsible adult in the 21st century (Forkosh-Baruch & Avidov-Ungar, 2019). The key factor in successful ICT integration in education is the attitude teachers and students have towards technology use and computers (Gressardand Loyd, 1985 in Meena,2020). The more the positive attitude towards ICT the more efficient use in the teaching and learning process (Guillen-Gamez, et al. (2020). Attitude and knowledge have interconnectivity between them, so it is important to have a positive attitude towards ICT which encourages to gain knowledge about it and which in turn results in successful integration (Mirete, et al., 2020). The objective of this study was to determine the influence of three factors: Attitude, Knowledge and Use on the integration of ICTs in teaching and learning process. Our key findings did fulfil our research objectives. Below is the summary of our key findings:

- Nine out of Ten participants are in favor of including ICTs in teaching and learning process.
- Many Technical universities are using ICTs even before the pandemic and the results are great.
- A positive attitude is required for a successful integration of ICT in the teaching and learning process.
- All the factors are interrelated so if one is taken care by universities then rest of them will follow the path.
- To drive digital transformation, the technical knowledge, skills and barriers needs to be taken care by the universities.
- Encouragement and motivation are needed.
- To tackle situation like the pandemic (Covid-19), work on all the three factors is of utmost importance.

The key findings go hand in hand with the literature studied for this work. It is of utmost importance to understand the technical knowledge and skills of both students and teachers, for driving the digital transformation in German higher education institutions and catering to their respective needs (Bond, et al., 2018). Similarly, the findings also suggest the need for training for both teachers and students. The study carried out by Bogdandy, et al. (2020) suggests that the digital transformation due to the Covid-19 pandemic was not as smooth as expected and there were challenges faced by both the teachers and students. It was due to a lack of digital skills, lack of ICT knowledge, and the digital revolution. So, moving forward the attitude, knowledge, and use of ICT should be considered seriously to tackle situations like Covid-19 in the future. Figure 11 shows the modified initial framework proposed in this work points highlighted in this work. The modified framework highlighted the key findings and shows the interrelation between the three factors: Attitude, Knowledge, and Use.

Figure 9: Modified ICT framework (Self illustration)



Conclusion and Limitations

This work aimed to explore the role of ICT in the teaching and learning process and the factors influencing ICT integration in the teaching and learning process. The work opted for a qualitative study utilizing the case study method. Based on the results obtained in this work, we can conclude the need for ICT training, more use of ICT tools available online (either free one or paid one), a more innovative style of teaching, and creating awareness of ICT use in teaching and learning process. This work also concluded that the three factors: Attitude, Use, and Knowledge are interlinked and should be worked upon jointly for a successful ICT integration in the teaching and learning process. Some positive points found in this study were that most of the German universities (especially technical universities) are successful in integrating different ICTs according to the need of the subject and are aware of the positive outcomes of ICT integration. The infrastructure needed for successful ICT integration is also present in most German universities. Most of the students as well are using ICTs for their studies and feel that ICTs in some cases can help in doing things that are manually impossible and difficult to do. Some negative points highlighted in this work are the need for ICT training both for teachers and students, a more positive attitude /outlook towards ICTs, improvements in the online teaching methods to cater to students even in difficult situations like Covid-19. The need of the hour currently is to empower the students by implementing the latest ICTs in teaching for honing their creativity and upgrading their technological skills (Trehan &

Trehan, 2019). The emergency online teaching has indicated in this work the need for a more adaptive and collaborative kind of teaching which can be achieved easily if we start integrating ICT tools successfully in our teaching-learning process. Going further, post Covid-19 situation will require a hybrid form of teaching which will not be possible without the communication technologies and applications which enable the hybrid teaching (König, et al., 2020). It was wonderful to see that most of the teacher participants were aware of ICTs and some are also successfully using them and taking benefits out of them. One more issue which was highlighted in this study was people not being aware of the exact ICT meaning. Most of them initially thought that ICT means online learning which is just a small part of ICT application. As it is an umbrella term for a large array of technological devices, applications, networking components, systems, the correct guidance, and training need to be provided for clearly communicating what ICT is and how it can be used efficiently. It was also observed that most of the student and teacher participants were well-read and were ready to explore more about ICT.

This work considered only three main factors: Attitude, use, and knowledge for the study but there is the future scope of studying other factors as well such as personal, professional, technological factors to assess the current situation of ICT more accurately in teaching and learning process. The essence of qualitative study is the participant's reactions, non-verbal communication (such as gestures, expressions) as opposed to quantitative study. But this could not happen due to the pandemic situation. A further recommendation would be to take personal interviews in a face-to-face environment for more efficient and effective results. A further suggestion would be to take at least 15 to 16 interviews in a total of both teachers and students so that a critical mass of each group will result in more accurate results. Focus groups can also be used in further studies. ICT is a topic related to today's era and it should be studied more thoroughly especially post Covid-19 as the situation is going to be changed and the educational landscape will undergo a great transformation in the upcoming years.

"The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn and relearn." – Alvin Toffler

Appendix

Appendix 1

Table 1: Grand Design (Self illustration)

Research approach	Qualitative Research	
Research design	**Research Method**	Case Study
	Research Technique	Interviews
Data collection	Semi-Structured Interviews	
Sample selection	**Sampling Criteria**	Professors and students at German universities with at least some prior knowledge of ICTs.
	Sampling Technique	Purposive Sampling
	Sample Size	10 Participants
Data Analysis	Content Analysis (Deductive approach)	

Table 2: Research Table (Self illustration)

Research Objective	Research Question	Interview Question	Literature Source
1. To critically explore the factors influencing ICT integration in teaching process?	1. How attitude towards technology use influence the integration of ICT in teaching process?	• Do you use ICT in your teaching process? If yes, then which are the factors that motivates you to use technology in teaching process? • What motivates you to explore new ICT tools which you can use in your classes? • Which are the factors that motivated you to invest and dedicate your time to integrate updated ICT tools in your teaching process?	Bogdandy, et al., 2020 Guillén-Gámez, et al., 2019 Guillen-Gamez et al., 2020 Bond et al., 2018

	2. How technology Knowledge influence the integration of ICT in teaching process?	•What is your perception on technology use by students to accomplish their educational and personal goals? Which are the tools that are used currently by your students for studying? •In your opinion how could technology (ICT) helps students learn concepts differently? Is the quality, nature or efficiency of learning improved? •Do you think technology (ICT) is still used in a traditional way for teaching students? What can be done to improve the technology (ICT) use? •Have you gone through any specific training for ICT? If yes, then which training helped you the most in digital content creation for your teaching process?	Mirete, et al., 2020 HINOJO-LUCENA, et al., 2019 Gómez-Trigueros, 2019 Koskinen, et al., 2015 Bogdandy, et al., 2020 Bond et al., 2018
	3. How technology use influences the integration of ICT in teaching process?	•In today's time do you believe that use of ICT is important in teaching and learning process? If yes, then please mention the factors which you think makes it important? •Do you encourage your students to use ICT in your classes? •Does ICT enhance the interaction between teacher and students? In your opinion what are the benefits of using ICT in teaching process?	Mirete, et al., 2020 Koskinen, et al., 2015 Bond, et al., 2018
2. To critically explore the factors influencing ICT integration in learning process?	1. How attitude towards technology use influence the integration of ICT in learning process?	•Which are the factors that motivate you to use ICT tools in your university studies? •What motivates you to explore new ICT tools which you can use in your classes? •Which are the factors that motivates you to invest and dedicate your time to integrate updated ICT tools in your learning process?	Bogdandy, et al., 2020 Gómez-Trigueros, et al., 2019 Guillén−Gámez, et al., 2019 Bond et al., 2018 Guillen-Gamez, et al., 2020 Mirete, et al., 2020 Bogdandy, et al., 2020

	2. How technology Knowledge influence the integration of ICT in learning process?	•What is your perception on technology use in your classes? •In your opinion do you think technology (ICT) helps students learn concepts differently? Is the quality, nature or efficiency of learning improved? •What can be done to improve the technology (ICT) use in studies?	Mirete, et al., 2020 HINOJO-LUCENA, et al., 2019 Gómez-Trigueros, 2020 Koskinen et al., 2015 Bogdandy, et al., 2020 Bond, et al., 2018
	3. How technology use influences the integration of ICT in learning process?	•In today's time do you believe that use of ICT is important in teaching and learning process? If yes, then please mention the factors which you think makes it important? •What encourages you to use technology (ICT) for your academics or personal life? •Which are the tools that are used currently by you for your studies? •Does ICT enhance the interaction between teacher and students? If yes, please briefly explain your view?	Mirete, et al., 2020 Koskinen, et al., 2015 Bond, et al., 2018

Table 3: Interview Details (Self illustration)

Participant No.	Participant current position	Interview mode	Length (in minutes)	Date
P1	Professor at Humboldt university of technology	Zoom Call	50:00	25th June 2020
P2	Professor at Karlsruhe institute of technology	Zoom Call	35:06	1st July 2020
P3	Member of Prolehre team at Technical University of Munich	Zoom Call	56:14	2nd July 2020
P4	Professor at University of Applied Management Studies Mannheim	Microsoft Teams	50:55	5th July 2020
P5	Professor at University of Applied Management Studies Mannheim	Microsoft Teams	50:00	9th July 2020
P6	Masters Student at Technical University of Munich	Microsoft Teams	21:00	10th July 2020

P7	Masters Student at University of Applied Management Studies Mannheim	Microsoft Teams	35:56	12th July 2020
P8	Masters Student at University of Applied Management Studies Mannheim	Microsoft Teams	25:40	13th July 2020
P9	Masters Student at SRH Heidelberg	Microsoft Teams	24:30	14th July 2020
P 10	Masters Student at Hochschule Emden-Leer	Zoom Call	22:56	15th July 2020

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Social Entrepreneurship and Crowdfunding Model: From Social Entrepreneurship Perspective

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Abstract

Many research studies have shown that social entrepreneurship plays a very significant role in supporting societies to move forward in the direction of sustainability. Social entrepreneurship provides sufficient and self-sustainable solutions for social purposes beyond personal wealth pursuit. In the Era of rising social entrepreneurs, the obstacle that arises is the funding for the social mission, its business needs, and financial sustainability. Crowdfunding plays a crucial role in this. The process of crowdfunding starts with peers, family, and acquaintances eventually leading to massive funds. The social entrepreneurs, a group of individuals who opt to pledge funds to support the initiative, and the platforms that intermediate between them are the major participants of the process. Hence, this paper first reviews the extant literature on social entrepreneurship, crowdfunding, and intermediaries. Based upon the findings, the author initiates the step towards building the framework of the social entrepreneurial and crowdfunding ecosystem. This study contributes to the literature by describing the initial holistic behavioral model of the social entrepreneurs and the funders that comes together to help a business sustain for resolving the sustainability issues of the societies. The theory of Value-Attitude-Behavior (VAB) is used to understand the participation of the crowd funders in sustainability initiatives. From this model, the most relevant future research agendas are derived and provided.

Keywords: Social Entrepreneurship, Social Entrepreneurs, Crowdfunding, Equity-based Funding, Lending-based Funding, Donation-based Funding, Reward-based Funding, Sustainable venture.

Introduction

Social entrepreneurs are the individuals who identify with the problems in society, find business opportunities and take huge financial risks to solve problems and make an impact on the social and environmental aspects. They are dedicated innovators, who systematically adds the value in the society through the focus on the social market failures also for-profit objective (Pahwa, 2021). This has gained a lot of attention because of the arising complex issues in modern society, that's where social entrepreneurs take effect. These people are often mistaken for charity, altruism, or philanthropist but they are the people who create the evolved business models capable of providing goods and services through an efficient and self-sufficient business solution to determine social and environmental problems (Boparikar, 2015). According to Ashoka (2010) cited in Kaufmann et al. (2014), happy people who are interested in politics, giving to charities, extroverted, and more liberal in their political ideology operate as social entrepreneurs. The belief is to not escape or transfer the problem solution to government or business sectors but to take new steps and persuade the entire society (Kaufmann et al., 2014). Unfavourably, even with the increase in societal support, social entrepreneurs fail to acquire sufficient financial support from the capital market (Mosakowski & Calic, 2016). Hence, the shortage of funds from the investors becomes the main disadvantage as social motivation takes the backseat when compared with the financial considerations (Boparikar, 2015; Lehner, 2013). The social and environmental aspects of the social enterprise in unattractive to the

traditional investors and lenders (Mosakowski & Calic, 2016). Considering traditional investing institutions being incompatible with the enterprise that seeks to rise above their self-interest, it is obvious to anticipate the emergence of new financial intuitions that corresponds to the societal support for social entrepreneurship (Mosakowski & Calic, 2016). As per the existing literature and the statistics projected from around the world, it is no mistake to suggest that crowdfunding is the source of finance to aid the shortage of funds for social entrepreneurship (Mosakowski & Calic, 2016; Bosma et al., 2016). Consequently, crowdfunding models' types spread in form of donation, reward, lending, and equity, are expected to project an annual growth of 29% between 2018 and 2022 (Statisca, 2018). The ongoing discussion has been going for a while on the success of social enterprises in sustaining themselves through various types of funding models. Consequently, this research aims to address the most recent suggestion by Testa et al. (2019, pp. 14) for future research on not so far prevailing research on "How the various models of crowdfunding can be best leveraged to support social entrepreneurship and innovation?". The following existing literature was tested through a qualitative study as it constitutes another research gap (Abramson & Billings, 2019; Bergamini et al., 2017). Respectively, the aim is to bridge the two gaps. Also, lays a foundation in preparing a holistic model from existing scattered models. To address behavioral changes of the project creators and backers towards the success of sustainable entrepreneurship via different funding models. Later, the synthesized model prepared with the support of existing literature will be combined with the findings from the qualitative research analysis. Clearly, in this paper, the aim is to create an ecosystem from the perspective of social entrepreneurs in the form of social entrepreneurship model.

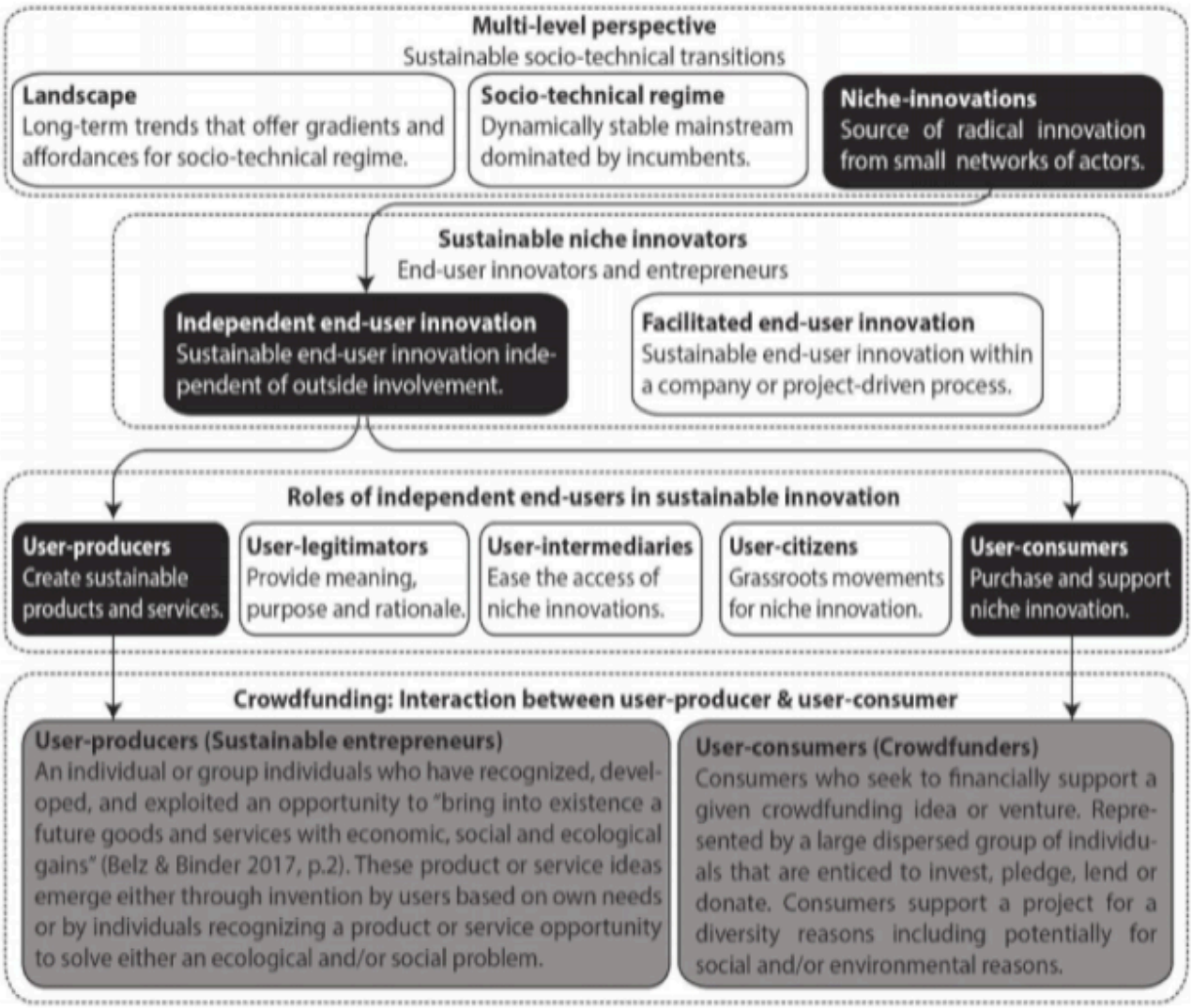
Literature review

Social Entrepreneurship and Crowdfunding

Social entrepreneurship comes into existence with the identification of the logjams in society and recognition of the ways to free them. William Drayton, founder of "Ashoka" is deemed to be engineered the phrase "social entrepreneur" (Boparikar, 2015). According to Mair and Naoba (2003), cited in Chipeta & Surujlal. (2017) since the concept of social entrepreneurship is rising as incubators of social change, it is very important to understand the zeal of the entrepreneur, who ripe the business to resolve the social and environmental issues. Furthermore, it is very important to understand that sustainability is a big issue faced by contemporary societies and is expected to cause more trouble in the future (Maehle et al., 2020). Hence, an increase in the number of sustainable projects which provide an impact on social and environmental dimensions is demanded (Maehle et al., 2020; Boparikar, 2015). Presently, the most important objective is the development of sustainable projects to attain the position of a sustainable future (Chen, 2016). Hence, it is announced, that social entrepreneurs have the solutions to solve the issues and level up the benefits, but most of them have the very confined business knowledge and management skills. As a result, it is difficult for the social entrepreneur to raise funding from bank institutions or business angels (Maehle et al., 2020; Horisch, 2015). To overcome the requirement of finances for sustainable purposes, sustainability crowdfunding usage as a method has been witnessed. For sustainable projects to sustain, investment by the funders is made for the sustainability of the organization (Kim & hall, 2021; Simeoni & Crescenzo, 2018). Although it is evident that social entrepreneurship is facing major financial challenges (Simeoni & Crescenzo, 2018). Non-profits social enterprises face issues in acquiring funds as no sufficient consideration is given to the financial aspects because the focal point lies with the social impact of their enterprise

(Boparikar, 2015; Horisch, 2015). On contrary, the social enterprise that decides to take a for-profit form struggles with its primary mission of social or environmental impact (Brakman Reiser, 2013). In practice, the entrepreneurs face the dilemma of keeping their shareholders' interests aside as they possess the power to remove/sue the directors who do not work in their best interest (Abramson & Billings, 2019). Hence, the directors give a propensity to the stakeholder's fiduciary duty. Although, the positive co-relation of sustainability-orientation has been identified with the success of crowdfunding. Especially with the partial mediation of project creation and third-party platforms endorsements (Mosakowski & Calic, 2016; Kim & hall, 2021). Crowdfunding fits the objective of social entrepreneurs as they seek social as well as financial returns (Mollick, 2014; Lehner, 2013). It enables the funder to invest in various types of projects in small amounts using various internet platforms (Agrawal et al., 2014). Crowdfunding comes with different forms of funding as well (Bento et al., 2019; Jovanovic, 2017). Moreover, the following consists of four funding based forms: Donation, where the funder does not receive any monetary benefits, reward, where small rewards are received in the form of honorary recognition, final product, or service, etc. equity, where the shares are allotted in the capital of the company equivalent to the amount funder has planned to invest and lending, where the investment is in the form of a loan by the funder (Bergamini et al., 2017; Jovanovic, 2017; Horisch, 2015). In the literature, the distinction will be made between the two models, the donation and reward based model i.e non monetary compensations received by funders, and the equity and lending based model i.e monetary compensation received by the funders for their support (Horisch, 2015; Mollick, 2014). For the process of crowdfunding to initiate with the four forms of funding models, the process requires three participants: project creator, platform, and funder. (Jovanovic, 2017; Mosakowski & Calic, 2016). The project creator raises funds for its innovation, the innovation is initiated by the platform and funded by the funder (Jovanovic, 2017).

Figure 1: Multilevel Perspective Model (Nielsen, 2017)



In the MLP model, the author identified the large shifts in the "Socio-technical" regime in the form of disruptive products or services that were overruled by the niche innovators (Nielsen, 2017). Further, individuals or the group of individuals who led to the creation of niche innovation in sustainability-orientation are also termed as social entrepreneurs (Mair & Marti 2005). The journey of social entrepreneurship starts with the transformation of these user-producers to user-entrepreneurs (Schot et al., 2016). Whereas user-consumer or crowd funder plays a mainstream role of not only purchasing the product but actively engaging in enabling the innovation of the product or service (Nielsen 2017). Hence, from the perspective of the business cycle, the user-consumer or crowd funder supports the development of the fundamentals of the product or service (Nielsen et al., 2016). Besides, it is to be noted while investing in a project, "Crowd funder typically do not look much at collaterals or business plans, but at the ideas and core values of the innovators firm" (Horisch 2015, p.4). As a result, the crowd funder also fails to evaluate the ecological benefits, or the social impact accomplished (Hörisch, 2019). It is observed by the authors that communication and proximity between the project creator and backer have a positive correlation with crowdfunding success (Maehle et al., 2020). These factors help the project creators to share their story behind the project with the backers, which helps them to

evaluate the project (Rey-Marti et al., 2019). Bird, (1998) cited in Chipeta & Surujlal, (2017) states that the state of mind of the backers is controlled by the intentions of the project creator. Hence, the actions directed helps the project creator to achieve their specific goals. Consequently, intention also helps to understand the degree of motivation in social entrepreneurs, individuals risk taking, inclination, and committed personalities (Chipeta & Surujlal, 2017). Therefore, even though monetary funding models require investment returns unlike non-monetary funding models, the core idea of making a social impact can be prioritized as the backer's investment decisions are influenced by the social and environmental impact of the project (Petruzzellia et al., 2019). Hence, guarantees given in the monetary form can be parallelly achieved. Intermediaries or platforms can act as a facilitator that offers the effective introduction of the project creator and backer into the prevailing framework (Nielsen, 2017). Therefore, online platforms help the innovator to overcome the barriers of geographic, social, and economic boundaries of crowdfunding markets (Maehle et al., 2020). Most studies confirm the success of crowdfunding can be achieved by the effective working of the platform and building legitimacy (Ahlstrom & Bruton, 2002). Legitimacy is acquired by the platforms when its behavior is aligned with the norms and the values of the society (Mollick 2014). Hence in platforms, the project's legitimacy plays a significant role for the crowd funders to make their decisions on funding the project. The pursuit is to find co-creation than just sticking to financial returns (Rey-Marti et al., 2019). In addition, various authors have confirmed that lack of trust is the main reason for the disadvantage in acquiring finances through crowdfunding (Rey-Marti et al., 2019). Therefore, ample efforts are being devoted to increasing the transparency of the process that takes place during crowdfunding. Furthermore, the comprehensive information of the projects, its details, and disclaimer of the risks are displayed to the potential funder investing through the platform (Rey-Marti et al., 2019). In Germany, Ecocrowd.de came into existence in 2014. Thus, to guarantee the legitimacy of the platform, the projects pitching on the platforms were checked and consulted by the German Federal Environmental Foundation to verify their evident link with sustainable development (Horisch, 2015). However, legitimacy is the key metric that guarantees the survival of the organization. As a result, the bulletproof method for the crowdfunding intermediaries was used to catalyst social entrepreneurship. Hence, build and preserve legitimacy (Rey-Marti et al., 2019).

Figure 2: Value-Attitude-Behaviour Theory (Kim & hall, 2021)

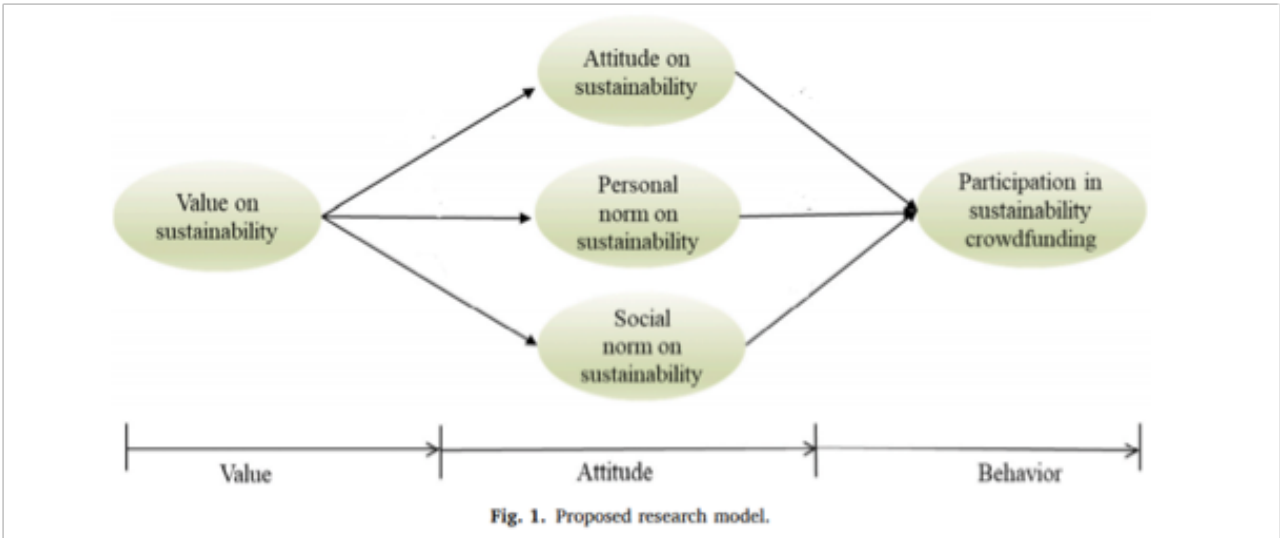
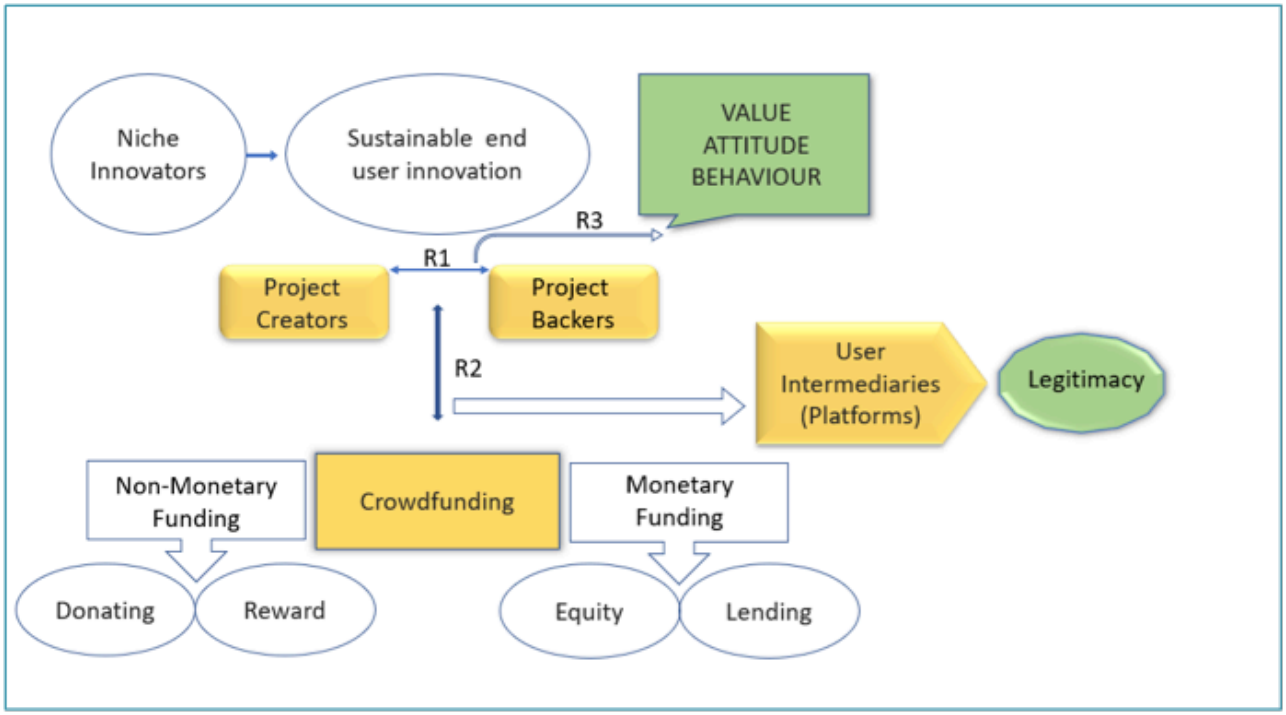


Fig. 1. Proposed research model.

Value-Attitude-Behavior (VAB) theory suggests “that the influence of value on specific behaviour is mediated by attitude toward the behaviour, revealing that influence should theoretically flow from abstract values to midrange attitudes to specific behaviours” (Kim & hall 2021, p.4). Further, Chipeta (2015, p. 29) states the definition of attitude is "a mental and neural state of readiness, organized through experience, exerting a directive and dynamic influence upon the individual's response to all objects and situations with which it is related". Whereas, values determine individuals’ self and personality, and they act as motivators for their actions (Tenner & Horisch, 2021). Hence, the values outline the attitude of the individual and provide standards against which the sustainability behavior of the individuals and societies gets measured. Hence the similarities in the ethics and values of the group of individuals framework shape up the social norms (Kim & hall, 2021). Also, the shaping up of the values based on individual experiences is referred to as personal values. Therefore, personal values are found to be in relation with the consumer conduct, where the conduct would be identified to be driven by the principles (McCarty & Shrum, 1994). The crowdfunding projects could see an increase in the funding of the projects if the specific characteristics and the set of values of an individual who supports sustainability-oriented crowdfunding projects are recognized. To target the potential funding sources, the identification of these values of an individual becomes important for the team manager (Tenner & Horisch, 2021). The theory of basic human values can be applied by which the latter can be identified. These values form personal and social norms. The value clusters are influences by the norms.

Figure 3: Model source: (Kim & hall, 2021; Testa et al., 2019; Chipeta & Surujlal, 2017)



In figure 3, to find the working of the three participants (project creators, backers, and platforms), a graphical representation of the three research questions has been mentioned above. Now, as mentioned before, the aim of the study is to know “how the various models of crowdfunding can be best leveraged to support sustainable entrepreneurship and innovation” (Testa et al. 2019, p.14) and the factors affecting the behavioural changes of the project creators and backers with the help of Value-Attitude-Behavior (VAB).

Methodology

The case study method is estimated to be well suited to answer all the why and how questions for which real-life context and observations are derived from the individuals living the phenomena. Due to the explorative nature of this study, a qualitative design analysis has been conducted to find the results. Since the knowledge of the topic is very limited, the study is descriptive. The three research questions for this research are framed after the review of many former pieces of research. All eight interviewees are social entrepreneurs with experience of finance acquisition through crowdfunding models. A set of semi-structured questions were prepared because of the open-ended nature of the questions. For enriched data collection, purposive sampling (nonprobability) is selected. In addition, snowballing sampling is also applied. The interviews conducted were transcribed with Microsoft speech-to-text built-in software. At last, collected data has been investigated through qualitative data analysis. This analysis focuses on the categories and coding framework (Kukartz, 2019). Hence, the combination of the two categories helps to reach the findings and conclusion of the research. MAXQDA software is used for coding the data. As a sample document, one full interview is provided in the appendix. The respondents are referred to as “R” following with the respondent’s number with the perspective to keep anonymity and privacy in consideration (Kaufmann et al., 2014).

Table 1: Research Table: (Own Illustration)

Research Objectives	*Research Questions*	*Interview Questions*	*Sources*
To investigate the factors that help project creators to entice project backer's behavior	What are the factors in the mission of the social entrepreneur that trigger the funding activity of the backers?	1. How important is motivation of the social entrepreneur for gaining funding by equity/lending compared to donation/reward? 2. Do ecological success factors increase the propensity for donation/reward funding more than economic success factors? 3. How does the management skill set required for investment via equity/lending differs from that for donation/reward funding? 4. How does the commitment of the social entrepreneur help for applying the funding models?	(Maehle et al., 2020) (Mosakowski & Calic, 2016) (Grimadli, 2015-16) (Chen, 2016) (Horisch, 2015) (Boparikar, 2015) (Kaufmann et al., 2014)
To know the role of the platforms in shaping the behavior of crowdfunders	To what extent do the platforms influence the perception of legitimacy and trust of the crowd funders?	5. How important is it for the platforms to disclose the actions of the top-level management in the funding models? 6. What precautions should be taken by the platforms to avoid the perception of risks of the funders? 7. Does the monitoring of the social impact differ for the funding models? If yes how? 8. How important is it to show the ideas and core values behind the project for reward/donation funding compared to equity/lending funding?	(Abramson & Billings, 2019) (Bento et al., 2019) (Jovanovic, 2017) (Bergamini et al., 2017) (Horisch, 2015)
To validate the applicability of the value attitude behavior concept for crowd funding.	To what extent do the personality traits affect the value attitude behavior of crowd funders. How do they differ as to the models of crowdfunding?	9. How do funders 'values on societal and environmental purposes change the attitude of participation in the donation/reward-based model compared to the lending/equity model? 10. How does the Crowdfunder's belief in the project change as to the different funding models? How do their expectations differ when rewarding/donating compared to providing equity/lending? 11. Does the social norm purpose motivate funders in donating/rewarding more than providing equity/ lending?	(Kim & Hall, 2021) Chipeta & Surujlal, 2017) (Chen, 2016)

Presentation of Findings

Social Entrepreneurs' Intentions

1) Motivation, Purpose, and Commitment

To challenge the socio technical regime of the society, motivation is one of the key aspects, but the definition of motivation varies (R1, R2, R3, R4, R5, R6, R7, R8). *"As social entrepreneurship, when you are working on the problem while trying to understand or create a solution that fits the issue, you need to have the motivation to be able to surpass all the challenges that arise"* (R5). A slight change can be identified while raising funds through equity/lending models by observing the degree of the shift from 'motivation towards solving a social issue' to balancing out between 'motivation to make a social impact and wealth maximization of the shareholder' (R1, R2, R3, R4, R7, R8). Motivation

is an internal process, and no external factors divert or influence any shift (R1, R5). Nevertheless, the success of the social entrepreneur is achievable with persistent motivation while raising donating/reward funding (R1, R2). Most respondents confirmed the definition of motivation is individualistic, and to understand the shift of motivation from donation or reward funding models to equity or lending funding models, we need to understand the "purpose" of motivation of the social entrepreneur (R1, R2, R3, R4, R5, R7, R8). Similarly, R3 outlines, "*I think its purpose in terms of what keeps you going is what is important, so I think (…) it's important (...) regardless of any funding models" (R3).* Commitment catalyst success in raising funds regardless of any model, the funder wants to get acquainted and build trust with the people working behind the project (R1, R2, R4, R5, R6, R7, R8). Therefore, motivation, purpose, and commitment are the characteristics needed regardless of any crowdfunding model used.

2) Ecological Factors

While raising funds, the social entrepreneurs require to conduct impact assessments for all the awareness activities (R2). R5 clearly states donation funding has more attention on ecological success factors. As a result, it is safe to state that social impact through a good product or service can trigger an emotion that indeed can help the entrepreneur to raise funds through donation (R6, R7). R8 articulated the use of "key results areas" in their enterprise as funder acquires confidence while donating. Here R1 indicates. *"Impact and ecological metrics will act as a story or a base where financial sustainability is a niche" (R1).* R5 drew attention to the monetary funding model and emphasized *"In case of equity funding model, it is more focused on economic factors because those economic factors are going to determine how. How profitable?" (R5).* Hence, it is derived that ecological success factors attract more donation-based funding than equity-based funding.

3) Management Skill Set

The management skill set is required to yield returns for shareholders as compared to donation funding models, until the model is creating and duplicating the social impact (R1, R4, R7, R8). In monetary funding models, R4 explains the investor is always looking for leadership qualities and other team-orientated qualities to measure the efficiency of the work. The funder is keen to know the areas of utilisation of funds and how the social impact and investment compound in the enterprise (R5, R6, R7, R8). Although in non-monetary funding models: A generally low management skillset is observed and the story behind the project is indicated to be important (R1, R3, R6). If a donor is not satisfied with the impact creation, the possibility is to see no recurring donations (R6, R7). Hence, to keep the donations intact the enterprise may want to change and make the efficient working of its management but there is still no direct influence of the donation funders over the management (R2, R5, R4). As a result, the management skill set holds more importance in monetary funding than in the non-monetary funding model.

Intermediaries' Legitimacy

1) Transparency

The representations of the social entrepreneurship are the ideation, mission, vision, goals, and objectives (R1, R2, R3, R7). R4 stretched. *"What is the code of conduct? because if you have a long-term approach you will investigate the core value of a business and how it makes changes"* (R4). The investment is trusted with the social entrepreneur because the platforms are trusted and verified. Hence the duty of the platform is to verify all the documents, proofs and conduct background check is to avoid frauds in their name (R5, R7). The progress, the actions of the team, and their credibility should be projected by the

platforms, to make it crystal clear for the funders about their fund's procurement (R4, R6, R8). Consequently, for recurring donations, transparency is maintained in showcasing the social impact updates on their platforms (R3, R7). R4 suggested, the donation funder always funds the "idea" of solving the issue. Whereas in an equity-based model, the identification of the target market, founding team, and financials for return in investment are done by the funder (R3, R4). Here, the ideas and core values of the project are important regardless of any crowdfunding model used.

2) Risk Avoidance

While analyzing, the author recognized the adaptation of "due diligence" by the platforms to secure the funder's investment especially in the case of the equity-based funding (R1, R2, R3, R4, R5, R7). The background check of the organization and the continuous process check through multi reviews or partly reviews, and internal audit assessment is required (R2, R4, R7). R1 suggests. *"there should be a tracking mechanism (…) when the funder is putting their money, a certain percentage is utilized by the platform for the increase in their wealth because there is no clear audit strategy or any kind of regulations by the government"* (R1). Proper audits and interactions between the entrepreneur and funder are conducted to mitigate the risks (R2). *"Proper round of screening, especially for equity"* (R3) and for transactional processes *"third party billing (…)*" (R4). Further, R5 and R6 enumerate that proper documentation starting with the step process involving verification for the authentic accounts and certification processes should be seriously considered by all platforms. Hence, the respondents mentioned more procedures for non-monetary funding than monetary funding.

3) Social Impact

Monitoring of social impact is necessary for any business regardless of the use of any funding model. Hence, the processes may differ but the outcome to showcase the impact remains constant (R1, R2, R3, R5, R6, R7, R8). R4 provides the technique of "know your investors" and presents the result in the "understandable form". *"For example, KYC? (…) we follow know your investor or investment, how the funder is willing to fund because the purpose matters*" (R4). R1 stated the priority of setting the "key metrics" in respect to monitoring the financial impact and the process of funds utilization and sustainability of the social impact captures the same leverage. In accordance, R7 and R8 mentioned, 'Key Performing Indicators' and 'Key Result Areas', and the tracking of the process with the timeline provided is necessary to get the overall picture. Hence, it is relatively evident that the key metrics in the case of social impact for donation-based funding hold more significance than that of an equity-based funding model (R1, R3, R7, R8).

Value-Attitude-Behaviour

1) Attitude: The respondents associate the attitude to be influenced either by personal or social norms.

Personal Norm

The massive agreement was witnessed on the change of the belief of the funder while pledging through any crowdfunding model. The investor seeks ROI in monetary terms with monetary funding models (R1, R2, R3, R4, R5, R6, R7, R8). R2 stated. *"If somebody is looking for investing 100 and getting 115 then he will invest in an equity model"* (R2). A social entrepreneur must take care of the fiduciary duty as ROI is the expectation if not higher ROI for shareholders (R3, R4, R5). Most donation funding is received as the act of philanthropy (R1, R2), the expectation differs in the form of impact or rewards (R3, R6, R7, R8). The chances can be that donation funders have no expectations, and the process

ends with the action of funding for a social cause (R4, R5, R7). Nevertheless, all the respondents identified the personal norm to have an equivalent effect on both the funding models.

Social Norm

All the respondents believed that societal norms trigger the emotions for donation funding. In that case, the sole purpose of the donor is to see upliftment in the community through resolving a social issue (R1, R2, R3, R4, R5, R6, R7, R8). R7 explicates, "*Equity and lending are investment and donation, it's sheer giving, it is most influenced by the social norms"* (R7). Social norms play a very significant role in deciding for the funder to recognize which prospect or core value of the organization makes more sense than others (R4, R5). R8 explicated. "*Certain donors donate with their heart, and they donate primarily* on how impactful or direct the impact will be to the beneficiaries" (R8). R5 brings attention to the behavior of developed societies in terms of donation funding. "citizens of developed societies tend to give back more (…) they are able to think in value (…) participation in making a positive impact to the environment" (R5). Once again, all the respondents identified the personal norm to have an equivalent effect on both the funding models.

2) Corporate Social Responsibility

As an act of philanthropy, the donation-based funding is pledged by the organization with the expectation of no returns (R1, R4) or to abide by the rules of CSR (R2, R6). R2 explained about the enterprise receiving funds. *"Big organizations are doing for Clean to Green marrying the SDG's (…) have adopted for Clean to Green" (R2)*. Another view by R5, the concept of "greenwashing". *"Greenwash is something that some organizations and some investors to appear to the public that they are greener, not necessarily they are focusing on the impact, but they are more focus on building their image"* (R5). Henceforth, the respondents acclaimed CSR to be more inclined towards the equity-based funding model as the businesses do the follow-up of the financials.

3) Seed Capital

Donation equity funding is used for the short term, and short-term gains (R1, R2, R4, R7, R8). R4 believed *"If you are in one year or two-year-old organization, that time donation is important to stand on your own feet, but not always*" (R4). Hence, raising initial funds for niche innovation through non-monetary funding can help social entrepreneurs in starting to resolve social issues (R1, R4). However, the equity-based funder's attitude will be different towards the enterprise in terms of finances (R2, R4). R3 added. *"Donors will donate to an unsustainable model as a charity as compared to an equity-based funder, he will not do it. He will look at where the market is growing (…) cost that resonates with them*". (R3) Therefore, with growing enterprises, funders want their share to give returns too (R7). Hence, seed capital can be raised for the idea of the social entrepreneur with non-monetary funding is easier than a monetary funding model.

Discussion

In research question 1, motivation and commitment are some of the major metrics for social entrepreneurs to raise funds through any funding model (R1, R2, R3, R4, R5, R6, R7, R8). However, respondents emphasised on "purpose" of the social entrepreneur to be the deciding factor in raising funds through different funding models. As the sustainability of the enterprise can be achieved by non-monetary funding models but the continuous scalability would require monetary funding models (R1, R2, R3, R4, R5, R6, R7, R8). The

respondents focus on the need for the skill sets to be more efficient in monetary funding models than non-monetary funding models. As already mentioned, the motivation of the project backer can be philanthropic, but the chances of financial returns are expected in monetary funding models (Vismara, 2019). In addition, more inclination towards the social-impact success than economics success factors are found in the case of non-monetary funding models. In research question 2, it is suggested that the legitimacy and trust formation through the platform influences the funding raised by social entrepreneurs from crowd funders (Rey-Marti et al., 2019). The built of legitimacy can be achieved when the transparency is showcased with the ideation, mission, vision, goals, and objective of the social enterprise (R1, R2, R3, R7). An entrepreneur's objectives, values, beliefs associated with its niche innovation need to be presented by the intermediaries to influence the success of the project (Mosakowski & Calic, 2016). The code of conduct and the ideas and core values of the top-level management or team leading the social enterprise should be displayed (R4, R6, R8). Monetary or Non-monetary funding model, 'Due Diligence' is a must ((R1, R2, R3, R4, R5, R7). In the research question objective 3, ambiguous results could be found. The Value-Attitude-Behaviour theory supports finding the individual's beliefs, norms, and actions towards social entrepreneurship (Kim & hall, 2021). Personal norms can make a lot of difference, an individual's attitude towards the social issue can help to raise the funds to resolve the issue (R1, R2, R3, R4, R5, R6, R7, R8). Non-monetary funding is triggered by altruistic motivation and emotions related to an issue (Jovanovic, 2017). In monetary funding, the individual's attitude changes. The expectation of returns is present, even though they can be immediately or after a certain period (R1, R3, R4, R7). Social norms can trigger the funder to pledge non-monetary based funding with the mission to achieve sustainability orientation. However, in the monetary funding model, the funders still perceive the returns expected to be the same as any traditional business (Boparikar, 2015). In addition, social norms also help in identifying the market opportunities with the raising sustainability issues and can trigger the funders to invest in the social entrepreneurship seeking investment for the future (R1, R2, R5, R7). Here the respondents stated the attitude to be affected by the personal norms or social norms of the funders. In return, the deductive categories created separately as per the proposed model by Kim & hall (2021), were collaborated into the subcategories of the personal norm and social norm in the category of attitude. Although CSR was mentioned to be one of the factors for funding through crowdfunding models. The reasons specified were either to abide by the CSR or greenwashing. Hence it is still unclear to conclude if CSR is triggered majorly by personal norms or social norms. Similarly, in the case of non-monetary funding models to be more successful in the seed capital stage. Hence, the attitude of the funder regarding the seed capital stage is still unclear.

In figure 4, the consolidated results are presented as the final model. The process of crowdfunding is integrated with the factors influencing the three actors to conduct successful funding. Once again, the model presented is from the perspective of social entrepreneurs. The factor's degree emphasis has been shown using the donut chart. The donut chart information is given in figure 5.

Figure 4: Social Entrepreneurship and Crowdfunding Behavioral Model

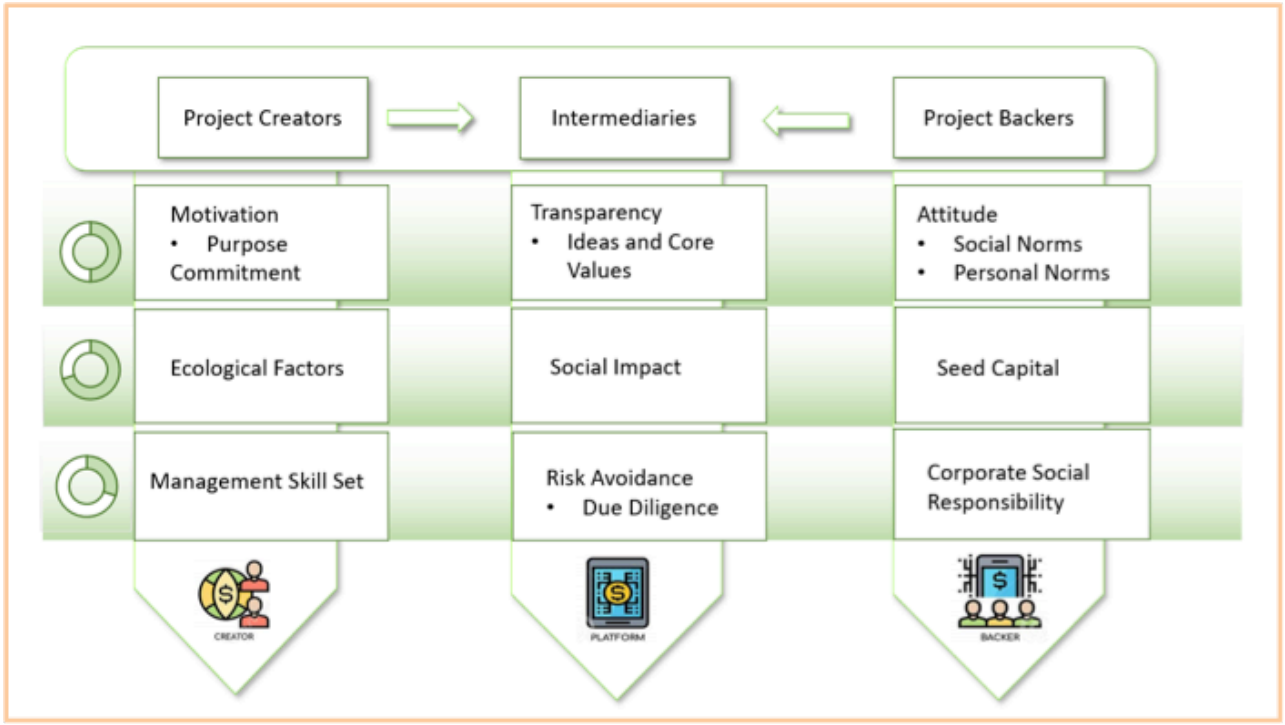
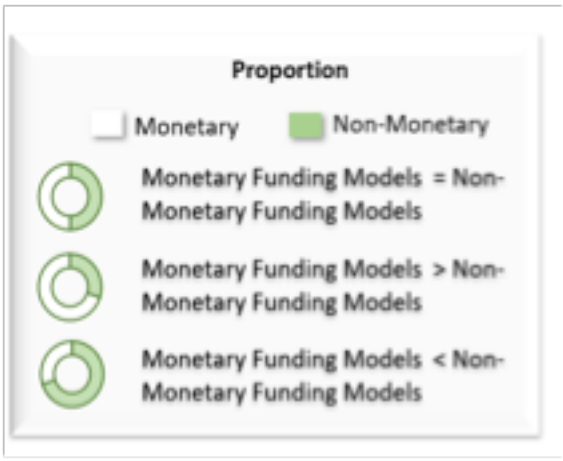


Figure 5



Conclusion

This study aimed to close the gap on “How the various models of crowdfunding can be best leveraged to support social entrepreneurship and innovation?” (Testa et al., 2019, pp. 14). Further, perform qualitative analysis to collect empirical evidence and prepare a social entrepreneurial model to understand behavioral changes of project creators and backers from the perspective of social entrepreneurs. Hence, the gap has been closed. Also, academic research is still emerging in the form of the crowdfunding ecosystem. Given the results of the study, it has been concluded that crowdfunding is an efficient alternative to financing. However, Monetary funding models and Non-Monetary funding models have the same factors affecting the behavior of the crowd funder but to different degrees. The major success link is found through the platforms, hence keeping up with the extraordinary legitimacy and trust with the funders. In non-monetary funding, the emotional connection

with the social issue of the funder has been found with no or very less expectation of getting returns. Another emerging section of funders has been observed, where the funder invests after identifying the purpose, motivation, and commitment of the social entrepreneur to make an impact and then become a part of it. In monetary funding, there is a shift found where funders are interested to invest in the social enterprise's ideas and core values. This funding diverts the social entrepreneur's sole purpose of social impact to also maintain the fiduciary duty of the funders. The main advantage of this model is the sustainable acquirement of funds and effective management working. Hence, the growth of the social impact leads to financial growth and the growth in funders' shares. As a result, the funding models offer growth and scalability encouraging other niche innovators to enter the market and funders to make the investment building a sustainable ecosystem for sustainable development.

Limitations and Future Research

Social entrepreneurship raising funds through crowdfunding is relatively a new process. Hence, the qualitative dataset used for this study was very limited in number, resulting in lesser empirical evidence. Nevertheless, future research should overcome this limitation and use larger data for qualitative analysis. Also, time plays a significant role in the process of the data collection and investigating the interviews, Hence, this restricts from taking multi-dimensional interviews. Another limitation of this paper is that the factors stimulating the interactions between social entrepreneurs and crowd funders are solely from the perspective of a social entrepreneur. Hence, future research can be conducted from the perspective of the intermediaries and the investors. In addition, the data set used has a very high share of social entrepreneurs from India. Hence the research could be conducted with other locations. As the study did not have enough resources to conduct any specialized intermediary study, the generalization of the results should be avoided. One must also keep in mind that raising investment or topics related to finances are very sensitive and accordantly the communication on that is done very cautiously. As mentioned earlier the equity and lending-based funding models were considered as monetary funding models and donation and reward funding models as non-monetary funding models. Hence, this constitutes another research gap, the future study can be conducted treating donation and lending funding as separate models. Same in the case of equity and lending funding models.

Appendix

The category system

Social Entrepreneur's intentions			
Categories	**Procedure**	**Definition**	**Anchor Examples**
Motivation	Deductive	All text passages mentioning the need for motivation in the equity and donation funding model	"When you are working on the problem while trying to understand or create a solution that really fits the issue, you need to have the motivation to be able to surpass all the challenges that arise" (R5).
SC_Purpose	Inductive	All text passages stating the involvement of purpose in selecting different funding models.	"I think it's a purpose in terms of what keeps you going is what is important, so I think (…) it's important (...) regardless of what funding models you are using (…)" (R3).
Ecological Factors	Deductive	All text passages referring to ecological success factors help in raising funds through the donation funding model	"For example, one of my neighbors bought organic soil and fertilizers from me. After using the product, my neighbor was so satisfied with the product that with the word-of-mouth unintentional advertisement, I didn't just get many customers but also a donation funder" *(R6).*
Management Skill Set	Deductive	All text passages considering management skillset to be mandatory in the equity funding model	"People will buy your shares only when they see some profits or when they see some dividends in the coming future. So, management would require you to focus on your bright future as well. And align it with the bright future accomplishment of your social goals. So, you have ten responsibilities, and your management duties increase". (R7)
Commitment	Deductive	All passages referring the degree of commitment to be high in both the funding model	"You know how hard the road becomes, you are going to keep in track, and you are going to be there. That is something that makes more than 70% of all the decision making" *(R5).*
Platforms Legtimacy			

Transparency	Deductive	All text passages indicating disclosing the actions of top-level management to be important in both the funding models	"What are the standard operating processes for businesses to be conducted that has to be checked, and whether the employees are happy, whether they have all those because you can't get an ISO certificate till all your processes are certified and audited." (R2).
SC_ Ideas and core values	Inductive	All text passages suggesting proper disclosure of ideas and core values of the team	"Say we are consumers then we tend to identify more with the organization that has core values that aligned with us" (R5)
Risk Avoidance	Deductive	All text passages indicating equal measures taken to avoid risk in both the models	"Confidence needs to be built into him or her as to his money will be wisely spent or his money will directly go to the beneficiary and once the connection is there, seminars and interaction events should be organized" (R8).
SC_ Due-Diligence	Inductive	All text passages referring to due diligence by the platforms in both models.	"Proper round of screening" (R3) and for transactional processes "third party billing (…)" (R1).
Social Impact	Deductive	All text passages identify the monitoring of social impact to be the same in both the funding model	"Monitoring methodologies could differ (…) the result remains the same (R2).
Values			
Attitude	Deductive	All passages refer to the inclination of high values towards the donation funding model.	"Donation funding is through an emotion (…) emotion to help people (…) reason why donations are anonymous too" (R6)
SC_ Personal Norm	Deductive	All passages refer to a high degree change of belief from donation funding to equity funding.	"For example, I have seen when certain someone lost their parents in certain aliment then that person that's contributing to that (…) like say affected by cancer, the person will start contributing to the organization working in the same domain (…) because they went through the same pain" (R2).

SC_ Social Norm	Deductive	All text passages indicating the high degree of donation funding triggered by social norms.	"Citizens of developed societies tend to give back more (…) they are able to think in value (…) participation in making a positive impact to the environment" (R5).
Corporate Social Responsibility	Inductive	All text passages referring to raising donation funding because the big corporates abide by CSR.	"Big organizations are doing for Clean to Green marrying the SDG's (…) have adopted for Clean to Green" (R2).
Seed Capital	Inductive	All text passages referred to donation-based funding as the seed capital.	If you are in one year or two-year-old organization, that time donation is important to stand on your own feet, but not always"

Source: Own Illustration

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