

## **The Interplay Between ICT, Participatory Governance, and Sustainable Development: A theoretical overview**

### **L'interaction entre les TIC, la gouvernance participative et le développement durable: Un aperçu théorique**

**Madiha GHARBAOUI, (PhD student)**

*Research Laboratory in Economics, Management and Business Management (LAREGMA)  
Hassan Premier University of Settat, Morocco*

**Abdelali ZAIMI (PhD student)**

*Laboratory of Research in Management Sciences of Organizations (LRSGO)  
National School of Business and Management of Kenitra, Morocco  
Ibn Tofail University of Kenitra, Morocco*

**Aziz DOUARI, (PhD, Professor)**

*Research Laboratory in Economics, Management and Business Management (LAREGMA)  
Hassan Premier University of Settat, Morocco*

|                                 |  |
|---------------------------------|--|
| <b>Correspondence address :</b> | Faculté d'Économie et de Gestion de Settat,<br>Km3, Route de Casablanca, Settat,<br>Université Hassan Premier<br>Maroc (Settat)<br>26000<br>05 23 72 19 39<br>École nationale de commerce et de gestion de Kénitra   |
| <b>Disclosure Statement :</b>   | Authors are not aware of any findings that might be perceived as affecting the objectivity of this study   |
| <b>Conflict of Interest :</b>   | The authors report no conflicts of interest.   |
| <b>Cite this article :</b>      | GHARBAOUI, M., ZAIMI, A., & DOUARI, A. (2023). The Interplay Between ICT, Participatory Governance, and Sustainable Development: A theoretical overview. <i>International Journal of Accounting, Finance, Auditing, Management and Economics</i> , 4(2-1), 285-306.<br><a href="https://doi.org/10.5281/zenodo.7829340">https://doi.org/10.5281/zenodo.7829340</a> |
| <b>License</b>                  | <b>This is an open access article under the CC BY-NC-ND license</b>  |

*Received: March 10, 2023*

*Accepted: April 14, 2023*

**International Journal of Accounting, Finance, Auditing, Management and Economics - IJAFAME**

**ISSN: 2658-8455**

**Volume 4, Issue 2-1 (2023)**

## **The Interplay Between ICT, Participatory Governance, and Sustainable Development: A theoretical overview**

### **Abstract**

The relationship between information and communication technologies (ICT), participatory governance, and sustainable development has become increasingly important in the contemporary world. It is important to discuss it because these concepts are all critical for achieving sustainable development goals. Sustainable development involves meeting the needs of the present without compromising the ability of future generations to meet their own needs, and it requires a holistic approach that addresses economic, social, and environmental factors. This theoretical article investigates the complex interplay between Information and Communication Technologies (ICT), Participatory Governance, and Sustainable Development. In order to explore this relationship, the article draws on a review of existing theoretical models and empirical studies. The data for this study was collected through a systematic review of existing literature on the topic, including academic articles, policy documents, and reports from international organizations. Additionally, the article explores the different ways in which multiple countries have realized this relationship, including case studies of the implementation of these concepts. The article draws on a range of studies that have been conducted to investigate the relationship between ICT, Participatory Governance, and Sustainable Development, providing insights into the various challenges and opportunities that arise in this context. The results of the study suggest that there is a need for a more nuanced understanding of the relationship between these concepts, and for a holistic approach to their implementation in order to achieve sustainable development goals. The study also highlights the importance of considering the local context and the unique challenges and opportunities of each situation when designing projects and initiatives that incorporate these concepts. Ultimately, the article argues that while there are challenges associated with the implementation of ICT, Participatory Governance, and Sustainable Development, there is a strong case for their continued use in future projects and initiatives aimed at achieving sustainable development goals.

**Keywords:** ICT, Participatory governance, Sustainable development, Access to information, Citizen engagement

**JEL Classification:** I28, L78, L88, O15, O33, O38

**Paper type:** Theoretical Research

## 1. Introduction

Information and communication technologies (ICTs) have played a significant role in transforming the way governments interact with citizens and deliver public services over the past few decades. The rise of e-government and digital technologies has enabled governments to reach more citizens and provide services more efficiently and effectively. This transformation has also given rise to the concept of participatory governance, which involves engaging citizens in decision-making processes and giving them a voice in how public services are delivered.

The concept of participatory governance is not new, but the use of ICTs has made it easier for citizens to participate in decision-making processes and for governments to incorporate citizen feedback into policy decisions. In recent years, there has been a growing interest in the potential of ICTs to support participatory governance and promote economic development. Advocates argue that by promoting transparency, accountability, and citizen engagement, ICTs can help to create a more inclusive and democratic society, and drive economic growth.

One of the earliest proponents of participatory governance was the political scientist Carole Pateman, who argued that democracy requires active citizen participation in decision-making processes. Her 1970 book "Participation and Democratic Theory" laid the foundation for the idea that participatory governance can strengthen democracy by giving citizens a more direct role in the political process.

In the 1990s, the development of the internet and other digital technologies opened up new possibilities for participatory governance. The political scientist Archon Fung was among the first to explore these possibilities. In his 1999 book "Civil Society and Political Theory", Fung argued that ICTs could be used to create new spaces for citizen engagement and deliberation, and enhance the legitimacy of political decision-making processes.

Since then, a number of researchers and practitioners have contributed to the discussion of ICT and participatory governance. One of the most influential was the political scientist Beth Noveck, who served as the first Deputy Chief Technology Officer of the United States in the Obama administration. Noveck's 2009 book "Wiki Government: How Technology Can Make Government Better, Democracy Stronger, and Citizens More Powerful" argued that ICTs could be used to create more open and participatory government institutions, and enable citizens to play a more active role in shaping public policy.

Other researchers have focused on the specific technologies and tools that can be used to promote participatory governance. For example, the information scientist Andrea Kavanaugh has explored the use of online deliberation platforms to promote citizen engagement and decision-making, while the political scientist David Lazer has studied the use of crowdsourcing and other digital tools to gather citizen feedback and inform policy decisions.

Overall, the discussion of ICT and participatory governance has evolved over time as new technologies and tools have emerged, and as researchers and practitioners have gained a deeper understanding of the potential benefits and challenges of these approaches. By building on previous research and drawing on case studies from diverse contexts, this article aims to provide insights into how ICT can support participatory governance and contribute to economic development.

Although there are numerous interpretations of sustainable development, the Brundtland Report's definition, which states that development should meet current needs without compromising future generations' ability to do the same, is commonly used (WCED, 1987). The "triple bottom line" approach, emphasizing the need for ecological, sociocultural, and economic development, is frequently applied in accordance with this definition (Elkington, Citation1998; Inayatullah, 2011; Bifulco et al., Citation2016). However, despite skepticism, there is a prevalent belief that ICT can enable co-creation with citizens to achieve sustainability

by enhancing their participation (Roman and Miller, Citation2013; Hollands, Citation2008; Torres et al., Citation2006). Nonetheless, several studies have disproven the ability of state ICT to dramatically transform the relationship between citizens and the government in public affairs, leading academics and practitioners to question whether ICT applications can overcome citizens' apathy and mistrust toward political representatives (Yetano and Royo, Citation2015; Edelman et al., Citation2009). Additionally, the use of ICTs raises questions about the exclusion, as only those with access to digital devices can participate (Molinari and Ferro, Citation2009; Yigitcanlar and Lee, Citation2014).

The contribution of this study to the discussion is firstly conceptual: we aim to define the different components of this relationship in order to develop a deeper understanding of this ICT-supported mode of collaboration. Second, this paper contributes to the literature by expanding our understanding of the relationship between participatory governance and ICT and the outcomes in terms of contribution to sustainable development.

In summary, the main objective of this study is to generate a real database for the present context by providing an overview of what is known about the contribution to sustainable development of collaboration between public authorities and citizens, based on information and communication technologies (ICTs). The article is structured as follows: in the next section we present the different research concepts, followed by the section in which we present a theoretical perspective on the promotion of participatory governance and sustainable development through the adoption of ICTs and their equitable use. We then present what the studies reveal about the outcomes of this relationship. In the final section, we discuss the above studies and suggest avenues for future research in the conclusion.

## 2. Presentation of the concepts

### 2.1. ICT

Information and communication technologies (ICTs) are the technologies and tools that are used to create, process, store and exchange information. It encompasses a wide range of hardware, software and infrastructure that enable communication and information exchange, including computers, smartphones, tablets and other devices, as well as operating systems, productivity tools and applications. ICT also includes the networks and infrastructure that connect these devices and enable communication and information exchange, such as the internet and various wireless communication technologies. Examples of ICT include computers, laptops, tablets, smartphones, and other mobile devices, as well as Internet of Things (IoT)<sup>1</sup> devices, social media platforms, cloud services, productivity software, video conferencing tools, electronic payment systems, big data analytics tools, and virtual reality technologies are augmented. These examples show the wide range of tools and technologies that fall under the umbrella of ICT, and the various ways in which they are used to create, process and exchange information.

ICT has become an essential part of modern life, with many people using it for work, education, communication and entertainment. As such, they have had a profound impact on society and the economy, leading to the creation of new industries, the transformation of existing industries, and the development of new forms of social and political organization.

As Douglas Engelbart, a computer engineer and inventor of the computer mouse, noted, " The digital revolution is far more significant than the invention of writing or even of printing." Bill Gates, co-founder of Microsoft, also observed that " The internet is becoming the town square

---

<sup>1</sup> *The Internet of Things or IoT is the interconnection between the Internet and physical objects, places and environments. The name refers to a growing number of objects connected to the Internet, allowing communication between our so-called physical assets and their digital existence.*

for the global village of tomorrow." Mark Weiser, computer scientist and chief technologist at Xerox PARC, stated that " The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it." These quotes highlight the tremendous impact that ICT has had on society, and how it has transformed the way we live and work. These quotes show the considerable impact that ict has had over the years on society, and how it has transformed the way we live and work.

## 2.2. Participatory Governance

Participatory governance is a democratic decision-making process that involves citizens and other stakeholders in the formulation and implementation of public policies and programs. It is characterized by open and inclusive communication, consultation and collaboration between government leaders and the public, and aims to improve the quality and legitimacy of public decision-making. It can take many forms, including citizen participation in decision-making (public management, etc.) through, for example, the right to petition, public consultations, participatory planning, and community monitoring and evaluation.

Many scholars and practitioners have described participatory governance as a key element of democratic governance and sustainable development.

Archon Fung, professor of democracy and citizenship at the Harvard Kennedy School, defines participatory governance as:

*"a process of decision-making in which citizens take an active part in public policymaking and implementation."*

Sherry Arnstein, an American community activist and writer, developed the widely cited "ladder of citizen participation," which describes participatory governance as a level of engagement in which citizens have the power to make decisions and share responsibilities with government authorities. Le Programme des Nations unies pour le développement (PNUD) définit la gouvernance participative comme

*"a way of working in which stakeholders collaborate to identify and prioritize issues, agree on actions to address them, and monitor and evaluate progress."*

It can help build trust between citizens and government leaders, promote transparency and accountability, and increase the effectiveness and efficiency of public policies and programs. At the same time, it ensures that the needs and perspectives of marginalized and disadvantaged populations are taken into account in public decision-making. Examples of participatory governance initiatives include participatory budgeting in Brazil, community management of natural resources in Africa, and citizen juries in Australia. These examples show the diversity of approaches to participatory governance and the different contexts in which they can be applied.

## 2.3. Sustainable Development

Sustainable development is a concept that seeks to balance economic, social and environmental considerations to promote long-term well-being and prosperity for current and future generations. It involves the responsible use of natural resources, protection of biodiversity, reduction of poverty and inequality, and promotion of inclusive economic growth.

One of the most widely cited definitions of sustainable development comes from the Brundtland Report, a seminal publication of the United Nations World Commission on Environment and Development. This report defines sustainable development as " development that meets the needs of the present without compromising the ability of future generations to meet their own needs". This definition emphasizes the importance of intergenerational equity and recognizes the need to balance economic development with environmental and social considerations.



Sustainable development is closely linked to the United Nations Sustainable Development Goals (SDGs)<sup>2</sup> which provide a global framework for addressing key social, economic, and environmental challenges. The SDGs include 17 goals, such as eradicating poverty and hunger, promoting gender equality, providing access to clean water and sanitation, and combating climate change.

Many countries around the world have made sustainable development a key policy objective. For example, in Morocco, the government has launched several initiatives to promote sustainable development and reduce poverty. These initiatives include the National Initiative for Human Development (INDH), which aims to improve access to education, health care, and social services in rural and urban areas. Also, the Green Morocco Plan, which aims to promote sustainable agriculture, protect natural resources and reduce greenhouse gas emissions.

Sustainable development also involves promoting sustainable business practices and corporate social responsibility. Many companies around the world have adopted sustainable business practices, such as reducing waste and greenhouse gas emissions, promoting employee well-being, and investing in renewable energy. For example, the multinational Unilever<sup>3</sup> has adopted a sustainable living plan that includes goals to reduce the environmental impact, improve social conditions for employees and suppliers, and promote sustainable consumption.

### **3. ICTs between participatory governance and sustainable development: theoretical perspectives**

The role of ICTs in promoting participatory governance is becoming increasingly important in today's digital age. They can play a crucial role in promoting participatory governance by providing tools and platforms for citizens to participate in decision-making processes.

The use of ICTs to promote participatory governance is a topic that has been widely studied and discussed by academics and practitioners in the field. One of the key figures in this field is Archon Fung, a professor at the Harvard Kennedy School, who has written extensively on participatory governance and the use of ICTs to promote citizen engagement. In his book "Empowered Participation: Reinventing Urban Democracy," Fung argues that the use of ICTs can help create more inclusive and responsive forms of governance by enabling citizens to participate more actively in decision-making processes.

Beth Noveck is another prominent researcher in this area. She has written extensively on the topic of open government and the use of ICT to promote citizen engagement. Ms. Noveck was the founder and director of the White House Open Government Initiative and is currently a professor at New York University. In her book "Wiki Government: How Technology Can Make Government Better, Democracy Stronger, and Citizens More Powerful," Noveck argues that the use of ICTs can help create more collaborative and innovative forms of governance by allowing citizens to participate more fully in the decision-making process.

In addition, several theoretical perspectives can help us understand the relationship between ICT and participatory governance, and how ICT can be used to promote more inclusive and effective forms of citizen engagement.

One such perspective is the theory of deliberative democracy, which emphasizes the importance of open and inclusive communication among citizens and between citizens and government leaders. According to this theory, effective deliberation requires that all voices be heard and that the decision-making process be fair and transparent. The use of ICT can facilitate this

---

<sup>2</sup> The name Sustainable Development Goals is commonly used to refer to the seventeen goals established by the member states of the United Nations and which are gathered in the 2030 Agenda

<sup>3</sup> Unilever is a Dutch-British multinational company with headquarters in Rotterdam and London. The company is present in more than 100 countries and in 2010 was the fourth largest global player in the food industry, behind Nestlé, PepsiCo and the Coca-Cola Company, and the world's largest producer of ice cream and tea

process by allowing citizens to share information and collaborate with government officials in real time, and by providing platforms for discussion and debate that are accessible to all citizens. Another perspective is social capital theory, which emphasizes the importance of social networks and interpersonal relationships in promoting trust and cooperation among citizens. According to this theory, strong social networks and interpersonal relationships can help promote more effective forms of civic engagement and decision-making by enabling citizens to share information, build consensus and work together to address common challenges. The use of ICT can help facilitate this process by allowing citizens to connect and collaborate with each other, even if they are geographically dispersed.

A third perspective is empowerment theory, which emphasizes the importance of giving citizens a greater voice and role in decision-making processes. According to this theory, citizens who have the opportunity to participate in decision-making processes are more likely to feel invested in the outcomes of those processes and to work collaboratively with government leaders to achieve their goals. The use of ICTs can contribute to the empowerment of citizens by providing them with greater access to information and enabling them to participate more actively in decision-making processes.

The fourth perspective is digital citizenship theory, which emphasizes the importance of promoting digital literacy and digital rights as a means of empowering citizens to engage in civic activities online. According to this theory, digital citizenship involves not only the ability to use digital technologies, but also the ability to navigate complex digital environments and engage in ethical and responsible online behaviors. The use of ICT can help promote digital citizenship by providing training and support for citizens to use digital technologies effectively and by promoting policies that protect digital rights, such as freedom of expression and privacy.

- **ICT and Sustainable Development**

ICTs (information and communication technologies) play a crucial role in promoting sustainable development by enabling a more efficient, effective and equitable use of resources and by facilitating the exchange of knowledge and expertise among various stakeholders. Some of the ways in which ICT can support sustainable development are resource efficiency, environmental monitoring, sustainable production and consumption, education and awareness... Several theoretical considerations can help us understand the relationship between ICT and sustainable development, including:

**The theory of ecological modernization:** This theory emphasizes the importance of technological innovation in promoting sustainable development. According to this theory, new technologies can help reduce the environmental impact of economic activities and increase resource efficiency. The use of ICT can facilitate this process by enabling the development of new technologies and providing platforms for the exchange of knowledge and expertises.

**Social-ecological systems theory:** This theory emphasizes the interconnectedness of social and ecological systems, and highlights the importance of adaptive governance and management strategies to promote sustainability. In the context of sustainable development, this theory suggests that ICTs can be used to promote more integrated and collaborative approaches to sustainable development by facilitating communication, knowledge sharing and participatory decision-making among diverse stakeholders.

**Capability Approach:** This approach emphasizes the importance of human capabilities and well-being in promoting sustainable development. In the context of ICTs, this theory suggests that technology can be used to enhance the capabilities and well-being of individuals and communities, providing access to information, education, health services and other essential resources.

Political ecology: This theory emphasizes the political and economic dimensions of environmental problems, and highlights the role of power and social inequality in the distribution of environmental damage and benefits. In the context of sustainable development, this theory suggests that ICTs can be used to promote more democratic and participatory governance, enabling greater public engagement and accountability in environmental decision-making.

- **Sustainable and equitable use of ICT**

Kofi Annan, past Secretary General of the United Nations, once said:

*"The true test of good governance is its ability to deliver sustainable and equitable outcomes for all citizens."*

The United Nations Development Programme has highlighted the importance of participatory governance in promoting sustainable development, noting that :

*" Inclusive and participatory governance is essential for ensuring that people are at the center of development processes."*

The use of information and communication technologies (ICTs) has become an increasingly important component of development strategies around the world. However, it is essential to ensure that the use of ICTs is sustainable and equitable, promoting the well-being of all individuals and communities. To achieve this goal, it is crucial to incorporate participatory governance mechanisms that allow for a more inclusive, transparent and accountable use of ICTs.

One way that participatory governance can promote the sustainable and equitable use of ICTs is to ensure inclusiveness. This means involving a wide range of stakeholders in decision-making processes, including marginalized and vulnerable communities, and creating opportunities for their voices to be heard. In doing so, participatory governance can help ensure that the use of ICTs is aligned with the diverse needs and perspectives of all stakeholders.

Transparency is another essential aspect of participatory governance. It is important to promote transparency in the use of ICTs to ensure that they are used in a sustainable and equitable manner. This includes making information on the use and impact of ICTs available to the public and ensuring that decision-making processes are open and accessible to all stakeholders. When stakeholders have access to information, they are better equipped to understand how ICTs are used and to hold decision-makers accountable for their actions.

Accountability is also essential to ensure sustainable and equitable use of ICT. By establishing accountability mechanisms, including clear lines of responsibility for managing and regulating ICTs, as well as mechanisms for monitoring and evaluating their use and impact, participatory governance can foster greater accountability and more effective regulation of ICT use.

Strengthening the capacity of stakeholders to engage effectively with ICTs is another key aspect of participatory governance. This includes providing access to training and education, as well as supporting the development of local and community ICT initiatives. When stakeholders have the skills and resources to engage with ICTs, they are better equipped to use them in ways that support sustainable development goals.

Several theoretical approaches examine how participatory governance can lead to sustainable and equitable use of ICTs. One such perspective is the capability approach, which emphasizes the importance of empowering people to make informed choices about their lives and well-being. According to this perspective, participatory governance can help ensure that ICTs are used sustainably and equitably by empowering people to understand and make informed decisions about ICT use.

Another theoretical perspective is the social construction of technology (SCOT) framework, which emphasizes the importance of considering the social context in which technologies are



developed and used. According to this perspective, participatory governance can help ensure that the development and use of ICTs is sustainable and equitable by involving diverse stakeholders in the design and implementation of the technology.

In addition, the concept of technological justice also emphasizes the importance of equitable access to technology and the need to ensure that technology is used in a way that benefits all members of society. This perspective emphasizes the role of participatory governance in ensuring that the benefits of ICTs are distributed in an equitable and just manner.

Finally, the concept of the Sustainable Development Goals (SDGs) also provides a framework for understanding how participatory governance can lead to sustainable and equitable use of ICTs. The SDGs emphasize the importance of promoting social and economic development in a way that is environmentally sustainable and socially inclusive. Participatory governance can help ensure that ICTs are used in ways that promote these goals by involving stakeholders in the design and implementation of technologies that promote sustainable and equitable development.

## **4. Projects and Achievements**

There are many testimonials of how the concepts of ICT, participatory governance, and sustainable development have been applied in real-world settings. By involving diverse stakeholders in the design and implementation of technology, and by promoting transparency and accountability, these approaches can help ensure that technology is used in ways that support social and economic development, while protecting the environment and promoting equity.

### **4.1. Citymapper Mobility Index in London, UK**

Citymapper is a transit app that provides real-time data on transportation options in cities around the world. In London, the company has developed a mobility index that uses the app's data to measure the impact of transportation on the environment and public health. The mobility index is used by city leaders to inform policy decisions on transportation and urban planning.

### **4.2. E-Governance in India**

The goal of the project was to transform the delivery of public services through the use of ICT. The project, which began in the early 2000s, was designed to enable citizens to access government services and information through the Internet and other digital platforms. The project was motivated by the need to improve the transparency, efficiency and accessibility of public service delivery.

One of the key outcomes of the e-governance project was the creation of the National e-Governance Plan (NeGP), which provided a framework for the implementation of e-governance initiatives across the country. The plan called for the development of various applications and platforms, such as Common Service Centers (CSCs), State Wide Area Networks (SWANs), and State Data Centers (SDCs), that allowed citizens to access government services and information.

The project involved a variety of actors, including the government, civil society organizations, and private sector actors. The government provided the policy and regulatory framework, while private sector actors developed the applications and provided the necessary infrastructure. Civil society organizations played a key role in ensuring that the project was inclusive and that citizens, especially those in rural areas, could access the services and information provided. Several factors contributed to the success of the e-governance project in India. These include political will and commitment, adequate funding, availability of skilled human resources, and

participation of civil society organizations. In addition, the project was designed with a focus on the needs of citizens and aimed to improve their access to services and information.

#### **4.3. Open Data Portal in Buenos Aires, Argentina**

The city of Buenos Aires has developed an open data portal that allows citizens to access government data on a range of matters, from public safety to waste management. This has increased government transparency and accountability, and helped citizens engage more effectively in decision-making processes. The city is also committed to sustainability, and the open data portal has facilitated the development of innovative solutions to environmental challenges.

#### **4.4. Digital Financial Services in Kenya**

Digital financial services (DFS) in Kenya were first introduced in 2007 by telecommunications operator Safaricom through its mobile money platform, M-PESA. The focus of the project was to promote financial inclusion and increase access to financial services, particularly for the unbanked and underbanked population in Kenya.

The actors involved in the project are Safaricom, the Central Bank of Kenya, the Kenya Authoritative Communication, and various other public and private sector stakeholders. Factors that have contributed to the success of proximity payment services in Kenya include the widespread adoption of cell phones, a favorable regulatory environment, and the ability of proximity payment services to meet the needs of low-income individuals and small businesses. Overall, the case of DFS in Kenya demonstrates the potential of ICT to promote sustainable development by providing access to financial services and promoting financial inclusion. It also highlights the importance of an enabling regulatory environment, public-private partnerships, and the use of technology to meet the needs of underserved populations.

#### **4.5. Scientific citizenship in the Philippines**

The Philippine government has partnered with a citizen science platform called iNaturalist to collect data on the country's biodiversity. Through this platform, citizens can upload photos and observations of wildlife, which are then verified by experts. This data is used to inform government policies on conservation and sustainable development. The platform also promotes public awareness and engagement in environmental issues.

#### **4.6. Energy efficiency program in Medellin, Colombia**

The city of Medellin has implemented an energy efficiency program that promotes sustainable development while reducing costs for citizens. The program provides citizens with information on best practices to reduce energy consumption, and offers financial incentives to improve the energy efficiency of their homes. The program is supported by a participatory governance model that includes citizen engagement in decision-making processes.

#### **4.7. Green Map System in New York City, USA**

The Green Map System is an online mapping platform that identifies and highlights sustainability initiatives in cities around the world. In New York City, the platform has been used to promote citizen engagement in sustainability initiatives, while providing city officials with data on the impact of these initiatives. The platform is designed to promote transparency, participation and sustainability in urban planning and development.

### **5. Literature review**

A large body of research has explored the interaction between ICTs, participatory governance and sustainable development. These studies highlight the importance of ICT and participatory

governance in promoting sustainable development outcomes, and also highlight the challenges and opportunities associated with these approaches.

We developed a set of criteria to determine the eligibility of studies and reports for our literature search. These criteria were established to guide our search strategy and ensure that the selected sources meet our research requirements.

To comprehensively address our research topic, we utilized the following combinations of research terms: participatory e-governance, sustainable e-governance, citizen e-participation, urban sustainability, participatory governance, ICT and good governance, sustainable participation, integration of ICT in sustainable development, governance, citizen e-collaboration, sustainability, smart city, citizen sustainability, participatory e-governance, co-creation sustainability, collaborative e-governance, and sustainability and ICT. This approach allowed us to encompass various dimensions and facets related to the interplay between ICT, participatory governance, and sustainable development in a cohesive manner. We incorporated diverse research designs, such as case studies, questionnaires, experiments, literature reviews, and comparative research. We selected studies published between 2013 and 2022, as the concept of smart cities and the use of ICTs for participatory/collaborative governance are relatively recent developments (Harrison et al., 2010). We limited our search to publications written in the English language for inclusion in our review.

**Table 1: Presentation of selected studies**

| Authors & Years                            | Articles   | Study conducted   | Result obtained   |
|--|--|---|---|
| Catrien JAM Termeer and Anne Bruinsma 2016 | ICT-enabled boundary spanning arrangements in collaborative sustainability governance            | This article examines the role of ICT-enabled boundary spanning arrangements (IBSAs) in facilitating cross-boundary collaborations and contributing to sustainable solutions. It explores the extent to which IBSAs can effectively bridge boundaries and foster collaborative efforts towards addressing sustainability problems, and under which conditions they are most effective.  | The article starts by introducing the concept of boundaries and presents a typology of three distinct types of boundaries. It further provides examples of different ICT-enabled boundary spanning arrangements (IBSAs) and discusses their potential in overcoming physical, cognitive, and social barriers.   |
| Omar al hujran and anas Aloudat 2013       | Factors Influencing Citizen Adoption of E-Government in Developing Countries: The Case of Jordan | The authors conducted a study to investigate the adoption of e-government services by citizens in Jordan, with a focus on identifying the factors that influence the level of adoption. The study also aimed to develop a conceptual framework based on the Technology Acceptance Model (TAM) to explore the relationships between government trustworthiness, service quality, citizen satisfaction, and citizen adoption of e-government services. Data was collected through a self-administered questionnaire from 356 randomly selected Jordanian citizens across the country. | The study findings reveal that perceived usefulness, perceived ease of use, citizen satisfaction, and trustworthiness are significant predictors of the intention of Jordanian citizens to use e-government services. Furthermore, the results highlight the significant impact of service quality dimensions such as responsiveness, reliability, and empathy on citizen satisfaction. This study makes important contributions to the academic and practical understanding of e-government issues, particularly in the context of Jordan as a developing country in need of further research in this area. The insights gained from this study could also assist government agencies in improving the effectiveness of their e- |

|   |   |   |   |
|---|---|---|---|
|   |   |   | government services, thus providing valuable guidance for policy and decision-making.   |
| Christine Meschede and Maria Henkel<br>2019 | Library and information science and sustainable development: a structured literature review | A comprehensive literature review was conducted, utilizing a structured approach and supplemented with bibliometric analyses. A total of 102 journals and conferences in the field of Library and Information Science (LIS) were included in the review. From this, 81 publications were identified that specifically addressed the topics of sustainability and sustainable development. The contents and methodological approaches of these publications were thoroughly analyzed by the authors. | A significant portion of the articles reviewed were found to be centered around the intersection of sustainable development and libraries. Some publications also focused on information and communication technology (ICT) or information systems. However, there were limited articles that addressed other topics such as government, urban development, or scientific output, indicating a relatively smaller body of literature in those areas. The authors call for more research in this area and concrete ideas to help develop a sustainable future. |
| Ana Yetano and Sonia Royo<br>2016           | Keeping Citizens Engaged: A Comparison Between Online and Offline Participants              | This study examines potential differences in enrollment and drop-out rates between e-participation and traditional participation in a long-term citizen collaboration project. The theoretical framework employed is based on the concept of networked individualism.   | The findings reveal that capturing and sustaining citizen interest can be challenging, even in sensitive topics that offer tangible benefits. Despite the increased accessibility provided by information and communication technologies (ICTs), public apathy persists, and person-to-person contact proves to be more effective in maintaining engagement. Based on these results, recommendations are proposed for reducing dropout rates in long-term citizen collaboration projects.   |



|   |  |  |   |
|---|--|--|---|
| <p>Patience I. Akpan-Obong and al. 2022</p>                               | <p>E-Governance as good governance? evidence from 15 West African countries</p>                                  | <p>This study critically examines the assumed relationship between e-governance and governance in 15 West African countries, utilizing data from the 2016 and 2018 World Governance Indicators (WGI) and E-government Development Index (EDGI) as proxies for measuring governance and e-governance, respectively.</p> | <p>The study concludes that ICTs are indeed effective in advancing government goals, but their outcomes are significantly improved when integrated with existing governance institutions and structures. This research contributes to our understanding of development and governance by providing empirical evidence of both the potential and limitations of ICTs in government administrative practices, particularly in geopolitical contexts with limited resources.</p> |
| <p>Zsuzsanna Tomor, Albert Meijer, Ank Michels and Stan Geertman 2019</p> | <p>Smart Governance For Sustainable Cities: Findings from a Systematic Literature Review</p>                     | <p>The authors present a systematic review of the literature on smart governance, defined as technology-enabled collaboration between citizens and local governments to advance sustainable development</p>  | <p>The results indicate that there is limited empirical evidence supporting the purported sustainability benefits of smart governance. Moreover, the findings reveal an ambiguous picture, with both positive and negative effects reported in relation to sustainability achievements. The study emphasizes the importance of contextual conditions in understanding these mixed outcomes in the realm of smart governance.</p>  |
| <p>Raef bahrini and Alaa A. 2019</p>                                      | <p>Impact of Information and Communication Technology on Economic Growth: Evidence from Developing Countries</p> | <p>The study aims to evaluate the impact of information and communication technology (ICT) on the economic growth of selected developing countries in the Middle East and North Africa (MENA) region and the Sub-Saharan Africa (SSA) region by using a panel Generalized Method of Moment</p>                         | <p>The results obtained from the econometric model reveal that, with the exception of fixed telephone, mobile phone, Internet usage, and broadband adoption are the primary drivers of economic growth in developing countries in MENA and SSA regions during the period of 2007-2016. Furthermore, our</p>   |

|   |   |  |   |
|---|---|--|---|
|   |   | (GMM) growth model over the period 2007–2016.  | findings highlight the relatively higher levels of Internet usage and broadband adoption in MENA countries compared to SSA countries. In light of these findings, it is recommended that policymakers in MENA and SSA countries increase their investments in ICT infrastructure to harness the potential of ICT as drivers of economic growth. This may involve implementing policies that promote the development of financial sectors, establish a favorable regulatory and institutional environment, foster economic openness, prioritize resource allocation to ICT infrastructure development, and address the negative impacts of inflation and government consumption. |
| Priscila Engelberg and Michael Gurstein, 2016 | Participatory Governance and ICTs for Local Development: The Case of the Municipalities of Minas Gerais, Brazil | The study examines the role of ICTs in promoting participatory governance and local development in Brazil. | The authors find that ICTs have played a key role in promoting citizen engagement in local governance processes, and have helped promote more inclusive and sustainable development outcomes.   |
| Rachel Slocum and Alfonso Morales, 2017       | ICT for Participatory Development: A Review of the Literature   | The study provides a comprehensive review of the literature on ICT and participatory development.          | The authors find that ICTs have the potential to promote citizen engagement, transparency and accountability in development processes, but that this potential is often limited by issues of access, power and inequality.  |

|  |   |   |   |
|--|---|---|---|
| <p>Parvathi Jayaprakash and R. Radhakrishna Pillai, 2022</p> | <p>The Role of ICT for Sustainable Development: A Cross-Country Analysis</p>                    | <p>The study conducts an analysis at the country-level to investigate the impact of information and communication technologies (ICTs) on sustainable development. Sustainable development is conceptualized in this study as comprising three dimensions: economic, social, and environmental. Secondary panel data analysis is employed using a dataset that includes 80 countries over the period of 2000-2016. The Seemingly Unrelated Regression Estimation (SURE) method is used to understand the simultaneous relationship between ICTs and the three dimensions of sustainable development.</p> | <p>The findings of the study reveal that information and communication technologies (ICTs) have a significant positive impact on the different dimensions of sustainable development at the national level. However, further analysis using mediation analysis demonstrates that the influence of ICTs is particularly strong on the economic dimension, and the spillover effects from the economic dimension contribute to the realization of the environmental and societal dimensions of sustainable development. These results highlight that the widespread adoption of ICTs in even the most remote countries can serve as a promising opportunity to address the agenda of sustainable development.</p> |
| <p>Tii N. Nchofoung and Simplice A. 2022</p>                 | <p>ICT for sustainable development: Global comparative evidence of globalisation thresholds</p> | <p>The aim of this paper is to examine the impact of ICT on sustainable development and explore the mechanisms through which this impact is influenced. The study focuses on a sample of 140 countries worldwide, spanning the period from 2000 to 2019.</p>  | <p>The results of the study reveal that ICTs have a substantial and positive impact on sustainable development. However, the net effects may vary depending on the measure of ICT, the geographic location of the economy, and the income category. The study recommends that policy makers consider the benefits of ICTs when formulating measures for the sustainable development agenda.</p>   |

|                              |  |  |   |
|------------------------------|--|--|---|
| <p>Shu Wang and al. 2014</p> | <p>Determinants of Information and Communication Technology Adoption in Municipalities</p> | <p>The authors conduct a separate examination of the adoption of two distinct types of information and communication technologies (ICTs): intranet, which is designed to enhance efficiencies within an organization, and e-services, which aim to improve efficiencies for the public and government agencies. The analysis is based on data collected in 2012 from a national random survey of managers in 500 municipal governments with populations ranging from 25000 to 250000</p> | <p>the authors uncover those factors such as organizational centralization, work routineness, and personnel constraints are associated with the adoption of both intranet and e-services, but these relationships are mediated by an organization's risk-taking culture. Additionally, they find that external stakeholder influence has a positive correlation with ICT use. Specifically, governmental stakeholder influence is related to intranet adoption, while non-governmental stakeholder influence is related to the adoption of e-services. This study emphasizes the significance of comprehending the dynamics that drive the adoption of different types of ICTs.</p> |
|------------------------------|--|--|---|

*source: compiled by authors*

## 6. Discussion

Our paper presents a comprehensive synthesis of diverse literature strands, spanning across public administration, urban studies, planning, and computer science, which are relevant to various geographical spaces including smart cities and governance. Our aim is to foster an integrative comprehension of these concepts. Notably, nearly half of the studies we reviewed are from specialized fields that examine the application of information technologies in human interactions, encompassing themes such as government, technology, collaboration, citizen participation, and sustainable development. However, even if the number of articles specifically addressing our topic: *The Interplay Between ICT, Participatory Governance, and Sustainable Development* is limited. The research we have discussed collectively highlights the potential of ICT based participatory governance to promote sustainable development and economic growth. They illustrate how ICTs can facilitate citizen engagement, improve service delivery, promote transparency, accountability and environmental sustainability.

The studies set literature to enhance the understanding of the main concept starting with, governance: participatory/smart one of the examination of its components that are: governmental organization, citizen participation, Citizens can offer useful and helpful suggestions for government agencies to arrive at better informed policy decisions (Al Hujran et al., Citation2013; Stratigea et al., Citation2015; Anttiroiko et al., Citation2014; Singh Kalsi and Kiran, Citation2013) and the use of technology.

Also, they discuss the outcomes of this smart governance based on ICT adoption relatively to the sustainable development integrating social, economic, and environmental values.

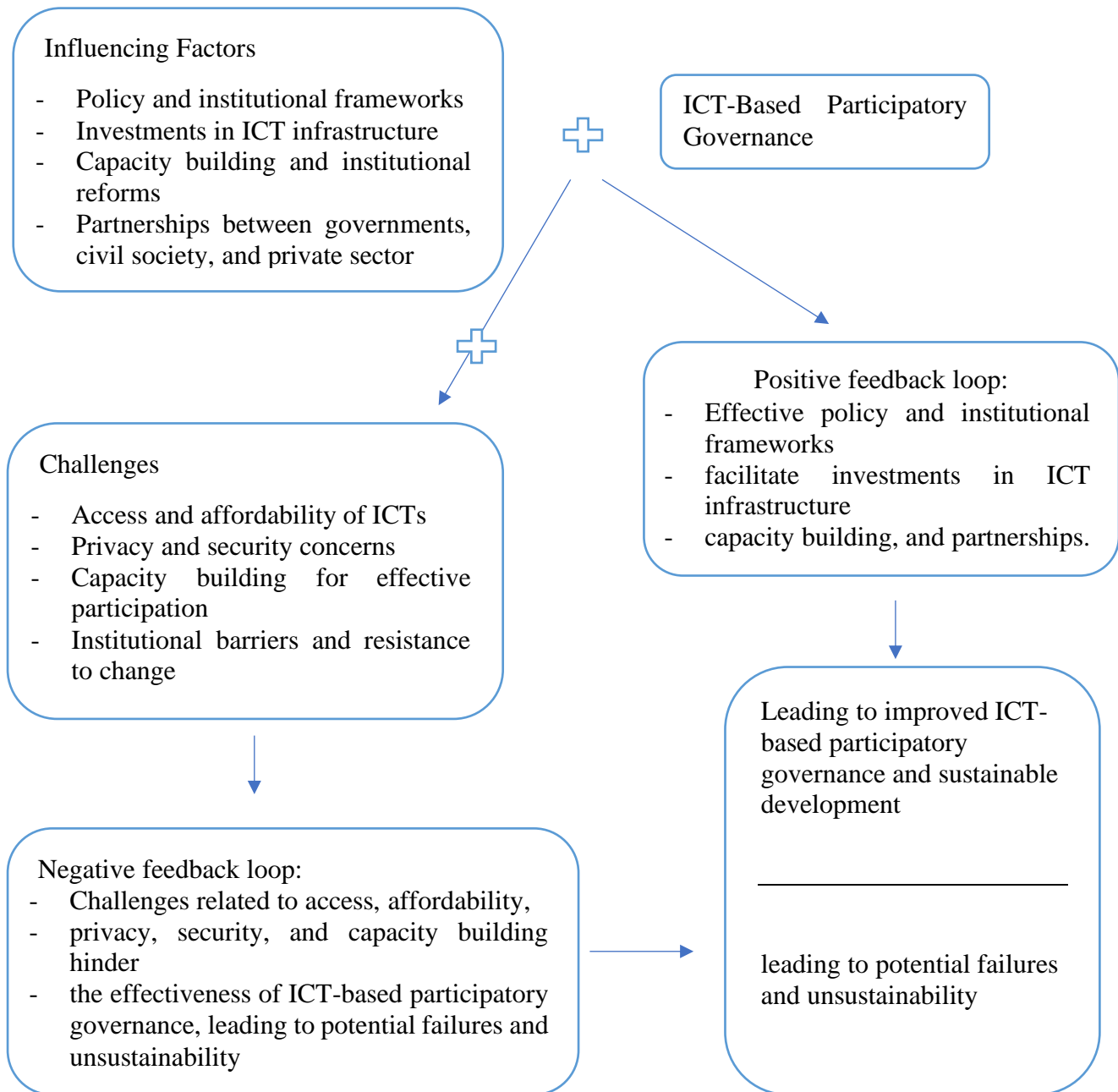
Add to that, those studies, highlight the factors that impact or influence the progress of citizen participation into government actions to arrive to sustainable development and the need for appropriate policy and institutional frameworks to support the development of participatory ICT-based governance, including investments in ICT infrastructure, capacity building and institutional reforms. The studies also shed light on the importance of partnerships between governments, civil society and the private sector to harness the potential of ICTs for sustainable development.

However, these studies also identify challenges that hinder the realization of the full potential of participatory smart ICT-based governance, including issues of access and affordability, privacy and security concerns, and the need for capacity building and institutional reforms.

In the model below (Fig 1) , the concept of sustainable development is integrated as an outcome of effective ICT-based participatory governance. The positive feedback loop illustrates that when policy and institutional frameworks are effective, investments in ICT infrastructure, capacity building, and partnerships can lead to improved ICT-based participatory governance, which in turn can contribute to sustainable development. On the other hand, the negative feedback loop shows that challenges related to access, affordability, privacy, security, and capacity building can hinder the effectiveness of ICT-based participatory governance, potentially leading to failures and unsustainability. The inclusion of the concept of sustainable development highlights the broader societal and developmental goals that ICT-based participatory governance can contribute to, such as economic, social, and environmental development, inclusive and equitable development, participatory and accountable governance, and sustainable use of resources and technology. It underscores the need for ICT-based participatory governance initiatives to align with and contribute to the broader objectives of sustainable development.



*Figure1: Summary of the research findings with the key variables*



*Source: compiled by authors*

## 7. Conclusion

Given the widespread positive reporting of findings that highlight the potential of technology-based government-citizen interactions and its leading to the sustainable development, despite the limited empirical evidence, we were spurred to conduct an in-depth literature review. Our primary aim was to address the existing gaps in knowledge and shed light on the intricate relationship between ICT-based participatory governance and sustainable development, as we sought to answer our main research question.

The initial finding from our study underscores the limited occurrence of participatory governance in the context of ICT-based collaboration between government and citizens for advancing sustainable territorial development. Despite the proliferation of diverse digital tools

for collaboration, literature highlights the prevalence of one-way information provision in citizen-authority interactions. While governments may promote citizen engagement and civic empowerment both online and offline, in practice, large-scale public-citizen deliberation or interaction is not encouraged. As a result, ICT-supported government-citizen cooperation for collectively shaping public affairs remains infrequent. This can be attributed to the lack of capacity and willingness on the part of both government and citizens to actively engage in smart participatory governance for sustainable city development. Existing structures, models, and routines continue to dominate, and the very availability of technological infrastructure does not guarantee a paradigm shift in attitudes.

In conclusion, the relationship between ICT, participatory governance and sustainable development are complex and dynamic, with each concept reinforcing and supporting the others. The use of ICTs to promote participatory governance and sustainable development has the potential to create a more inclusive, transparent and accountable society by empowering citizens to participate in decision-making processes and improving access to services.

However, realizing the potential of ICT-based participatory governance for sustainable development requires careful attention to issues of access, participation, capacity building, and institutional reform. Effective policies and institutional frameworks are needed to ensure that the benefits of ICTs are distributed equitably and that citizens have a greater voice in decision-making processes.

Overall, as we look to the future, what steps can we take to ensure that ICT-based participatory governance is harnessed to its full potential to promote sustainable development and economic growth? How do we balance the benefits of ICTs with concerns about privacy, security and the potential for exclusion? How do we build effective partnerships between governments, civil society and the private sector to leverage the potential of ICTs for sustainable development? These are important questions that we must continue to explore and address as we strive to create a more sustainable and equitable future for all.

## References

- (1). Akpan-Obong, P. I., Trinh, M. P., Ayo, C. K., & Oni, A. (2022). E-Governance as good governance? evidence from 15 West African countries. *Information Technology for Development*, 1-20.
- (2). Al Hujran, O., Aloudat, A., & Altarawneh, I. (2013). Factors influencing citizen adoption of e-government in developing countries: The case of Jordan. *International Journal of Technology and Human Interaction (IJTHI)*, 9(2), 1-19.
- (3). Ali, M. S. B., & Gasmi, A. (2017). Does ICT diffusion matter for corruption? An economic development perspective. *Telematics and Informatics*, 34(8), 1445-1453.
- (4). Bahrini, R., & Qaffas, A. A. (2019). Impact of information and communication technology on economic growth: Evidence from developing countries. *Economies*, 7(1), 21.
- (5). Bonney et al., 2009 Citizen science: a developing tool for expanding science knowledge and scientific literacy
- (6). Certoma, C., Corsini, F., & Rizzi, F. (2015). Crowdsourcing urban sustainability. Data, people and technologies in participatory governance. *Futures*, 74, 93-106.
- (7). Chakrabarty, Aritra 1 June 2015 Technology and Governance: Enabling Participatory Democracy
- (8). Chung 2, C. S. (2015). The Introduction of e-Government in Korea: Development Journey, Outcomes and Future 1. *Gestion et management public*, (2), 107-122.

- (9). Dawes, S. S. (2008). The evolution and continuing challenges of e-governance. *Public administration review*, 68, S86-S102.
- (10). De Guimarães, J. C. F., Severo, E. A., Júnior, L. A. F., Da Costa, W. P. L. B., & Salmoria, F. T. (2020). Governance and quality of life in smart cities: Towards sustainable development goals. *Journal of Cleaner Production*, 253, 119926
- (11). Dickinson, J. L., Zuckerberg, B., & Bonter, D. N. (2010). Citizen science as an ecological research tool: challenges and benefits. *Annual review of ecology, evolution, and systematics*, 41, 149-172.
- (12). Dodge, M., & Kitchin, R. (2013). Crowdsourced cartography: mapping experience and knowledge. *Environment and Planning A*, 45(1), 19-36.
- (13). Effing, R., & Groot, B. P. (2016). Social smart city: introducing digital and social strategies for participatory governance in smart cities. In *Electronic Government: 15th IFIP WG 8.5 International Conference, EGOV 2016, Guimarães, Portugal, September 5-8, 2016, Proceedings 15* (pp. 241-252). Springer International Publishing.
- (14). ferro, E., Caroleo, B., Leo, M., Osella, M., & Pautasso, E. (2013, May). The role of ICT in smart cities governance. In *Proceedings of 13th international conference for E-democracy and open government. Donau-Universität Krems* (pp. 133-145).
- (15). field. *Notizie di POLITEIA*, 27(104), 13-28.
- (16). García-Sánchez, I. M., Rodríguez-Domínguez, L., & Frias-Aceituno, J. V. (2013). Evolutions in e-governance: evidence from Spanish local governments. *Environmental Policy and Governance*, 23(5), 323-340.
- (17). Hafkin, N. (2002, November). Gender issues in ICT policy in developing countries: An overview. In *UN division for the advancement of women expert group meeting on Information and communication technologies and their impact on and use as an instrument for the advancement and empowerment of women, Seoul, Republic of Korea* (pp. 11-14).
- (18). Hanna, N.K. (2010). Implications of the ICT Revolution. In: *Transforming Government and Building the Information Society. Innovation, Technology, and Knowledge Management*. Springer, New York, NY. [https://doi.org/10.1007/978-1-4419-1506-1\\_2](https://doi.org/10.1007/978-1-4419-1506-1_2)
- (19). Hilty, L., Lohmann, W., & Huang, E. M. (2011). Sustainability and ICT-an overview of the
- (20). Islam, M. S. (2008). Towards a sustainable e-Participation implementation model. *European journal of ePractice*, 5(10).
- (21). Jayaprakash, P., & Radhakrishna Pillai, R. (2022). The role of ICT for sustainable development: a cross-country analysis. *The European Journal of Development Research*, 1-23
- (22). Latif, Z., Xin, W., Khan, D., Iqbal, K., Pathan, Z. H., Salam, S., & Jan, N. (2017). ICT and sustainable development in South Asian countries. *Human Systems Management*, 36(4), 353-362.
- (23). Maiye, A., & McGrath, K. (2010). ICTs and sustainable development: A capability perspective.
- (24). Meschede, C., & Henkel, M. (2019). Library and information science and sustainable development: a structured literature review. *Journal of Documentation*.
- (25). Misra, A., Misra, D. P., Mahapatra, S. S., & Biswas, S. (2018, May). Digital transformation model: analytic approach on participatory governance & community engagement in India. In *Proceedings of the 19th Annual International Conference on Digital Government Research: Governance in the Data Age* (pp. 1-7).
- (26). Nchofoung, T. N., & Asongu, S. A. (2022). ICT for sustainable development: Global comparative evidence of globalisation thresholds. *Telecommunications Policy*, 46(5), 102296.

- (27). Nwabueze, A. U., & Ozioko, R. E. (2011). Information and communication technology for sustainable development in Nigeria. *Library Philosophy and Practice*, 1, 92.
- (28). Ogidan, J., Adekola, O., Grace, E., & Oluwanishola, O. (2017). ICT for good governance and socio-economic development in Nigeria. *World Scientific News*, (72), 522-534.
- (29). Schulz, D., & Newig, J. (2015). Assessing Online Consultation in Participatory Governance: Conceptual framework and a case study of a national sustainability-related consultation platform in Germany. *Environmental Policy and Governance*, 25(1), 55-69.
- (30). Soomro, K., Khan, Z., & Ludlow, D. (2017). Participatory governance in smart cities: The urbanAPI case study. *International Journal of Services Technology and Management*, 23(5-6), 419-444.
- (31). Syukri, M. (2022). *Participatory Governance In The New Developmental State: Assessing Its Efficacy For Marginal Groups In Indonesia*. Unpublished PhD Thesis, The University of Western Australia.
- (32). Termeer, C. J., & Bruinsma, A. (2016). ICT-enabled boundary spanning arrangements in collaborative sustainability governance. *Current Opinion in Environmental Sustainability*, 18, 91-98.
- (33). Tomor, Z., Meijer, A., Michels, A., & Geertman, S. (2019). Smart governance for sustainable cities: Findings from a systematic literature review. *Journal of urban technology*, 26(4), 3-27.
- (34). Twinomurinzi, H., Phahlamohlaka, J., & Byrne, E. (2012). The small group subtlety of using ICT for participatory governance: A South African experience. *Government Information Quarterly*, 29(2), 203-211.
- (35). Wang, S., & Feeney, M. K. (2016). Determinants of information and communication technology adoption in municipalities. *The American Review of Public Administration*, 46(3), 292-313.
- (36). Wangwe, S. M. (2007). A review of methodology for assessing ICT impact on development and economic transformation
- (37). Yetano, A., & Royo, S. (2017). Keeping citizens engaged: A comparison between online and offline participants. *Administration & Society*, 49(3), 394-422.