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ACTIVE CITIZENS AND PARTICIPATORY SENDING FOR OPTIMUM GOVERNANCE

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ABSTRACT

Today the human will be reflected in the growth of urbanization, which is overgrowing around the world. People are increasingly seeking to live in cities and take advantage of urban living comforts to gain personal growth and happiness. *Smart Cities* rely on both individuals and the community and create economic and sustainable development and a high standard of living. The essential component of urban living is *Active Governance*. *Participatory Governance* should be a purpose for modern citizens. *Active Citizens* enroll multiple tasks in a *Smart City* and experience different forms of participation simultaneously. This essay analyses *Smart City Governance* that uses technology to support planning and decision-making most efficiently. We also refer to *Smart People* and *Smart Citizens* as the foundation of *Smart Cities*. We emphasize *Smart City Governance* to support planning and decision making most efficiently. We suggest good practices of

Smart Cities digital applications that require the active participation of citizens and individual's receptivity to participate actively to improve the image of their town and, in general, improve their lives.

Keywords: Smart city, Urban Living, Active Citizens, Smart Governance

JEL Classification: O31

Introduction

Smart cities rely on both individuals and the community in traditional and modern infrastructures, creating economic and sustainable development and a high standard of living for the inhabitants (Caragliu *et al.*, 2011). The essential component of urban living is active *Governance*. The multidimensional Smart city is a living being, as a metropolitan area and an administrative unit. *Participatory Governance* should be a purpose for modern citizens. One significant element of an intelligent city is human capital (Shapiro, 2006). The existence of an educated and specialized population is a driving force for economic development. People with skills and creativity will exchange knowledge and experiences (Campbell, 2012). The coexistence of both technological and human dimensions makes a city smart.

Background

Smart cities are created under the influence of many different factors and usually the partnership between the private and public sector. All these interactions not only are produced locally but interstate or even internationally. For this reason, city leaders, in turn, should be able to interact with stakeholders within and outside the city to transform it. Today the human will is reflected in the growth of urbanization, which is overgrowing around the world. People are increasingly seeking to live in cities and take advantage of urban living comforts to gain more personal growth and happiness opportunities. Cities are evolving rapidly and are emerging to accommodate this growth. *Smart City* applications solve common problems that arise in cities (Sharma *et al.*, 2017). Smart cities are the future of urban cohabitation and sustainability. Nowadays the cities are increasingly dependent on networks, sensors, and microcontrollers. Artificial intelligence has managed to mimic human behavior satisfactorily, and in a few years, many jobs replaced by machines. Today, smart cities are evolving in all countries, from the poorest to the most economically viable. Many S*mart City* applications do not rely on artificial intelligence and technology but first on observation and citizen action.

Active Citizens enroll multiple tasks in a smart city and experience different forms of participation simultaneously. Cities can host all kinds of smart initiatives to

serve the citizens and respectively accept their involvement. Municipalities, trying to respond to daily problems in the most efficient way, recommend using mobile apps to report everyday issues and monitor the given solutions. In other cases, smart cities apps aim to establish normative and interactional values (Rose *et al.*, 2020) by managing data concerning healthcare, education, sustainability or by contributing to "civic publicness" (Cowley *et al.*, 2018).

S*mart City* need technological infrastructure, but their development would not have been possible without the support of citizens (Sing Lai *et al.*, 2020). Today, the government tries to reach out to citizens to actively participate in S*mart City* projects (Carlo Francesco Capra, 2016). S*mart City* need *Smart People* who can participate in both *Governance* and city reform. This kind of citizen participation is more than just ritual participation in government. *Smart People* are the potential of S*mart City* involved in decision-making, implementing reforms, and playing an active role in developing smart solutions. *Smart Citizens* can contribute more to their city in less time. They can also oversee the implementation and design of structures to create sustainable developments for S*mart City* (GoI, 2015, p. 18) (Datta, 2017).

E-government has the potential to re-lead cities and gives weight to the way cities can function collaboratively, promote competitiveness and prosperity (Krassimira *et al.*, 2009). Existing applications for smart cities are helpful but do not emphasize the human dimension of cities. In a truly S*mart City*, people play a leading role, and technology is supportive. Creating an urban ecosystem based on participation and innovation and citizen communities interacting with the authorities would be particularly important as they would lead users to new forms of *Governance*. In this case, citizens are the force of change that somehow ensures that every day could be dealt with more easily (Oliveira, Campolargo, 2015).

In this essay, we analyze S*mart City Governance* that uses technology to support planning and decision making most efficiently. Still, we also refer to *Smart People* and *Smart Citizens* as the foundation of *Smart Cities*. We also emphasize in *Smart City Governance* that uses technology to support planning and decision making most efficiently. We suggest good practices of smart cities that require the active participation of citizens and the receptivity of individuals to participate actively to improve the image of their town and, in general, to improve their daily lives.

Interaction Between Citizens and the Smart City

According to Cardullo P &Kitchin R, 2017, an initial way for citizens to interact with the S*mart City* is to embody the role of "consumer". There, citizens asked to choose which of the services provided by the city they wish to acquire. Active citizens use free applications. They, therefore, exchange personal data and create

data through the use of S*mart City* technologies. A second role of the citizens is that of the "resident". This role highlights the citizens who can afford the purchase/lease price of a property and live in a "smart building" or live in a "smart area". An additional role played by citizens is that of "data producers". The use/consumption of S*mart City* services is essential for citizens as they export data and provide information on how they will meet their needs.

In some countries, different forms and levels of citizen participation it is developed. Citizens' "non-participation" occurs when citizens pushed into specific behaviors. According to Arnstein 1969, some initiatives promote "manipulation" and aim to "allow those in power to" train "or" cure "participants". It is clear that citizens play multiple roles in the *Smart City* and simultaneously experience different participation forms. Cities can host all kinds of smart initiatives to serve citizens and respectively accept citizen participation. All levels of intelligent citizenship intertwining with liberal citizenship and personal autonomy, and the choice of individuals to perform specific roles and take responsibility for their actions. The state, in turn, facilitates liberal forms of government. Citizens are encouraged to help and provide solutions to practical issues. (Cardullo P &Kitchin R, 2017)

Smart Citizens – Smart People

Today's will be reflected in the growth of urbanization, which is multiplying around the world. People are increasingly seeking to live in cities and take advantage of the comforts of urban living to gain more opportunities for personal growth and happiness. Cities are evolving rapidly and well placed to accommodate this development. S*mart City* applications solve common problems that arise in cities. (Sharma *et al.*, 2017)

Smart cities need technological infrastructure, but their development would not have been possible without the support of citizens (Sing Lai C. *et al.*, 2020). Today, the government tries to reach out to citizens to actively participate in S*mart City* projects (Carlo Francesco Capra, 2016).

Social infrastructure (intellectual capital and social capital) is a necessary privilege for all smart cities. This infrastructure concerns people and their relationships. *Smart People* create and benefit from social capital. According to Bartlett, L. (2005) S*mart City* is a combination of education, training, culture, arts and business, commerce and a hybrid variety of social, cultural, and economic enterprises (Nam T., & Pardo TA, 2011).

One of the basic guidelines for the concepts of a *Digital City* and a *Smart City* is *Smart People*. Suppose it is necessary to consider a citizen's request for new digital technologies to improve the quality of life. In that case, the main issue is its

relevance as a full participant-developer, realizing innovative and creative possibilities to enhance the quality of the urban environment. Thus, a *Digital City* is an element of a S*mart City*, and the concept of a *Digital City* is narrower and more specific. (KlochkovG. *et al.*, 2020)

Current technology applications for smart cities are an essential step, but they do not adequately exploit the human dimension of cities or the concept of smart human cities. In a S*mart City*, people, not technology, are the natural proponents of bourgeois "intelligence." Creating a participatory innovation ecosystem where citizens and communities interact with the authorities is vital. This interaction leads to user-centric services that require new *Governance* systems. The urban transformation in which citizens are the driving force of change ensures that they can quickly meet a city's challenges. These challenges are better addressed in the neighbourhood because they contain examples and experiences that demonstrate the viability, importance and impact of such an approach (Oliveira A., Campolargo M., 2015)

Participatory Sensing

Participatory detection refers to the example where human participants use personal mobile devices to create and share data from their environment (Burke J. *et al.*, 2020). Promising participatory crawling based on its ability to comprehensively collect data and solve complex social problems (Bach C. *et al.*, 2013) (Guo B. *et al.*, 2015). Some studies, for example, have focused on investigating the possibility of monitoring environmental change in urban areas. Users of the mobile phone must send reports (e.g., when they observe pollution in the area. This example tested for a wide range of different purposes, such as urban traffic, crisis management and price control of scattered sites. Some scholars today suggest promoting human participation but through monetary reward, gamification. Many of the above studies show positive results, mainly in increasing the number of participants in a short period. It is still unclear how will improve the quality of reports simultaneously as the quantity and corresponding ways of involving individuals to maintain them in the long run. (Gao G. *et al.*, 2020)

Participatory detection is also called citizen sensing (Burke J. *et al.*, 2020), urban sensing (Dutta P. *et al.*, 2009), in-depth detection (Lane ND *et al.*, 2008), or focuses detection man (Andrew T. K.a. 2006). Regarding participatory detection, four characteristics differentiate it from other detection examples. It initially utilizes mobile phones and allows the collection of large-scale data in locations that are difficult to access for sensor placement (Burke J. *et al.*, 2020) (Shilton K., 2009) (Tangmunarunkit H. *et al.*, α 2015). Also, it asks participants to write a description or take photos of the area in some cases. The above helps the participants give their interpretation as they collect the data. It also favors the

creation of data for the present natural or social environment, which in most cases contrasts with online crowdsourcing (Aoki P. *et al.*, 2017), (Bach C. *et al.*, 2013) (Coulson S. *et al.*, 2018). Also, important can be considered the fact that it emphasizes the collection of data by ordinary people and responds to their interests (Balestrini M. *et al.*, 2017), (Jaimes LG *et al.*, 2015), (Shilton K., 2009), (Tangmunarunkit H. *et al.*, 2015). Finally, there must be a separation for the participants because they are interested in the common good or act as sensors (Aoki P. *et al.*, 2017), (Balestrini M. *et al.*, 2017) :(Gao G., etc. 2020).

Interesting, for further analysis, is collecting information from social media, including information about the geographical location. Twitter also manages users Corresponding information. The tweets that tagging the user's location are less than one hundred (1%) (Sloan, L .; *et al.*, 2013) (Ryoo, K .; Moon, S. 2014), (Graham, M. *et al.*, 2014). So, since the individuals did not disclose their location at some point, the provider company officially announced that this feature was removed (Twitter WebClient Services, 2019). Therefore, the method of collecting participatory information from smart mobile devices that can locate and record information by location was considered appropriate (Burke, J.A. *et al.*, 2006). The widespread use of smartphones (Cisco Annual Internet Report 2018–2023) have built-in sensors such as GPS, camera, and speedometer enables high-quality participatory tracking. The participants can provide information that does not arise from the recording of sensor devices. They can be a product of human perception and collect information received from sensors and content a human's creation, such as information using human perception or human impression and experience. It is also essential that each participant be able to manage, on their own, the limitations of the device they are using or their potential time constraints. A machine does not have infinite computing power, capacity or battery, and individuals must calculate all of the above parameters. There is another crucial aspect that needs to give due importance. People involved in data detection and maybe are on vacation or in a tourist destination. They may often have to spend valuable time deprived of their personal experience as they will have to focus on updating the system. Therefore, because the personal time of the participants and their personal experience is affected, its possible to provide incentives to the users should be considered to offer better services (Kawanaka, Shogo; etc. 2020).

Advanced wireless technology and advances in participatory detection applications can follow a continuous upward trend. Individuals can provide a variety of information in real-time. Their devices can share information related to a specific location, such as the location of gas stations, or the state of traffic congestion on nearby roads, etc. Users can easily share information similar to the mobile provider. Participants can therefore receive and provide such services themselves. This kind of information is also a huge business opportunity. Respectively, of

course, they can be a springboard for malicious acts of monitoring or sending advertising messages, things that, in essence, violate the personal freedoms of individuals. There is always the risk of leaking information about users' health, lifestyle, religious or political beliefs, etc. Sensitive and private data should be protected, and there should be a sense of security on users (Christin D. *et al.*, 2011).

On the other hand, participatory data detection is a very convenient and effective method and at a low cost, which pushes you further from the mass availability of various applications. This information, as already mentioned, may have indications of the time and place of recording. We also noted that confidential information could leak. Therefore, it is essential to deal effectively with potential threats to the leakage of users' information and be convinced of the security of their data and provide seamless participatory data detection services. When participants are confident of safety, they could participate more and provide reliable data. Many researchers have explored this field of research to design motivational mechanisms that will enable individuals to experience and deliver high-quality data. (Xiao *et al.*, 2017) :(Zhang T. *et al.*, 2020)

There are many similar terms in the literature such as crowdsensing computing as well as crowdsourcing (Doan A. *et al.*, 2011), including participatory sensing (Estrin DL, 2010a), (Estrin DL, 2010b), (Burke JA *et al.*, 2006), crowdsensing, mobile sensing (Lane ND *et al.*, 2021), opportunistic sensing, social detection sensing) etc. Crowdsourcing appeared in 2006 to describe an organization form that shares similar tasks over the Internet to enable design, data collection, or technical problems to be completed. It allows many professionals or non-professionals to participate simultaneously and complete a task at a meagre cost.

This practice can solve problems that computers cannot solve automatically and is especially easy for people who use it—every day in the real world, more practical systems and applications created with crowd sending. Crowdsourcing and crowdsensing computing use the power of many people to perform tasks, but crowdsourcing places more emphasis on organizational forms to give solution to various tasks. In the case of crowdsensing computing, we deal with collecting information and then process the data of individuals to understand the world better and find helpful knowledge. On the other hand, participatory sensing deals with attracting users' participation to ensure the system's reliability (Chen Q, Shi L 2020).

In a participatory detection system, individuals or groups of individuals feel the environment around them, collect, display, and communicate observations and data of the domain (Becker M. *et al.*, 2013). With the development of social media and the widespread presence of smartphones, social data have given the sense of

different aspects of the environment and data that testify to the actual dynamics of a city (Silva T.H. *et al.*, 2012). Once the understanding of the dynamics of the town reached, then it may be possible to identify the habits of human mobility (Zheng YT *et al.*, 2012), (Cheng Z. *et al.*, 2011), to seek more appropriate design decisions for city tours (Ji R. *et al.*, 2009), to detect community and social behaviors (Cranshaw J. *et al.*, 2010) and to identify human behaviors (Joseph K. *et al.*, 2012), (Alharthi K. *et al.*, 2020)

There are two types of incentives for participatory detection: those who are financially motivated and those who are not dependent (Gao L. *et al.*, 2015). Money can be a motivation that triggers and reward the participants for the services they offer. Many studies have dealt with the impact between price and reward, the participation rate and the corresponding quality and quantity of data (Lee, J.S. *et al.*, 2010), (Khoi, N.M., 2018). Non-monetary incentives are mechanisms for providing invaluable values such as fun, satisfaction, creating valuable experiences, etc. (Sailer, M. *et al.*, 2017). Of particular interest is gamification, which is not related to monetary reward but activates the thinking, mood and mechanism of the game in the natural environment outside the game (Deterding, S., 2011), (Zichermann, G., 2011), (Groh F., 2011), (Kawanaka S. *et al.*, 2020).

Best Practices

In smart cities, smart waste management can solve many of the existing problems and give breath to urban living: municipal waste management concerns, both central and local governments (Konstantinou *et al.*, 2018a). Today, active citizens of modern cities, with their participation, contribute to promoting life in modern cities—the citizens of the new digital era, demanding better services. Local waste management authorities try to improve the efficiency of their services by proposing digital services (Konstantinou *et al.*, 2018b). Sustainable municipal solid waste management is imperative both quantitatively and qualitatively (Pikoulidis, 2015). Nowadays, Garbage collection carried out with regular disposal programs and modern methods of filling the bin level. Overflow, unnecessary emptying of the bins, and insufficient capacity are common phenomena (Karagiannidis *et al.*, 2006). One of the main goals of researchers worldwide is to identify the factors that affect the motivation of citizens to use smart waste systems. According to the U.S. Environmental Protection Agency (2020), residents charged for the amount of waste they dispose of in communities with pay-as-you-throw waste programs. This practice can create financial incentives for less waste production and recycling more garbage (Konstantinou *et al.*, 2021).

Information and Communication Technologies (ICTs) add transparency and ensure citizens' participation in the process of designing, formulating, implementing and

evaluating policies, laws and programs. This way, democracy strengthens and public trust increases. In many cases, citizens, and other stakeholders, are asked to comment on proposed legislation and policies under consideration. In Greece, the central government made electronic deliberation mandatory since 2009. Before submitted to Parliament, every draft legislation is published on a platform so that citizens can offer their remarks, criticisms and suggestions (http://www.opengov.gr). In the European Union, an e-participation tool called "Futurium" developed to collect input and ideas from citizens, professionals ext. The aim is to formulate future policies on a variety of themes concerning the E.U., such as long-term developments in science and technologies (Digital4Science, Digital4EU, Next Generation Internet), improving participation (eGovernment4E) etc. (European Parliament, 2018). In Latin American, the Colombian government designed, in 2010, a multichannel platform where citizens interact with the state at all levels. Through those forums, Colombians get information about policies, initiatives, etc. and communicate recommendation and concerns to their government, achieving increased participation in the decision-making process (OECD, 2020). A web-based platform called "Dear South Africa" was created in South Africa to enable citizens to intervene in proposed legislation and policies (D. Brand, 2019).

At the local level, where the contact with citizens is more direct and immediate, local authorities try to involve citizens in policies' formulation and implementation to gain public trust and legitimation. Most municipalities in Greece provide citizens with the opportunity to express their opinion about proposed plans and initiatives that significantly affect their lives, such as long-term business plans (http://epota.ypes.gr/) and local urban mobility interventions (Municipality of Athens https://svak-athina.com/, Municipality of Piraeus https://svak-piraeus.com/, ext.). Other local authorities have created Municipal Consultation Platforms, like Municipality of Thessaloniki (https://thessaloniki.gr/), or Municipality of Papagou – Holorgos (https://www.dpapxol.gov.gr/e-politis/2015-07-30-06-33-27/diavouleusi.html), where they present their initiatives and invite citizens to submit their proposals. Still, there is no feedback to the participants or guarantees about implementing their suggestions or contributing to the decision. Thus the usual disinterest, reluctance and limited representation to e-participation practices show that e-participation hasn't become a convincing policy instrument yet. Another approach enables citizens to contribute to the decision-making process by voting to allocate public resources through "Participatory Budgeting" (Borsboom-van Beurden J *et al.*, 2019, p.95). Berlin-Lichtenberg municipality in Germany, Belo Horizonte in Brazil, the City of Paris and Reykjavik municipality combine deliberation and participatory democracy, using platforms and voting procedures, and allow citizens to propose, debate and vote for budgetary decisions that directly affect their everyday lives (European Parliament, 2018). In Greece, urban

municipalities have also adopted Participatory Budgeting, like Athens' (http://budget.ismart.gr/), Kifissia's (https://www.kifissia.gr/el/StratigikesProtereotitesProipologismos), Chalandri's (https://www.chalandri.gr/dhmos/symmetoxikos-proypologismos/) and other cities. Despite the difficulties of the above initiatives, the main argument is that they are related to projects and not policy strategies. Therefore, they have a reduced impact on the current political agenda of local authorities.

With the constant need to improve public service delivery, policymakers try to involve residents and other stakeholders, receivers of the services, co-production, and co-creation of those services. The spread of the use of ICTs, and the familiarity with mobile apps, change the way citizens interact, provide inputs and contribute to the formation and delivery of public services. Reporting applications that allow citizens to locate everyday problems, with the help of geo-informational data, report them to the local authority and monitor the given solution, are very popular nowadays (Höffken S. and Streich B., 2013). Studies have shown that this way, a significant cost saving is achieved through reduces of human capital costs, reaching up to 90% versus systems based on phone contacts (Clark B. *et al.*, 2013). Furthermore, the feedback from the local authority that solve the problem improves the value of public service and increases the level of public trust. Most municipalities, nowadays, host in their webpage suitable platforms or offer a free download of mobile apps that enable citizens to report everyday city matters, uploading them, such as potholes on the road, burned out lights, broken pavements, litter, etc. Providing photographs, if needed, and making short remarks, citizens transform to "sensors" or "detectors" (Clark B. *et al.*, 2013), reporting the problem and monitor the given solutions to it. The municipality of Trieste adopted such an application in 2012 and has been awarded twice for its efficiency to respond to everyday city problems (EURISY, 2019, Municipality of Trieste). In Greece, most municipalities are also using similar technology like Municipality of Thessaloniki (IMCityThess), Municipality of Trikala (checkappTrikala), Municipality of Papagou – Holargos (citify), Municipality of Kalamaria (4myCity) ext.

Another field where ICTs, combined with citizens' inputs, create innovative services is the health care sector. Smart applications, addressed both to medical staff and patients, facilitate e-Health services concerning prevention, diagnosis, therapy, and patient observation. The aim is to achieve optimal primary health care services by overcoming accessibility barriers. In Hungary, a project called "PISCES EUREKA" provides Hungarian patients home care services to reduce time spent in hospital, improve their quality of life and efficiently allocate health resources. Patients with chronic heart diseases use wearable sensors to monitor their vital signs. The collected data are evaluated and transmitted by smartphone application to doctors keeping them informed, enabling them to interact and

provide necessary health care when needed (Gabor A. and Gausz B., 2018). In Greece, a national e-Health Program is implemented, since 2016, that addresses remote islands' inhabitants. Using unique booths, cameras, monitors and appropriate medical instruments, each of the 43 e-Health units broadcast lively the indications of patient's examinations to big urban hospitals. There, incoming data evaluated by various doctors' specialties offering health services according to individual needs to achieve early and correct diagnosis of possible diseases. Distance medical advice emphasizes preventive medicine and upgrades healthcare quality (Voutsidou S. *et al.*, 2019).

Smartphone applications are also used in smart cities to increase revenue, reduce operation costs, and add financial value to the town (Rose G. *et al.*, 2020) (Csukas M. S. and Szabo R. Z., 2021). A representative example is S*mart City* apps' that provide parking pieces of information. Urban cities, due to their population density, face a shortage of parking spaces. Monitoring and controlling large areas increase operational expenses and burden the city's budget. Managing the availability of open parking spaces can be achieved efficiently using sensors, Internet oF Things technologies and suitable applications (Paidi V. *et al.*, 2018) (Pham T. N. *et al.*, 2015). Many local authorities adopted smart parking managing systems to improve traffic flows, facilitate citizens and visitors in finding parking spaces, and efficiently collect parking fees and fines. The municipality of Trikala installed specialized sensors on the road surface of its famous streets. Each sensor sends the appropriate signal to the network controllers when a parking spot is either occupied or empty. Through a mobile parking app for smartphones, citizens and visitors can be informed in real-time about the availability of parking place in the area and pay the appropriate fee. Simultaneously, traffic control authorities are provided with real-time information about illegal parking instances, enabling them to impose the proper fines (https://trikalacity.gr/smart-trikala/). Municipality of Munich, in 2018, upgraded its S*mart City* app by providing additional information about the city, like parking availability, measured by special sensors installed at the smart lampposts located in the area (Borsboom-van Beurden J. *et al.*, 2019). The city of Athens also provides a smartphone application to its visitors and citizens, called myAthensPass, facilitating the collection of parking fees (http://parkinathens.gr/).

Conclusions

The adoption of actions and regulations based on the principles and tools of *Participatory Governance* strengthens democratic institutions and the provision of quality and effective services to citizens and society. At the same time, it is an essential step towards the digitization of *Public Administration*. In the ever-

changing environment that exists today, the *Public Administration* is called upon to redefine its role and to modernize the way it operates and upgrade the way and the quality of the services it offers.

One of the most crucial levers for achieving these principles is to strengthen *Open* and *Participatory Governance*. Citizens' participation in the formulation of policies, solutions, and implementing an ecosystem of actions enhances accountability and transparency in the Administration's decisions. The interventions that encourage Participatory Governance aim to create effective and direct communication channels with the citizens. The goal is for every citizen to be aware of the *Public Administration* procedures that concern him and to help and shape them according to his needs in the most profitable way so that they cease to be time consuming and inefficient.

Smart Cities need the contribution and participation of *Smart People* who can participate in *Governance* and urban reform. Citizen participation is not just about sterile ritual participation in government, but it is the practical exercise of democracy. *Smart People* are the basis of *Smart Cities*, and when they are involved in decision-making and implementation of reforms, they play an active role in developing intelligent solutions. In this context, we evaluate the adoption of international and domestic practices used in digital transformation.

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