TALLINN UNIVERSITY OF TECHNOLOGY
School of Information Technologies

Hanna Khudyk
184593IVGM

INNOVATING UKRAINIAN PUBLIC SECTOR WITH A HELP OF CIVIC TECH

Master's thesis

Supervisor: Regina Erlenheim
PhD

TALLINNA TEHNIKAÜLIKOOL
Infotehnoloogia teaduskond

Hanna Khudyk
184593IVGM

INNOVATSIOONI LOOMINE UKRAINA AVALIKUS SEKTORIS CIVIC TECHI ABIGA

Magistritöö

Juhendaja: Regina Erlenheim
PhD

Author’s Declaration

I hereby certify that I am the sole author of this thesis. All the materials used, references to the literature and the work of others have been referred. This thesis has not been presented for examination previously.

Hanna Khudyk

Abstract

New technology is being increasingly used by governments to ensure the innovative development of the public sector. Civic Tech has become one of the popular instruments for improving public administration all over the world, since it enables broad democratic participation, make the government more transparent and accountable, improve public services, education, law enforcement and more.

Ukraine has been successfully experiencing the benefits of Civic Tech for the past five years and has become one of the sphere leaders in the CEE region. Now, numerous projects help to connect citizens with a government. However, there are limitations for full-fledged development.

Thought Civic Tech is a high demand topic, and the sector is developing rapidly in Ukraine, there is limited research focusing on real usage in the public sector. Under the main research question "How to innovate public sector in Ukraine with the help of Civic Tech," the author conducted the exploratory case study to overview the state of Civic Tech development in Ukraine, specify main enablers and barriers, and provide recommendations for the further improvement. In total, five interviews with the field experts were conducted. The key findings from the interviews were used to answer the research questions and as a basis for recommendations.

This thesis is written in English and is 97 pages long, including 8 chapters, 9 figures, and 9 tables.

Keywords: civic technology, civic tech, gov tech, government technology, open data, participation.

Abbreviations and concepts

ATC	Amalgamated territorial communities
CEE	Central and Eastern Europe
Civic Tech	Civic technology
DOBRE	Decentralization Brings Better Results and Efficiency
EGAP	E-Governance for Accountability and Participation
E-Governance	Electronic governance
E-Government	Electronic government
Gov Tech	Government technology
IBSER	Institute for Budget and Social and Economic Research
ICT	Information and communication technology
KIIS	Kyiv International Institute of Sociology
NGO	Nongovernmental organization
NPG	New Public Governance
OECD	Organization for Economic Cooperation and Development
OGD	Open Government Data
PAUCI	Polish-Ukrainian Cooperation Foundation
PB	Participatory budgeting
PPP	Public–private partnership

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1. Introduction

1.1. Overview of the research

Modern technology has the potential to drastically alter the way citizens interact with the government and each other by providing them effective instruments for communication and collaboration (Borins 2008). Cooperation with citizens helps public authorities strengthen communities and improve governance (Ebstein et al. 2006). Considering that, more and more states all over the world start to leverage technology to increase civic participation in decision making. The number of newly developed e-instruments for citizen engagement has risen sharply during the last years (Van Ransbeek 2020). This growing cluster of activity has become known as "Civic Tech" (Knight Foundation 2013).

The field of civic technology is developing rapidly and attracts the attention of multiple stakeholders. Governments, NGOs, investors, citizens, media, and other actors understand the potential of a newly emerged field and start using Civic Tech for creating a societal impact (Gilman 2017; Shiramatsu 2016; Shaw 2018).

Effective use of civic technology can enable broad democratic participation, make the government more transparent and accountable, improve public services, education, law enforcement, accelerate the state innovation process, and increase the investment attractiveness of state-owned companies (Гурський 2018). Besides, it can provide a vast field of opportunities for the public to access the data, which can be used for journalist investigations or the development of open data based instruments for citizens, and much more (McNutt et al. 2016; Shiramatsu 2016; Wilson and Chakraborty 2019).

Ukraine is a country that is currently undergoing numerous profound reforms and thus needs a more transparent, efficient, and accountable public sector (Лопушинський 2018). Civic Tech instruments allow the public to keep their politician accountable by accessing governmental information, controlling government spending freely, and participate in decision-making processes (Rumbul 2015). Such transparency, in turn, leads to numerous benefits, one of which is the reduction of corruption, which has always been one of the most significant problems in Ukraine and helps to raise the trust of the citizens. Therefore, the possibilities of Civic Tech have never been more urgently needed.

Ukraine started its way towards the digitalization of public sphere at the early 2010s, aiming at improving the mechanism of public administration and regulation, streamlining of management activities, and creating of the favorable innovation environment in the system of public administration (Луциків, Сороківська та Котовська 2017). Civic Tech was one of the first sectors which emerged on the wave of innovation. Such a situation was triggered primarily because of the open data reform, which started in 2014 (Karelin 2020). Now, this sphere is developing quite dynamically, despite the novelty. Today Ukraine is considered to be a market leader in civic tech sphere in Eastern Europe (Гурський 2018).

Thought Civic Tech is a high demand topic, and the sector is developing rapidly in Ukraine, there is no research focusing on the general development of this sphere in Ukraine. EGAP, Center for Innovations Development and other NGOs constantly publish studies and analytics of the e-governance and e-democracy development. Some authors overview separate Civic Tech projects. For instance, Dmytro Khutkyy and Kristina Avramchenko research the influence of participatory budgeting in Ukraine (Khutkyy and Avramchenko 2019). However, there is no case study concerning the current state of the Civic Tech sector, enablers, and limitations for its development. Such a study would help to understand the prerequisites and success factors for the field's growth as well as the problems that may occur. Consequently, this knowledge might be applied by the governments or other stakeholders to boost the development of the Civic Tech sector both in Ukraine and abroad. Therefore, this fact was used by the author as a justification for the research.

1.2. Research problems and questions

Considering the fast growth and positive results of Civic Tech sector development in Ukraine, the author argues in need to research this topic. The case study will help to understand the prerequisites leading to the success of Civic Tech projects, identify the main involved stakeholders as well as existing limitations. By collecting this information, the author will be able to provide recommendations for facilitating the field's development and formulate the model that could be later implied by the other countries. Besides, the suggestions would also be beneficial for the Civic Tech activist who plan to launch their projects.

For that purpose, one main research question and three sub-questions were identified by the author.

Answering these questions will help to understand:

How Civic Tech is used to innovate the public sector in Ukraine,

, - which formulates the main research question. Mainly, the answers will provide a better understanding of the success factors of Civic Tech sector development in Ukraine by figuring out the main drivers and barriers, and how the future of this sphere is envisioned. Ukrainian example can be beneficial for countries with a similar background, which are looking for guidance on the topic.

The following sub-questions which are aimed to be answered in frames of the thesis are given below:

1. *What enables innovations in the public sector?*

The sub-question aims to understand the general methods of innovating the public domain, find out its main drivers and barriers.

This question is answered by conducting a literature review and analyzing a theoretical background.

2. *How can Civic Tech be used for innovating the public sector?*

The sub-question aims at understanding what Civic Tech is, how it is different from the Gov Tech, what are its main characteristics, components, and how it can be used for innovating the public sector.

Answering this question will help to determine the possibilities of Civic Tech implication as well as the benefits it provides.

Theoretical background analysis and literature review will be used to answer the question.

3. *How are Civic Tech initiatives implemented in Ukraine?*

This sub-question aims to study the way Civic Tech initiatives are being implemented in Ukraine. Besides, it will determine the role and the main concerns of government, NGOs, civil society, and other stakeholders in its development, as well as

identify the significant limitations and enablers of the Civic Tech sector's growth in Ukraine.

The following question will be answered by formulating, describing, and analyzing the case study, which will allow providing recommendations for improvements that might be used in theory and practice, and future research perspectives. The interviews with Ukrainian experts in the field will be used as a supportive tool for answering this question.

4. *What are the limitations of Civic Tech development in Ukraine?*

Answering this sub-question will help to bring out the main barriers for the Civic Tech development in Ukraine. This information will help to understand the current limitations and will be used to provide recommendations for the further development of the sphere.

The following question will be answered by conducting expert interviews.

1.3. Research methodology

The current chapter aims to provide an overview of the research method used in the thesis. The chapter will explain the motivation behind choosing this specific approach, how it will contribute to achieving desired outcomes as well as its potential limitations.

Saldivar et al define Civic Tech as technology that facilitates democratic governance among citizens (Saldivar et al. 2017). It is believed that Civic Tech has a significant, positive impact on the world since it helps to understand the citizens' needs and provides them with the possibility to take part in the decision making, which, in turn, make government services more equitable, efficient and effective (Blank 2017). The potential of Civic Tech instruments to increase citizen engagement, government's transparency, and broaden public debate has been recognized not only by the civil society, but governments, development agencies, and philanthropists (Rumbul 2015).

This thesis will analyze the Civic Tech sphere in Ukraine to find out the drivers and barriers for its development and to provide recommendations for further improvement. An exploratory case study methodology was selected for conducting the research.

Yin defines a case study as an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident (Yin 2018).

A case study is a commonly used research strategy in areas such as psychology, sociology, political science, social work, business, and community planning (Runeson 2012). In these areas, case studies are conducted with the objectives of not only increasing knowledge but also bringing about change in the phenomenon being studied. Case studies help to recognize and understand an existing phenomenon in order to compare, extract strategic information, or get inspiration (Runeson 2012).

Klein and Myers define three types of case studies depending on the research perspective: positivist, critical, and interpretive (Klein and Myers 1991). The last one will be applied to the research. This perspective tries to understand phenomena through the participants' interpretation of their context, which correlates with Robson's exploratory and descriptive types (Robson 2002). In his understanding, exploratory type aims at finding out what is happening, seeking new insights, and generating ideas and hypotheses for further research, while descriptive tries to portray the current state of a situation or phenomenon.

For the purposes of the research, the inductive strategy was selected, meaning that the theory was induced from the observations (Runeson 2012). The current situation was observed and analyzed, and then the patterns were identified. Later this information was used the formulate a generalized theory (Burney and Saleem 2008).

With regards to data collection techniques, first-degree (semi-structured interviews) and second-degree (previously conducted interviews by Ukrainian journalist) methods were used (Lethbridgen et al. 2005). First-degree methods include those that involve direct contact with the interviewees and real-time data collection process. Second-degree methods include the collection of raw data without interaction with interviewees. This technique was chosen to allow better control over the data being collected and provide better context understanding (Runeson 2012). Semi-structured interviews serve exploratory and descriptive objectives of case-study research by providing a qualitative and quantitative description of the phenomenon by individuals (Robson 2002).

For the purpose of this research, five interviews with the Ukrainian field experts were conducted. The interviews were held in Ukrainian with one person choosing to communicate in Russian, which allowed to avoid possible translation mistakes due to

insufficient language knowlenge. Four interviews were conducted via Skype, while one respondent preferred to provide the written answers.

The interviewees were divided into several categories – governmental and NGO's and incubator representatives - to achieve a better understanding of the phenomenon and get different views on the current situation.

Interview questions were built aiming to identify the main enablers and barriers for the Civic Tech development in Ukraine, and the possible solutions. Interviews were digitally recorded and later manually transcribed into text and coded before further analysis. Coding was conducted based on the three main questions (enablers, barriers, and recommendations). Later the nodes were identified on the basis of interviewees' answers.

The list of the interviewees is presented below.

Table 1 List of the interviewees

№	Interviewee	Length of the interview
1	Serhii Karelin, Project Coordinator on E-Democracy at EGAP	28:23
2	Kateryna Borysenko, Head of R&D Department at SocialBoost	44:50
3	Sofia Sakalosh, Regional Coordinator at EGAP	26:18
4	Eugeniy Poremchuk, Co-founder of RozumneMisto; Technical Advisor to Ministry of Digital Transformation	50:55
5	Karina Litvinova, Researcher and Project Coordinator at Center for Innovations Development; E-Democracy Expert at Reanimation Package of Reforms	Written answers

Explanation building has been chosen as a primary technique to analyze the results of interviews (Yin 2018). This technique allows researchers to understand the cause-effect relationship that led to the emergence of a specific phenomenon. With regard to this study, such an explanation building allowed the author to draw firm conclusions.

Since this is exploratory research, future analysis and outcomes will allow formulating the problems, clarifying them, and creating hypotheses on possible solutions, recommendations, or frameworks (Runeson 2012).

The results of the research may be later implied to improve the state of the Civic Tech development in Ukraine or other countries. Besides, it can be used as a foundation for further research.

The author recognizes that the study is subject to limitations. The single case study may be insufficient for generalizing an outcome. Besides, the reliability of single case studies is often criticized, considering the subjective nature of the research (Willis 2014).

This case study may also contain a bias toward verification as different stakeholders interviewed for the research represent their interests, and their opinions may greatly vary (Flyvbjerg 2006).

Besides, considering the fact that the research was conducted just on the Ukrainian examples, the final results of the study may be too area-specific and not applicable in other contexts (Yin 2018).

2. Theoretical background

This chapter presents a theoretical description of the core concepts that underlie the subject of the thesis. This chapter aims to lay a theoretical background of public sector innovation, open data, and Civic Tech and show the interconnection between these concepts

2.1. Public sector innovation

In the age of digital technology, the implementation of innovative approaches towards public administration is becoming inescapable. Public authorities all over the world are working on the conceptual vision and strategy for the formation of new effective governance (Moore and Hartley 2008; Micheli et al. 2015). Considering the high turbulence and increasing uncertainty of the political arena, now it is highly important to guarantee an effective, innovative public service system capable of adjusting to changing conditions. Understanding the innovative nature of the public administration system is primarily determined by the understanding of the basic concepts that characterize this phenomenon, and "innovation" is one of them.

2.1.1. Understanding innovation

The concept of "innovation" is rather multidimensional and is widely used in the economic and technical fields. At the same time, it is applied to public administration less frequently (Albury 2010; Demircioglu and Audretsch 2017). Such a situation can be explained by the fact that during the last decades, a lot of research has been conducted in the sphere of private-sector innovations, while the discussions about public sector innovations are relatively new (Borins 2001, Bugge and Bloch 2016).

In general, multiple definitions of innovation were proposed by the researchers. For instance, Lynn says: “Innovation must not simply be another name for a change, or for improvement, or even for doing something new lest almost anything qualifies as innovation. Innovation is properly defined as an original, disruptive, and fundamental transformation of an organization's core tasks” (Lynn 2008).

David Albury, at the same time, defines successful innovation as the creation and implementation of new processes, products, services, and methods of delivery, which

result in significant improvements in outcomes, efficiency, effectiveness, or quality (Albury 2010).

On the contrary, Sørensen and Torfing argue with the assertion about the indispensable positive results of the innovation process. In the book "Enhancing Public Innovation by Transforming Public Governance" the authors claim: "the innovation is an open-ended and heuristic process that relies on imagination, intuition, chance discoveries and unacknowledged conditions that make it extremely difficult to plan and control and impossible to predict the result" (Sørensen and Torfing 2011). Therefore, the innovation process itself does not guarantee any positive improvements. Innovation changes the way organizations work; however, in most cases, the success of such activities depends on a subsequent subjective post evaluation by the affected parties. Consequently, the authors propose to define innovation as an "intentional, yet inherently contingent, a process that involves the development and realization of new and creative ideas that challenge conventional wisdom and break with established practices in a particular context" (Sørensen and Torfing 2011).

To simplify the understanding, we can also use the most general notion of innovation proposed by Rogers, who is the author of diffusion of innovation theory, which he defines as something new to the system of interest (Rogers 1962). In his study, Rogers Rogers highlights five factors that are important for the faster diffusion of innovations: trialability (the ability to try before committing), compatibility (with existing practices), relative advantage, complexity, and observability.

In this work, the author analyzes the concept of a public sector innovation; the two last notions of innovation will be applied as a basis to simplify the understanding of the concept.

2.1.2. Understanding public sector innovation

When we talk about public sector innovation, usually it is understood as new forms and methods of work of public authorities, new management technologies, approaches and tools used to solve emerging problems, as well as a partnership style of relations between public authorities, private sector and citizens (Moore and Hartley 2008). It can be new or transformed organizational structures, financial, information, legal and other mechanisms of public development management, approaches in the interaction of public authorities with the public and business, etc. (Луциків,

Сороківська, Котовська 2016). Such innovations can help to improve service delivery, as well as reclaim some legitimacy of government as a value-creating institution, by being more responsive to the needs and aspirations of citizens and users of services (Moore and Hartley 2008).

Hartley says that innovation can boost a special kind of change that is commonly referred to as 'step-change' (Hartley 2005). Therefore, 'public sector innovation is not only some minor day-to-day changes done to improve the functionality of the public but at the same time, it is not a "revolutionary transformation" meant to replace an entire system of action with a new one" (Hartley 2006; Osborne and Brown 2011). The step-changes usually mean mixing some existing ideas and practices with each other and new ones, which result in a change of the overall design, functionality, logic, or impact.

When we talk about the difference between public and private sector innovations, we should understand several aspects. First of all, such innovations are implemented above the organizational level, which means dealing with corporate networks that include numbers of actors. As we see in Figure 1, the public innovation system is rather complicated. In order to implement even the slightest innovation public authorities must take into consideration the interests of all the involved parties and come to the joint agreement, which usually makes the innovation process troublesome. Besides, innovations result in the transformation of complex social systems rather than changes solely within a particular organization.

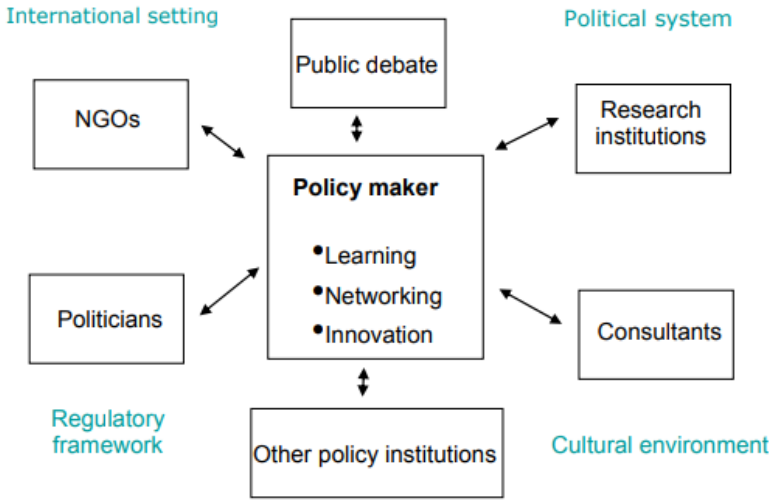

Figure 1 The public system seen from the perspective of the policymaker (Publin Report 2005)

Secondly, most of the public innovations imply incremental changes meant to improve the citizens' lives and performance, in contrast to "radical" or "systemic" innovations in the private sector (Albury 2010). In addition to this, the diffusion of innovation in the public domain is much slower and more difficult than in the private sector since the transformation of public services is more complex and takes longer (Albury 2010).

Another thing that differs the public and private sector innovations is that it highly depends on political power and budgeting. Such a dependency limits the number of executed projects and can result in the implementation (Publin Report 2005). Besides, innovations in the public sector have a high price of failure. Private companies can easily take risks while governmental bodies feel more reluctant to take such a responsibility.

Victor Bekkers and Mirko Noordegraaf point out several models of public sector innovation – two main ones, which are sometimes called "ideal type", and two modern alternative models (Bekkers and Noordegraaf 2016).

The first model is called an "enforced innovation". In such cases, public sector innovation is seen as a matter of intended innovation that is initiated by the top-down actions and is supported by the governmental agendas.

The authors distinguish three forms of enforced innovation (Bekkers and Noordegraaf 2016):

- Innovation that focuses on facilitating the development of local initiatives and experiments and sharing the knowledge gained from it.
- Innovation that focuses on the creation of collaborative networks where stakeholders have the same vision of future projects developed for the sake of public interest.
- Innovation that focuses on top-down management activity. In such a case, top management of the country has a vision of the future state's development, knows what is happening outside the organization, and understands the risks of the implemented changes.

Having analyzed these three forms, we can conclude that they have a different emphasis on the primary "facilitator" of innovation. The first one aims at boosting innovation by helping various local incentives in order to start, providing them with possibilities to get funding, legal consultancy, or sharing needed knowledge. In the second form, innovation is organized based on a collaborative market model that works by the

demand and supply rules, meaning that innovation is produced for the demand of problem owners. The third form sees innovation as one that can be steered and controlled by governmental executives.

The second model is called “free innovation”. In this model, public “innovation is initiated by bottom-up actions and organically embedding innovation in work routines, procedures and process, backed by service and client interests” (Bekkers and Noordegraaf 2016). The public interest can be incited by personal motives of the citizens, as, for instance, financial or professional interests, or also can be rooted in the civic position and interest in improving the quality of the governance in the country (Bekkers and Noordegraaf 2016).

In general, free innovation can be characterized by the following statements:

- It emerges from daily contacts of public workers with citizens who are identified as clients and is characterized by the application of specific procedures, processes, and formats.
- There is a strong connection between work and innovation highly dependant on social interactions and bias.
- It is focused on accumulating (layering) multiple improvements, which results in the development of new and redesign of previous routines.

In addition to the main public sector innovation models that were described formerly, Bekkers and Noordegraaf propose two alternative models, since nowadays, it is difficult to find a clear example of one of the main models. The enforced model can be set against the free model; top-down innovations can be set against bottom-up innovations leading to a mixture of the methods and approaches towards the public sector innovation, which can also be called hybridization (Kurunmäki 2004). Considering that, “focused” and “guided” innovation models, which encompass different couplings between organizational and professional principles, were introduced (Bekkers and Noordegraaf 2016).

In focused innovation, professionals are dominant, meaning that their work practices are the source of innovation. Such people want to innovate their working processes and are focused on the result. For instance, we can illustrate this model by the example of school teachers who constantly innovate their teaching methods to improve the results of their students.

In general, focused innovation is characterized by the following statements (Bekkers and Noordegraaf 2016):

- Innovation is part of professional work.
- Constant cooperation between the professionals, internal and external stakeholders (with and between each other).
- The implication of various methods for improving and diffusing innovations.
- Management aims at creating an infrastructure suitable for maintaining the existent and boosting the development of future innovation.
- Importance of professional education to develop the innovative skills of the workers.

In guided innovation, managers play an essential role as well; however, they do not have direct intends to steer or control innovative processes (Bekkers and Noordegraaf 2016). Civil servants are seen as those who can define multiple innovative problems and ways of tackling them. Managers, in this case, just allow any of the possible ideas to develop while orchestrating the servants in specific directions.

In general, guided innovation is characterized by the following features:

- Awareness of the fact that innovation cannot practically be executed in a top-down manner.
- Importance of organizational practices that can be implied as a source of innovation.
- Enhance inter-organizational interactions in order to activate innovative potential, often with the help of modern ICT capabilities.
- Giving the workers a possibility to find their solution to the identified problems.

All four models can be represented in the following schema (Figure 2) presented below.

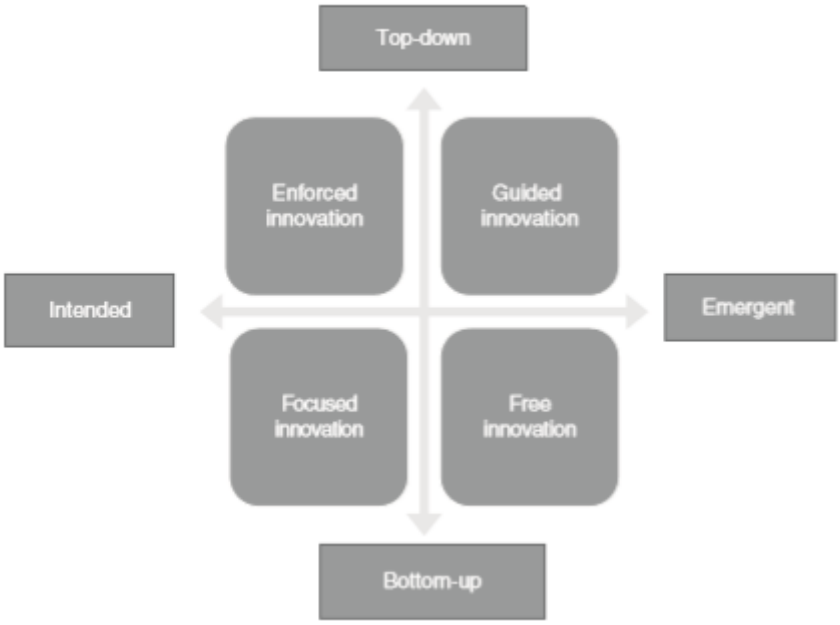

Figure 2 Models of public sector innovation (Bekkers and Noordegraaf 2016)

Each of these models can be applied depending on the context. In certain organizational and work settings, enforced and free innovation can still occur and bring positive results (Bekkers and Noordegraaf 2016). At the same time, the application of the focused and guided innovation models does not necessarily lead to better outcomes, since it vastly depends on the type of professionalism involved. Therefore, state's country managers who want to implement some innovation do not have to choose one of the models but need to take into account the specific context and decide on the best applicable features from the models.

2.1.3. Drivers and barriers

Considering the apparent advantages of public sector innovations, it is gaining popularity among the government all over the world. Such a trend can be illustrated by the growing interest of states and international organizations. For instance, in 2019, 41 countries adhered to the OECD Declaration on Public Sector Innovation, which notes countries commitment to actions under five headings (OECD 2019):

1. Embrace and enhance innovation within the public sector
2. Encourage and equip all civil servants to innovate
3. Cultivate new partnerships and involve different voices

4. Support exploration, iteration, and testing
5. Diffuse lessons and share practices.

In order to facilitate public sector innovation, the following drivers may be applied (Publin Report 2005):

1. Problem-oriented drivers
2. Non-problem oriented improvement
3. Political push
4. Growth of innovative culture
5. Support mechanisms for innovation
6. Capacity for innovation
7. Competitive drivers
8. Technological factors

Classification by the MEPIN Report, in turn, includes (Bugge et al., 2011):

1. Internal-management
2. Internal staff
3. Political driving force
4. Public organizations
5. Business
6. Citizen

Agolla et al. have also identified several drivers to public sector innovation. The authors state that the main internal drivers of public sector innovations are organizational strategy, organizational climate, strategic leadership, entrepreneurship, and intangible resources (Agolla et al. 2013). Besides, the study also defines external drivers to public sector innovations, which include political, economic, social, technological, ecological, and legal factors. The conceptual framework for public sector innovation is illustrated in Figure 3:

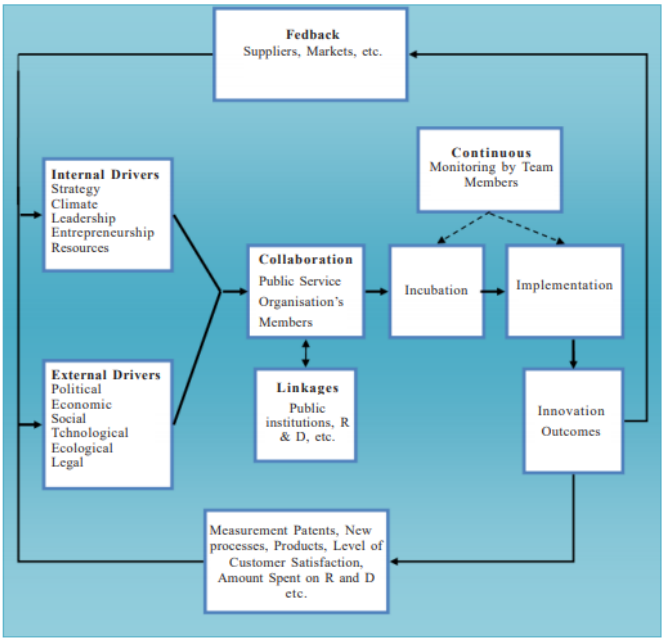

Figure 3 Conceptual framework for public sector innovation (Agolla et al. 2013)

All of these factors help governments to boost innovation. The major ones include political push, public oraganizations, technological factors, and citizens. However, it is not enough to just innovate random areas, and it is highly important to make it qualitatively. For that purpose, five significant characteristics of these successful innovations should be applied (Borins 2006):

- the use of a systems approach
- the use of new information technology
- process improvement
- the involvement of the private or voluntary sectors
- empowerment of communities, citizens, or staff

The use of information technology and the involvement of private and voluntary sectors, as well as the empowerment of citizens, are the essential factors in the contest of this work and are going to be discussed in more detail.

Despite the general popularity of public sector innovation and availability of drivers, some of the governments experience significant problems with implementing innovation in the public domain because of the multiple barriers which can appear on the way. Success factors can facilitate change; however, obstacles need to be overcome in order to foster effective change.

Researchers identify quite a lot of problems of introducing innovations in the field of public administration, which are associated with various aspects of the activities of employees, management features, prevailing cultural and business traditions, etc.

The Publin report (2005) highlights the following barriers towards the innovations in the public sphere:

1. Size and complexity
2. Heritage and legacy
3. Professional resistance
4. Risk aversion
5. Public/political profile and accountability
6. Need for consultation and unclear outcomes
7. Absence of resources
8. Technical barriers

At the same time, the MEPIN study proposes the following barriers (Bugge et al., 2011):

1. Lack of flexibility in the law
2. Lack of incentives
3. Lack of funding
4. Risk of failure
5. Lack of cooperation in the organization
6. Internal barriers (time or incentives)
7. External barriers (rules, suppliers, resistant users)

Considering the risks, governments should think of the best strategies to implement innovations. Delegation of the "innovation functions" to the private sector or cooperation with non-governmental organizations is one of the possible solutions.

Thus, the rise of the new forms of governance has resulted in significant changes in the relationship between the public and private sectors (Christensen and Lægreid 2007; Torfing and Triantafillou 2013). This change resulted in the increased involvement of the individual actors and new formats of public-private cooperation (Petersen et al. 2017).

Today, the new forms of public-private collaboration that are able to deliever efficient public services and enhance the public sector innovation are on demand (Moore 1995, Das Aundhe and Narasimhan 2016). Therefore, governments seem increasing to engage deliberately and actively in civic innovation through collaboration and

partnerships. The view on public innovation has thus evolved from one regarding it as external to public service delivery to one regarding these interactions as internal to public service delivery (Petersen et al. 2017). Thus, the active engagement of the public sector can substantially spur innovation if there is a collaborative effort on dimensions other than mere efficiency gains.

In this context, Civic and GovTech is an excellent example of the partnership between the state, NGOs, businesses, and citizens. Therefore, these notions will be discussed in the following sub-chapter.

2.2. Defining Civic and Gov Tech

During the last couple of years, "Civic Tech" (civic technology) and "GovTech" (government technology) have become popular notions often used to describe innovations in the public field (Saldivar et al. 2017). Despite the growing popularity, not many people can draw the line between those two terms and clearly differentiate their meaning. The concepts of Civic and GovTech are close in some of the applications. However, they serve for different purposes, which makes it logical to single them out in separate areas.

2.2.1. Understanding of Civic Tech

Researchers have referred to Civic Tech from both government-centric and citizen-centric perspectives (Saldivar et al. 2018). The first one defines it as the "use of technology by cities for service provision, civic engagement, and data analysis to inform decision making" (Cities 2012). The second one, on the other hand, presents it as "platforms and applications that enable citizens to connect and collaborate with each other and with the government" (Suri 2013).

At the same time, the International Data Corporation report defines civic tech as "merging technology innovation with civic purpose" (International Data Corporation 2014).

In general, Civic Tech is a new and still evolving concept, which represents a system that combines the following components (McNutt et al. 2016):

1. ICTs, including the Internet, the social media, Web 2.0 applications and practices made possible by the Internet;
2. Open civic data that support the technology;
3. The social methods of collaborative governance, open organizing and problem solving that make use of and help to realize the potential of the enabling ICT and open-data innovations;

According to the authors of the article, Civic Tech is built on these three pillars, which help to effectively develop public sector innovations that are later transformed into constructive civic action (McNutt et al. 2016). The combination of these elements creates a system that enables different actors to take part in decision making. In fact, the components may be available independently; however, all of them are needed for developing an effective Civic Tech (McNutt et al. 2016).

The Knight Foundation divides civic technology into two categories: an open government which focuses on advancing government transparency, accessibility of government data and services, and civic involvement in democratic processes (transparency, accountability, open data, public feedback, etc.) and community action that cover peer-to-peer information sharing, civic crowdfunding, and collaboration to address civic issues (neighborhood organizing, civic or community groups, etc.) (Knight Foundation 2013).

In general, civic technology is a complex phenomenon that includes different stakeholders and areas of social activity. The basic components are illustrated in Figure 4 (Stempeck 2016).

Figure 4 Civic Tech's components

In addition to the components listed on the figure, Civic Tech also includes and is dependent on the business side. It is, in most cases, represented by the technology companies. The business provides valuable data that can be used for the projects' creation while technology companies help to develop the products.

The next chart (Figure 5) provides a more detailed list of the involved assets and processes (Knight Foundation 2013).

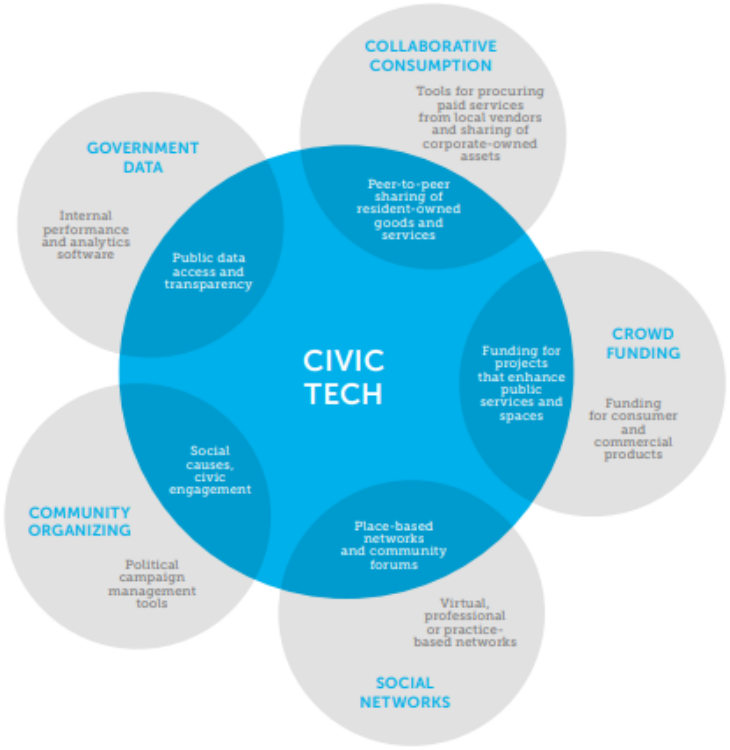

Figure 5 Civic Tech's components (extended)

Online communities are one of the key actors since they initiate the creation of civic platforms and provide new ideas through the social networks, stakeholder mobilization and collaborative activities (Mačiulienė and Skaržauskienė 2019).

In general, modern Civic Tech is located somewhere at the intersection of previously distinct fields, such as government, politics or journalism, and ICT. Each of the sections holds a vast potential for boosting the C2G and G2C collaboration (Stempeck 2016).

To summarize, Civic Tech largely depends on relationships with government, business, non-profit organizations, and citizens. Each of the stakeholders plays a vital supportive role in the development of the sphere. Thus, the government and business

provide an incentive for the projects' development, NGOs and incubators help to realize them and citizens use the benefits for their purposes.

Considering the number of actors involved in the Civic Tech sphere and its general complexity, the multiple tools exist to satisfy the needs of all the parties.

Matt Stempeck, the director of Civic Technology on Microsoft's Technology & Civic Engagement team, defines the following Civic Tech categories in his article (Table 2).

Table 2 Variations of Civic Tech (Stempeck 2016)

Crowdfunding platforms	Group decision-making tools
Benefit navigation tools	Ideation tools
Campaign organizing platforms	Issue reporting platforms
Check-in tools	Legislation engagement platforms
C2G communication tools	Mapping platforms
Crowdsourced data collection	Marketplaces and Clearinghouses
Data schemas and standards	Neighborhood forums
Data visualization tools and platforms	Online petition sites
Event organizing tools	Open Data publishing platforms
Freedom of information tools	Opinion matching platforms
G2C communication tools	Resource matching or sharing sites
Group communication tools	Sensors

As can be seen from the table, Civic Tech can provide the instruments for different purposes as well as for different stakeholders. However, Civic Tech is so much more than tools and platforms and the groups who make them. The Civic Tech also includes various social processes that are needed for delivering impact (Stempeck 2016). These processes can be categorized in the following way:

1. Convene (civic hacking meetups, roundtables, working groups, conferences, networks, etc.)
2. Inform (journalism, blogs, online forums, educational programs, research centers, workshops, etc.)

3. Build (innovation teams, labs, accelerators, incubators, tech companies, open governance initiatives, competitions, etc.)
4. Agitate (politics campaigns, artistic interventions, investigative journalism, etc.)
5. Codify (field definitions and governance, playbooks, and design principles, toolkits, etc.)
6. Support (accelerate public sector work, fellowship programs, etc.)

Interestingly, most of these activities are executed by the representatives of civil society organizations, such as CitizenLab, Civic Makers, SocialBoost, 1991 Civic Tech Centre, PopVox, and many others (The Civic Tech Field Guide, Poppert 2018).

For this matter,Rumbul has well noted: “The rise of civic technology in this new millennium has been organic and profound. It has not been led by politicians or corporations, nor by powerful knowledge-rich institutions or NGO's, but by individuals and loosely constituted groups with specific digital expertise and an interest in getting things done.” (Rumbul 2015, p.2).

Such interest can be explained by the fact that the implementation of CivicTech solutions helps reduce corruption, increases citizen involvement in the decision-making process. Often these aspects are ignored by the governments, especially in developing countries, which are not interested in the disclosure of their activity or spending. In such cases, Civic Tech becomes a valuable instrument in the hands of active citizens who, with its help, can influence decision-making.

To conclude, Civic Tech can be defined as the use of technology for the public good. Since the notion is quite generic, Civic Tech is often confused with a GovTech, which represents a similar set of instruments. Therefore there is a need to separate these terms.

2.2.2. *Understanding of GovTech*

When it comes to the GovTech, it is highly important to understand how it differs from the Civic Tech since sometimes it is difficult to grasp.

Researchers have several approaches to differentiate the terms. For instance, Hollie Russol Gilman (2007) assimilates the difference between GovTech and Civic Tech notions to the difference between e-government and e-governance. In the paper, Gilman uses Civic Tech mostly in the context of collaborative governance, defining it as

“technology that is explicitly leveraged to increase and deepen democratic participation” (Gilman 2017). At the same time, the author defines the GovTech as “application of technology to improve government efficiency or to modernize systems” (Gilman 2017).

The differences between these technology areas were described in detail by the CitizenLab (Ransbeek W. 2019). The main difference is that the final beneficiaries in Civic Tech are citizens, and in GovTech - governments. The goal of CivicTech projects is to engage people in solving various issues, while GovTech tools are usually created in order to improve the operational efficiency of government structures. So, the aim of GovTech is to increase the government’s efficiency by digitalizing the processes or providing new e-instruments (Ransbeek W. 2019). At the same time, the primary beneficiaries of the GovTech are governments.

Civic Tech tools can be used either by governments to communicate with citizens, or independently of governments by civil society organizations or even independent citizens.

Civic Tech allows citizens to collaborate with their government, which empowers them and results in social change (Ransbeek W. 2019). Civic Tech also provides governments with a better understanding of what their citizens’ need and wishes.

The difference between the terms can be illustrated in the following table:

Table 3 Comparison of Civic and Gov Tech (Ransbeek W. 2019)

Civic Tech	GovTech
Citizens as beneficiary	Government as customer
Community-centric	Operation-centric
Engagement	Efficiency

It is important to understand that Civic Tech helps increase legitimacy enabling citizens to take part in the decision-making, while GovTech directly increases the efficiency of government (Ransbeek 2019). Therefore, Civic Tech and GovTech should be seen as complementary tools as they work best when combined. Thus, Civic Tech ensures collaboration with citizens, while GovTech helps the authorities efficiently respond to these matters.

Civic technologies offer a potential solution to the concerns that citizens may hold in government-run digital services. In the majority of cases, civic technologies, which are run by NGOs, seek to provide citizens with an ability to engage with their governance in

a digital understandable for the user (Ransbeek 2019). It can be done in a contacting form when the citizen interacts with an official individual or in a citizen audit role when the citizen can receive and review official information regarding the government's activity.

To conclude, GovTech is determined by the intended user (which in that case is government), while civic tech is determined by the expected outcome (Sotsky and Kartt 2018). Therefore, we can say that "Civic Tech and GovTech are neither mutually exclusive nor perfectly overlapping" (Knight Foundation 2017). Gov Tech includes a number of technologies used by governments to increase the efficiency of its internal operations, while Civic Tech instruments most often include a citizen-facing component.

2.3. Open Data for Civic Tech solutions

Public authorities produce vast amounts of data every day (Bertot, Jaeger 2010). By making their data sets available to citizens, government agencies become more transparent and accountable (Amichai-Hamburgeret al. 2008, Kallberg 2011, Lakomaa et. Al 2013). By encouraging the use and free distribution of datasets, governments are helping to create innovative businesses and citizen-centered services. Open government data is reported to be one of the main ways the government can act as a "platform" (Transparency.org 2018).

When discussing this concept, it is important to distinguish between "open data" and "open government data" since they often can be misunderstood or misinterpreted.

Thus, the concept of open data refers to data that is open and provided by any source. At the same time, open government data directly relates to open data that is created and published by public authorities (Ubaldi 2013)..

Open Government Data (OGD) can be used for various purposes and by different actors.

The Open Data Study (2010) finds that for the successful implementation of any OGD program, three key societal groups are highly relevant (Dietrich 2015):

1. First layer - an active civil society that initiates changes in public policies using the means of traditional advocacy and by introducing innovative websites and instruments that demonstrate the efficient ways of OGD's use. At the same time, civic users of open data can be divided into three main groups: advocacy organizations and the media; civic tech incubators and academia (Davies et al. 2019).

The importance of engaged civic society was also claimed in World Bank's methodology to assess the readiness of a country to implement an OGD initiatives "Open Data Readiness Assessment" (Open Data Readiness Assessment 2015). This methodology underlines that among other factors, an active and engaged civil society is a key factor for the success of OGD programs.

2. Middle layer - civil servants and public authorities that see OGD as an instrument for improving governmental efficiency.

3. Third layer - high-level political leaders, including Heads of States and Ministers provided.

Interestingly enough, it appears that the majority of uses of open data originate from within the civic sector rather than government since when the public sector uses open data internally, it is not easy to detect such an activity (Davies et al. 2019).

Civil technology, if not always, is very often associated with open data. Vast arrays of open data allow people to see a problem confirmed by facts and begin to work on its solution (Berton et al. 2010, Lakomaa et al. 2013). However, the usage of open data by governments themselves can often be troublesome. Thus, a number of barriers may affect the disclosure and usage of open data sets. The primary identified obstacles are institutional barriers, the complexity of the task, lack of interest in using open data, lack of information and education, inadequate legislation or quality of information, and technical inconsistencies (Grundstrom and Lövnord 2014).

Unfortunately, often there is a skill-shortage in the sphere of public administration: useful data analysis to inform better policies is not common among federal agencies at all levels (Гурський 2018). Usually, public authorities own tons of valuable data, which needs additional professional resources to reveal its value entirely (Lakomaa et al. 2013). In this case, Civic Tech organizations can be an ideal solution - having access to the dataset, they can reveal their commercial potential and innovate a public sphere.

Over recent years, a mix of models is often used to bring together advocacy organizations with civic technology expertise to increase the use of open data. The hackathon model has become popular in many countries, acting as a meeting point between different stakeholders to explore data and identify its potential applications (Davies et al. 2019). Today, existing civic tech organizations, such as SocialBoost and 1991 Open Data Incubator in Ukraine, help to build communities around open data, effectively becoming a new generation of civic tech incubators for open data ideas.

Civic Tech communities are not only producing useful tools and applications. In fact, in many countries, they have played an important role as trailblazers and pioneers putting Open Government and Open Data on the political agenda (Davies et al. 2019). An example of this approach is scraping the content of official government websites and repurposing the data in more structured, searchable, visualized, and user-friendly ways (Grundstrom and Lövnord 2014).

Civic technology initiatives usually combine open data with technical and non-technical expertise to address a specific operational, policy or planning challenge (Kontokosta 2018). Such projects may include data visualizations, mobile, and web applications, or serve as a part of an online data portal. These products aim usually depend on the specific focus of the civic technology initiative and on what is being created, but may include (Wilson and Chakraborty 2018):

1. developing a common fact-base (government or community-managed open data portals),
2. empowerment of users (web or mobile applications that connect the public with social services or assist visually impaired residents with navigation),
3. facilitating public engagement by collecting information from residents to inform governance (service calls or participatory budgeting),
4. increasing government efficiency by monitoring relevant indicators (performance measurement dashboards and civic analytics), and
5. leveraging media coverage and community organizing to advocate for policy interventions (awareness-raising and political influence).

To conclude, open data provide a wide range of its implication in the civic tech projects. Ubaldi (2013) emphasizes that “open data initiatives create opportunities for participation that allow users to be not only passive consumers of content and services but also their developers”. Besides, it can be used for developing useful solutions for both the public and private sectors. Therefore, open data used in the Civic Tech projects provides citizens relevant information regarding the governments, thus helping to make competent and informed decisions, which makes governments more accountable and transparent (Meijer et al. 2015; Mayernik 2017) and raises the level of trust towards politicians. At the same time, services built with the help of open data can simplify day to day operations.

In this chapter, the theory on public sector innovation, Civic Tech, and open data was overviewed. The information helped to understand the basic concepts and differences between them, figure out the main enablers and barriers for the public sector innovations, point out the forms of Civic Tech initiatives and their benefits, as well as overview the implication of the open data in the sphere. This knowledge lays the groundwork for the current research.

3. Literature review

This chapter aims to review the research relevant to this topic. Having analyzed the current literature on Civic Tech, the author came to the conclusion that most of the studies focus on the questions of citizens' empowerment, public participation, urban planning, and collaborative governance (Saldivar, J. et al. 2018). However, no case studies that answer the question "how to innovate public with the help of Civic Tech," and namely explains how to make the best use of it. Therefore, it serves as a justification for this research.

In this chapter, an overview of the previous research of the Civic Tech implementations in the world is provided. This will help to highlight the benefits of Civic Tech usage and answer the sub-question "How to innovate public sector with the help of Civic Tech".

3.1. Civic Tech implication and benefits

The number of publications in the domain of civic technology has increased steadily recently (Saldivar, J. et al. 2018).

The major research on the topic is being conducted by the Knight Foundation. Their report "The Emergence of Civic Tech" examines clusters of innovation and investment within the field of civic tech (Knight Foundation 2013). At the same time, "Scaling Civic Tech. Paths to the sustainable future" report captures sustainability challenges, bright spots, and recommendations based on the perspectives of nearly 50 startup leaders and funders interviewed (Knight Foundation 2017). These two reports, as well as numerous publications by the Knight Foundation, lay a groundwork for the Civic Tech understanding and highlights major trends in the sphere, however more specific research is being conducted by the independent scholars. Some of the most interesting works will be discussed further.

Bev Wilson and Arnab Chakraborty discuss the use of Civic Tech for the smart cities (Wilson and Chakraborty 2019). The author notes that Civic Tech can benefit states in different ways. First of all, it provides citizens with transparency by making data available for public use. Secondly, it allows citizens to take part in decision making, which is a cornerstone of democratic governance (Arnstein, 1969). Thirdly, public authorities can receive valuable knowledge and inputs from the people involved in the

decision-making process (Nath 2011; Linders 2012). Lastly, Civic Tech can democratize the usage of the data collected and generated by sensors and other Smart City technologies, provided that those data are open. Civic Tech can change the traditional Smart City discourse, which is all about the numbers and quantification towards social inquiry and citizen representation (Ashton et al. 2017). Today it provides the possibilities for bridging the gaps between planners and the public (Goodspeed 2016), as well as between new technologies and planning practice (Schweitzer and Afzalan 2017).

The comparative case study by Rebecca Rumbul demonstrates both the differences and the similarities in usage of Civic Tech in both developed (the UK and the US) and developing (South Africa and Kenya) countries (Rumbul 2017). By answering the questions regarding the attitudes towards government and the plausible effects of Civic Tech on the public policies, the research has clearly indicated increased political efficacy amongst the countries which use civic technology. Most of the citizens replied that Civic Tech instruments enabled them to hold their governments accountable for their activity. Besides, citizens stated that the possibility to collaborate with governments affected the way they behaved, which would be different in case Civic Tech instruments were not available. Finally, the research showed a significant difference in demographic trends between the developed and developing countries, which should serve as a caution not to generalize findings among countries when examining similar technologies.

Emily D. Shaw discusses how Civic Tech can be used for improving the state of e-governance (Shaw 2018). The author states that the usage of civic technology can help governments to achieve the main goal of implementing e-government, which is a transformed citizen-facing service and increased public confidence. Civic Tech boosts the e-government by enabling the online government to citizen interaction on a regular basis. Appreciation of the service and inputs regarding its possible enhancements from the citizens motivate public authorities to improve both the tool and service.

Hollie Russon Gilman discusses how Civic Tech can be used for urban collaborative governance (Gilman 2017). The author offers three cases of Civic Tech and its intersection with collaborative governance: innovation units, open data, and civic crowdfunding. These cases show that governments can use civic technology for different purposes. First, such instruments can both guarantee increased transparency of the government and provide opportunities for citizens' participation in the decision-making. Second, Civic Tech can enable more effective use of government data. Lastly, the author

states that the context in which Civic Tech is being implemented matters since different political realities and approaches shape governance implementation.

Another interesting research was recently carried out by CitizenLab. They published the paper "The future of digital democracy," where interviews about citizen participation, innovation, and leadership were collected (CitizenLab 2020). Some of the interviews concern Civic Tech. For instance, Paula Forteza, a member of the French parliament, is discussing the future of Civic Tech. Paula is helping to transform the sphere over the next five years in the political realm, and points out three major challenges left:

- Remove institutional barriers and open up spaces for public participation with real impact;
- Create IT tools that can be attached to different participants and different needs. For this, Civic Tech should be able to gamify the process to attract the wider audience;
- CivicTech tools should be open-source, to increase the trust of the citizens and the transparency of the government.

Marci Harris, CEO and co-founder of PopVox, mentions that high-quality engagement is the responsibility of the authorities: "I think we, CivicTech providers, have made a mistake… We thought if we created useful tools, we would have a positive user experience, attract a broad audience and would solve the problem. These are all essential steps, of course, but what is important is to have representatives on the other side who are ready to listen" (CitizenLab 2020). Thus, the government plays a crucial role in facilitating the Civic Tech spere development. If there is no support and understanding from the civil servants, it will be difficult for the projects to evolve.

With regard to the real-world examples, today, most of the countries implement Civic and Gov Tech solutions in different forms. For instance, just Europe accounts for more than 2000 of such startups (Hugill 2019). However, the USA is usually brought out as one of the best examples of the Civic Tech sphere development (Shaw 2018, Borysenko 2020, Sakalosh 2020).

During the last ten years, the American Civic Tech market has gone through three main phases: early development before 2008; establishment of the new models in 2008-2016, and the recent reevaluation of the crucial role of technology for the civic change (Luminate 2019). Such a development was influenced by a belief in the broad possibilities of modern technology, the decreased cost for its implication, and supportive political

circumstances under the Obama administration (Shaw 2018; Luminate 2019). All of these factors resulted in an increased interest in the sphere, both the government and investors. Civic tech projects and organizations started to flourish, and some of those managed to reach impressive results. For instance, NextDoor, the neighborhood social networking site, became the first civic unicorn that reached USD1.1 million of value in 2015, while change.org that has more than 100 million of users (Luminate 2019).

Another good example of the Civic Tech organizations in the USA is OpenGov that aims to make the government more accountable by providing cloud-based software for increasing governmental efficiency. Today more than 1,800 governmental bodies all over the USA use the developed tools for better budgeting, reporting, operational performance, and increased transparency. In addition to these solutions, hundreds of other projects work in the USA for the sake of public good.

Estonia also has good examples of the Civic and Gov Tech projects since it is an innovative country that is characterized by the favorable conditions for the startups development. Therefore, such conditions motivate civic activists to launch the projects that can be beneficial for both the government and citizens. For instance, Citizen OS is an open-source platform that allows citizens to collaborate and take part in decision-making online. It aims at raising awareness about the participatory democracy and promoting e-democracy tools (Citizen OS 2020). DreamApply, which is a student admission platform that helps educational institutions manage applications, is an example of a successful mixture of Civic and Gov Tech project (Hugill 2019).

The Gov Tech solutions can be illustrated by the example of the Sympower, which enables better communication between energy assets and the elecrisity system, helping to reduce emissions and speed up the transition to low carbon systems. Ridango - a mobile ticketing and real-time passenger information solution for public transport operators is another example of the Gov Tech (Hugill 2019). Besides, a lot of other projects help to bridge the gap between the citizens and government in Estonia.

In summary, it can be concluded that the research in the sphere of Civic Tech is developing rapidly in the different countries, and, therefore, quite diverse. The researchers showed the various possibilities of Civic Tech implication, its main barriers and problems, as well as provided some recommendations for its further development. However, area-specific research is still lacking. Thus, the author believes that there is a need for more personalized case studies. Therefore, the case study of the Civic Tech development in Ukraine will be presented further.

4. Civic Tech in Ukraine

Having analyzed the literature on the topic, the author concluded that there are no studies of the Ukrainian Civic Tech sector, which served as a justification for conducting a case study.

This chapter overviews the current situation and discusses the successful examples of Civic Tech projects in Ukraine. This information will help to lay a groundwork for answering the sub-question three.

4.1. State of Civic Tech development in Ukraine

Just recently, Ukraine has begun to take the first steps towards a new type of information state. Today, digitalization is one of the state's priorities. It is claimed in the Digital Agenda 2020 that digitalization should be seen as a tool, not a final aim (Цифрова адженда України – 2020). Under the systematic state approach, "digital" technologies are expected to significantly stimulate the development of an open information society as one of the essential factors for the development of democracy in Ukraine, increase productivity, economic growth, job creation, and improve the quality of life of Ukrainian citizens.

Nevertheless, Ukrainians may still lack general awareness about digital tools, they are quite optimistic about the application of ICT in governance. Thus, 306 Ukrainian experts surveyed in a 2015 study conducted by the EGAP, considered ICTs as an enabler in (Tomkova J., Khutkyy D. 2017):

- making government more efficient, effective, and accountable,
- improving direct democracy,
- informing and engaging citizens in political life,
- increasing trust between citizens and state authorities,
- increasing citizens' influence in politics

Today, cooperation with citizens is stated as one of the main tasks. Active citizens engagement requires a holistic, multi-channel approach (Цифрова адженда України – 2020), and the application of information and communication technologies is one of the ways for achieving that. Now such technologies are becoming a useful tool for involving citizens in the decision-making process in Ukraine (EGAP 2016). Modern participatory instruments can transform the macro level of "citizens" into the micro-level of "specific

citizen", and the activity of "informatization" into "involvement" (Цифрова адженда України – 2020).

An important fact is that in recent years, decentralization reform has been steadily gaining momentum in Ukraine, enabling the equitable distribution of public funds between regional centers and small settlements (Decentralization 2020). After the Revolution of Dignity, a boom in various electronic tools were introduced: some were created by the government and most by civil society and IT volunteers (UNDP Ukraine 2018). In particular, portals such as e-data, which became a source for numerous Civic Tech projects as OpenBudget, or OpenDataBot, reasonably.

Today, e-democracy services are being actively implemented in our country, both at national and local levels. For instance, today it is possible to follow the decisions of your local council, request public information, or check how much money has been spent in your city, from your mobile phone and many more. Such services are powerful drivers for developing citizens' involvement in using e-services and developing communication with the government. In 2017-2018, experts from the Center for Innovation Development researched e-services for interaction between citizens and authorities in cities and amalgamated territorial communities (ATC) (Iemelianova, Loboyko, and Mayevska 2019). According to the study, 615 of the 705 ATCs have official websites, 511 of which contain links or widgets to access 1+ e-services. The most common are e-democracy tools (e-petitions, petitions), public information access systems.

Other trends include the increasing trust in platform solutions (Litvinova 2020). Platform solutions are in demand in cities, regions, united territorial communities of Ukraine. Center of Innovations Development conducted a survey on the functioning of e-services in cities in 2017. According to it, 59 out of 68 heads of local government and 24 out of 27 moderators of e-services in cities indicated that they were interested in implementing a single e-services platform that would be the only window access to some of the most needed IT solutions for citizens (Litvinova 2020).

Such platform solutions as the participatory budgeting platform «Civic project» (connected 50+ settlements) can be used as an example.

4.1.1. Participatory budgeting project

Even though some countries have been enjoying the benefits of counterparty budgeting since the last decade of the last century, this initiative fully emerged in Ukraine only in 2015 in three cities: Chernihiv, Cherkasy, and Poltava. In general, In nearly four years, from August 2015 to May 2019, at least 154 communities have implemented a budget for participation in Ukraine (Громадський Проект 2020).

The participatory budgeting platform in Ukraine is called “Hromadskyi Proekt” (Civic Project). It is an electronic platform on which the participation budget is implemented. Participatory budgeting is the process of redistributing part of the city budget to projects submitted by its activists (Khutkyy, Avramchenko 2019). Thus, within the limits of a certain amount, residents can submit their proposals for the improvement of the city, hold a public vote for such projects, and the city council, in turn, can implement them and report on the implementation process. The process is based on the allocation of a certain share of the budget funds directly to the inhabitants of the districts, according to their needs. The second element is that the budget is cyclical, i.e., projects are planned for implementation over one year, and the procedure is repeated annually. This kind of budget can be implemented in any institution at any level - at the level of a city, residential district, school, etc. (Khutkyy, Avramchenko 2019).

This rapid spread of PB is due to several factors: the willingness of community activists and local governments to cooperate and experiment, the availability of successful examples, the dissemination of information, applied for training, technical and financial support. In fact, local activists can be motivated to increase opportunities for public policy and community development, and local authorities can evaluate the benefits of involving citizens in the distribution of the local budget (Khutyy and Avramchenko 2019).

In addition to such platform solutions as participatory budgeting, there are many successful Civic Tech projects based on the open data. Some of the most prominent ones will be discussed further.

4.1.2. Open Data

Over the last few years, Ukraine has made a significant leap in making public data publicly available. According to Open Data Barometer, the ranking of countries that use

open data in 2015, Ukraine ranked 62nd with a rating of 16 out of 100. A year later, it climbed to 44th place with a score of 36 out of 100 (Open Data Barometer 2016).

According to the Global Open Data Index, in 2015 the country ranked 54th with a rating of 34%, although in 2014 it was not even listed. The most publicly available information, the rating experts called data on the state budget, legislation, and company registration.

An essential link between open data and users is services that help you process data to solve specific tasks. Therefore it is highly important to facilitate the development of the services and instruments. Today there are hundreds of Civic Tech projects based on the open data. Some of them are listed below:

– **OpenDataBot -** public open data platform. The service works in popular messengers. In particular, users learn about the appointment of company executives, tax debts, court decisions, blacklisting of the AMCU, and the Ministry of Economy. This helps to find relationships between companies, government agencies, and organizations. In this way, corruption schemes in tenders, cases of tax evasion and other violations are traced

– **ProZorro** – the procurement information portal. Prozorro allows you to browse public procurement by region, analyze who is the organizer of the auctions, the amount of money collected, as well as the amount saved through the system. For example, the e-procurement system helped save $ 60 billion in losses a year through corruption and lack of competition. In addition, according to Open Contracting Partnership, since the launch of ProZorro's e-procurement system, the average number of unique vendors has increased by 45%, and the number of contract information retrieval sessions has increased a thousandfold. All portal features are accessible to every Ukrainian without restrictions on access (Присяжнюк 2018).

– **OpenBudget.** This project focuses on the idea of disseminating open data processing tools to municipalities that do not have their own mechanisms to guarantee transparency in the region's financial sector. OpenBudget tools allow you to process revenue and spending data for your city budget. This allows local authorities and citizens to access visualized and comprehensible data in a convenient format. OpenBudget provides information such as the cost of upgrading a particular city or kindergarten.

Therefore, people can review all the costs and compare them with the total income to ensure that the activities of local governments are legal.

– **YouControl** – an online verification system. The service allows you to find out if the company is working, what kind of business it belongs to, what type of litigation it is involved in. You can follow the changes through an email subscription. It contains a dossier of 1.6 million companies based on data from 50 official registers.

– **Monitor.Estate** - a real estate market legal audit service that conducts statutory audits of real estate objects using open data from state registers. The inspection involves monitoring the names of participants, their registration addresses, the purpose of the facility, the availability of court cases, debts, and licenses.

– **LvivCityHelper -** the chatbot of Lviv City Council, which provides quick and easy access to city public information 24/7.

– **Суд на долоні (Transparent Court)** - an analytic tool for finding, researching, and visualizing court decisions that allows you to analyze case law in a few clicks. With the help of special algorithms, the texts of court decisions are transformed into structured data. The information received is combined with other open data published by the state.

– **Get-To-Tender**. The system for the search for relevant tenders The service will help you find the best bidding for ProZorro. Get-To-Tender uses machine learning technology to automate this process.

To summarize, despite the relative novelty, the Civic Tech sphere is developing rapidly and is already bringing positive results. If in the countries of Central and Eastern Europe, the areas of open data and Civic Tech are just beginning to develop, but Ukraine can be called one of the leaders in the region (Гурський 2018). Just the SocialBoost has shown promising results in the development of the Civic Tech sphere. Thus, the NGO

already has 1000+ participants; 5.5 million citizens have used their instruments; received 2.5USD of investments (Social Boost 2020). Besides, numerous projects, some of which were discussed in the chapter, are successfully operating, helping millions of people.

However, despite the examples of the successful Civic Tech projects, the reasons for their appearance, and the general condition of the Civic Tech sector in Ukraine are unclear. The research has shown that various factors influence the development of the field, which will be discussed in the details in the next chapter.

5. Interview results and discussions

This chapter provides the results and analyses of the interviews. The interviews were held in March and April 2020 with an aim to answer the following sub-questions:

Sub-question 1: *"What are the main enablers of the Civic Tech development in Ukraine?"*

Sub-question 2: *"What are the main barriers for the Civic Tech development in Ukraine?"*

Sub-question 3: *"What should be done to boost the development of the Civic Tech sphere in Ukraine?"*

The sub-questions will help to answer the main research question and provide recommendations for future development.

Each of the interviewees was asked to answer these questions. The condensed version of the results for the SQ1 and SQ2 is presented in the table below (Table 4). The answers for the SQ3 will be presented later in the chapter to simplify the reading. Further, the answers to SQs will be grouped into the categories and described by using the interviewees' statements and relevant literature.

Table 4 Interview results

Interviewee	The main enablers	The main barriers
1	– State Agency of E-governance; – Open Data; – Civic Hackathons; – Incubation programs; – NGOs; – Internet penetration;	– Citizens are not willing to pay for the services; – Lack of qualitative open data; – Lack of transparency and communication from the government; – Difficulty in getting funding;

2	– Political will (new people in the government); – International funding; – IT activists; – NGOs; – Incubation programs; – Open Data;	– Lack of systematic policies/standards; – Low digital literacy; – Lack of governmental strategy; – Lack of order; – Lack of promotion;
3	– Initiative from citizens; – International funding; – NGOs; – Incubators; – Hackathons and challenges;	– Lack of institutionality; – The importance is not fixed in the law; – Projects have troubles monetizing themselves; – Duplicating projects; – Lack of state support;
4	– Change of mindset (Revolution of Dignity) – Internet penetration; – International funding;	– Lack of state support; – Low participation level; – Low quality of projects; – Insufficient quality of open data; – The market is not ready; – Lack of security (for business); – Short-term projects; – Lack of information, events;
5	– Ability to identify and analyze community challenges; – Hackathons; – International funding;	– Duplication of projects (lack of common standards); – Lack of knowledge (local officials); – Psychological barriers of the citizens; – Lack of digital literacy;

5.1. Identified enablers

After the analysis, the enablers were aggregated by the author into the following categories: government, NGOs and incubators, civic activism, external support, and based on the stakeholder. Open data and technology were brought up into separate categories due to the importance (Table 5).

Table 5 Categorized enablers

№	Category	Node	Number of mentions
1	Government	State Agency of E-governance (state support)	1
		Political change (new people in power)	1
2	Open Data	Disclosure of open data sets	2
3	NGOs and incubators	NGOs and incubation programs	3
		Civic Hackathons	3
4	Civic activism	IT activism	1
		Change of mindset	1
		Citizen initiative	1
5	External support	International funding	5
		Partnerships	1
6	Technology	Internet penetration	2

Category 1: Government

In this category, the enablers that come from the government will be described. The section discusses the role of the State Agency for E-governance (now Ministry of Digital Transformation) and the political change in the development of the Civic Tech sphere in Ukraine. The quotes from the interviews will be used for the justification.

Node 1: State Agency of E-governance

The node was chosen since the governmental direction towards innovations played a vital role in the development of the Civic Tech sphere in Ukraine. In this regard, Serhii Karelin, the project coordinator on E-Democracy at EGAP, stated the following:

"The State Agency for E-governance established in 2014, which in 2019 was transformed into the Ministry of Digital Transformation, is the main driver of the Civic Tech development. The main factors include the legal basis and the introduction of technologies, mainly 3G and 4G, that enabled the wider Internet penetration introduction of other technologies like IoT and others".

The establishment of the separate authority responsible for the digital transformation shows the state's direction towards innovative development. Throughout these years, the Agency was working on achieving its goals. Thus, in five years, many positive changes have been introduced, such as 118 e-services on the state portal, MobileID; Digital and Open by Default principles fixed in the law; electronic document exchange in the authorities; publication of open data sets, and more (Кабінет Міністрів України 2019). The general direction towards digitalization and some of these steps in particular facilitated the development and growth of the Civic Tech sphere. Besides, the agency supported numerous initiatives organized by NGOs, international donors, incubators, and other stakeholders (for instance, Open Data Challenge[1], EGAP Challenge[2], and others).

Today the newly established Ministry of Digital Transformation continues to promote the innovative development of Ukraine by formulating the state policy in the field of digitization, open data, national electronic information resources, implementation of electronic and administrative services. For instance, this year, it launched the mobile app DIA, which should become an understandable and straightforward platform for the e-services. Now digital IDs and driver's licenses are available in the application, which has already been downloaded by over 2 million Ukrainians (Міністерство Цифрової Трансформації 2020). Kateryna Borysenko, the head of R&D department at SocialBoost

[1] Open Data Challenge. Available at: https://odc.in.ua/

[2] Кабінет Міністрів України. Available at: https://www.kmu.gov.ua/news/249043896

mentioned: *"I really hope that DIA will become the most successful Civic Tech project soon since its functionality will be useful for everyone".*

Besides, the Ministry is actively working on improving the digital literacy of the population. This node will be discussed further in the work.

Another facilitating factor is that the national fund for startups was created, which provides more possibilities for the development of the Civic Tech projects and decreases the dependency on international donors (Ukrainian Startup Fund 2020).

In general, the agency greatly influenced the development of the Ukrainian Civic Tech sphere by establishing the needed infrastructure and other enabling factors. Today, the Ministry of Digital Transformation continues to work on the goals of its predecessor and supports the Civic Tech projects organized by the organizations and the civil society.

Node 2: Political change (new people in government)

This node will discuss the influence of the recent political change on the development of the Ukrainian Civic Tech sphere. The following quote illustrates this enabling factor.

"I would say that first is because we got new people in power. If we talk about the municipalities, there are lots of new talented people who understand the possibilities and benefits of Civic Tech, so now we had inquiries to develop new products for them" (Borysenko).

Just the introduction of the new authority is not enough to innovate the public sphere. Both government officials and the citizens should understand the importance of the process and take part in it. Thus, the fact that the officials, especially on the local level, are interested in the implication of new technologies is a good sign.

The major political changes in Ukraine happened in 2014 and 2019. The first one resulted in the general development of the digital sphere (establishment of the State Agency for E-governance, disclosure of open data, the introduction of 4G and MobileID, etc.), and decentralization reform that, in turn, resulted in the increased power of the local authorities and the appearance of new civil servants who are passionate about innovative development. Therefore such services as Dosvid or edem.ua and others found a lot of users on the local level. To illustrate that, the statistics from the research of the Center of

Innovations Development can be used (Iemelianova, Loboyko and Mayevska 2019). Thus, in 2018, 67% of municipalities had current strategic documents that determined the development of e-governance, e-democracy, digitization, or Smart City. 63% of municipalities specified a structural division or an official responsible for the implementation of these strategic documents, and accordingly, the e-democracy development tools. In 2018, 46% of the surveyed municipalities had approved Charters of territorial communities, which contain legal regulation of some e-democracy tools, most commonly e-appeals and e-petitions. Such a situation shows the adoption of digital technologies by the municipalities and may be used as a justification for this node.

Category 2: Open Data

This category will discuss the importance of open data. Even though the disclosure of open data depends on the government, it was brought out into a separate category because of the multiple stakeholders involved in the process.

The information from the interviews and the literature was used to discuss the following node.

Node 1: Disclosure of open data sets

The disclosure of the open data was one of the main enablers of the Civic Tech emergence and development in Ukraine. The following quotes justify the node.

"One of the enablers was Open Data. In 2013 the Law on the Access to the Public Information was introduced, and it was the first revolution when at least some kind of data that can be processed appeared. It was the first time when the data could be received in the electronic format. After that, in 2015, the changes to the law on the "Citizen's appeal" and Resolution 835 on the Open Data were introduced. These steps were crucial after the Revolution of Dignity. What it gave us is e-petitions and the possibility to address the government in electronic format, which wasn't possible before. The 835 regulated the sets of Open Data that needed to be published. Separately, with regards to the transparency, the EData portal was introduced in 2015" (Karelin).

"Another thing is that now we are in the top 30 countries for open data accessibility. Denis Hurskyi was one of the initiators of this reform in 2015 (Resolution 835). Now our Open Data portal is one of the best in the world" (Borysenko).

Both of the experts agree that the fast development of Ukrainian Civic Tech was largely due to open data reform. Taking into account the fact that a lot of open data appeared in the public sector, it became possible to create the services and instruments on its basis.

Three major legislative changes became a prerequisite for the wider public's access to information in Ukraine (EGAP Brief 2016). SocialBoost was one of the initiators of these legislative changes (Ценцура 2019). Civil society has also played a vital role in the process (EGAP Brief 2016).

In 2011, the Law on Access to Public Information[1] enabled citizens' access to public information through government websites and emailed queries with obligatory state response. Besides, the Order of the Cabinet of Ministers on the Approval of the Concept of Creation and Operation of Information Systems for Electronic Interaction of Public Electronic Information Resources[2] in 2012 additionally reinforced government bodies' required adherence to transparency, openness, and efficiency (EGAP Brief 2016). Since 2014, the constant promotion of the open data agenda has played a vital role in Ukraine's efforts to guarantee a more comprehensive state's transparency (EGAP Brief 2016).

In the wake of the political, economic, and military crisis, which lasted all of 2014, in April 2015, the "open data reform" took place in the country. The Verkhovna Rada made amendments to the Law of Ukraine "On Access to Public Information"[3], as a result of which the concept of open data appeared in the legislation. Now, the Law on Access to Public Information defines the procedure for exercising the right of everyone to have access to information held by the subjects of power, other providers of public information defined by this Law, and information of public interest (EGAP Brief 2016).

[1] zakon4.rada.gov.ua/laws/show/2939-17

[2] zakon5.rada.gov.ua/laws/show/634-2012-%D1%80

[3] https://zakon.rada.gov.ua/laws/show/2939-17

In October 2015, a resolution of the Cabinet of Ministers of Ukraine No. 835[1] was issued, defining which data should be open in the open data format. In the same year, with the support of donors, a social organization SocialBoost, created and transferred to the management of the State Agency for Electronic Governance (now Ministry of Digital Transformation), the National Open Data Portal - data.gov.ua (EGAP Brief 2016).

Resolution No. 835 is updated periodically at the request of the public, expanding the list of datasets and other provisions (TAPAS 2019; Тексти.org.ua 2019). The results of the study "On the Compliance of Ukrainian Legislation with the European Open Data showed that the Access Law and Regulation No 835 meet the requirements of Directive 2003/98/EC and Directive 2019/1024/EC, except for some aspects (TAPAS 2019). In general, the Law on Access to Public Data in Ukraine provides for better regulation of access to open data (EGAP Brief 2016).

On June 5, 2019, amendments to the Resolution No. 835 “On Approval of the Provisions on Datasets to be Disclosed in the Form of Open Data” came into force. The government expanded the list of kits from 616 to 887, introduced an annual evaluation of the work of managers, increased data quality control through pre-moderation (Тексти.org.ua 2019).

All of the steps mentioned above made open data reform possible and greatly influenced the development of the Civic Tech sphere.

The concept of open data in Ukraine is based on the idea of e-government, which in turn is guided by principles such as cooperation of state bodies and citizens, transparency of functioning of state bodies, and involvement of citizens in the decision-making process (Popelysyn 2018). Today, the process of data disclosure in Ukraine ensures the implementation of the basic principles of e-government.

The success of the reform is already visible. Thus, according to the Global Open Data Index[2], which is formed by the international non-governmental organization Open Knowledge International, in 2017, Ukraine ranked 31st and improved its result by 23 positions compared to 2016. In the updated Open Data Barometer rating for 2018[3], our country came in 18th place. In these ratings, Ukraine overtook its neighbors and some EU

[1] https://zakon.rada.gov.ua/laws/show/835-2015-%D0%BF

[2] Open Data Index (2017) https://index.okfn.org/place/

[3] Open Data Barometer (2018) Available at: https://opendatabarometer.org/country-detail/?_year=undefined&indicator=undefined

countries, including Italy, Greece, Portugal, Croatia, Bulgaria, and Poland. Ukraine received the most favorable assessments for the openness of the state budget and expenditures, purchases, the unified state register of legal entities, individual entrepreneurs, public entities, and national legislation.

The raising amount of open data enables the creation of multiple Civic Tech projects on its basis. NGOs and incubators play a vital role in the development of such projects. Therefore they were separated into the separate category, which is presented below.

Category 3: NGOs and Incubator

The role of NGOs and incubation programs will be discussed in the node. Besides, since the hackathons in Ukraine are, in most cases, initiated by those actors, they will be covered altogether.

Node 1-2: NGOs incubation programs and hackathons

Numerous programs and contests, including the hackathons, were held by the NGOs and incubators in Ukraine to support the development of the Civic Tech sphere. Their role can be explained by the following quotes.

"There are a lot of organizations working on the market: SocialBoost, 1991, Eidos, Center for Innovations Development, and lots of other organizations which at some point influenced the development of Civic and GovTech" (Karelin).

The expert lists the major organizations that facilitated the development of the sector. The next quote highlights the role of NGOs in developing an inclusive civil society through Civic Tech projects.

"NGOs help to develop civil society while supporting Civic Tech. The more Civic Tech project we have, the more people influence what's going on in the country/cities" (Sakalosh).

Today, one of the most significant actors in the sphere of Ukrainian Civic Tech is SocialBoost. It is a Ukrainian Civic Tech NGO focused on developing IT projects with social impact. SocialBoost is a community of professional programmers, activists, and managers who work with government agencies and IT companies to create services that address citizens' concerns.

SocialBoost started as a social and technological movement from a series of hackathons. In 2013 and 2014, hackathons were held with the theme “open data”. According to their results, SocialBoost IT specialists, with the support of Microsoft Ukraine, started to create a single state portal of open data - data.gov.ua. Later, in the summer of 2016, SocialBoost launched the participatory budgeting platform “Civil Project”, which was discussed in the previous chapter.

In 2016, 1991 Open Data Incubator was founded by the SocialBoost after the mandatory publication of state data was achieved. Under the traditional IT-incubator scheme, in 1991, volunteers and start-ups came together, while appointed mentors, taught, piloted their ideas and implemented ready-made projects in the Ukrainian state structures (Ценцура 2019).

1991 Open Data Incubator runs cycles: there are tasks, topics and partners assembled for a specific incubation cycle, with whom we design the program further and solve specific problems " (Ценцура 2019). Such an approach helps to develop valuable Civic Tech solutions for the significant issues with the help of Civic Tech.

Besides the incubation program, every year, Ukraine hosts the national Open Data Challenge[1], which helps grow data-driven projects. In addition to the chance to compete for a prize fund of 3.5 million UAH, the teams receive long-term mentoring support, the help of specialists in the field, get acquainted with representatives of the public sector and business for a confident move forward. The most significant achievement of the Open Data Challenge in Ukraine in 3 competition cycles is a community of 14 winners and 40 finalists teams. Among them, we can highlight Monitor.Estate, LvivCityHelper, Суд на долоні, Відкрита влада which were discussed in the previous chapter.

At the end of 2017, the SocialBoost launched the 1991 Civic Tech Center, the first Central and Eastern European hub for the development of civic technology organizations and startups. The center aims at developing projects in the fields of open data, e-

[1] Open Data Challenge https://odc.in.ua/#ancor-1

democracy, and e-governance. The Center functions as a co-working based on competitive selection and membership fees, with acceleration and mentoring programs for projects (Золотова 2017).

Another important organization for the development of the Ukrainian Civic Tech is EGAP. The eGovernment Program for Government Accountability and Participation (EGAP) aims to use the latest information and communication technologies (ICTs) to help improve the quality of governance, boost citizen engagement, and foster social innovation in Ukraine. The main components of the EGAP Program are the development of e-services and e-democracy at national and regional levels (EGAP 2020).

As a result of the EGAP activity, Ukrainians receive affordable and high-quality e-services, authorities - streamline processes and save time, and society as a whole minimize corruption risks and more effective accountability (Децентралізація. Міднародна співпраця 2020).

One of the most significant EGAP's projects was the EGAP Challenge. It is the eDemocracy IT project competition that aims to create effective tools to help citizens receive new quality services, interact effectively and directly influence the government, and bring the government a new level of transparency and efficiency (Кабінет Міністрів Україні 2016). For instance, such successful projects as OpenDataBot[1] and «Інформер[2]» were initiated during the challenge.

To conclude, the NGOs and incubators play a vital role in the life if the Civic tech projects since they facilitate the emergence of such initiatives and create an environment for their successful development. The hackathons and challenges are the essential components that boost the development of the Civic Tech sphere. However, their success depends on the initiatives of the civic activists who are interested in developing Civic Tech projects. Therefore, civic activism and its importance will ve discussed in the next category.

Category 4: Civic activism

[1] OpenDataBot

[2] Інформер. Available online: https://egap.in.ua/novyny/proekt-peremozhets-egap-challenge-uspishno-vprovadzhenyj-u-vinnytsi/

This category includes several nodes such as “IT Activists”, “Citizen Initiative” and “Change of mindset”. The first two can be logically combined into one node, while the last one will be discussed separately.

Node 1: Change of mindset (Revolution of Dignity)

The Revolution of Dignity has resulted not just in the change of the people in power, but also the shift in citizens’ mindset. People were not willing to tolerate the lack of transparency and corruption anymore. Such a problem with government transparency and accountability became a push towards the open data reform and the development of the Civic Tech initiatives.

The following quote serves as justification for this quote.

“For me, it is Euromaidan in the first place. It is still ongoing. The state was really corrupted before. Now citizens and their needs are becoming the central element” (Poremchuk).

Civil technology is an excellent litmus test for society because they “show” the weaknesses of the state - be it strict government control, low Internet penetration, environmental problems, or violation of freedom of speech (Гурський 2019). The most significant issue in Ukraine was and still is a lack of trust towards the government. Consequently, when people got access to open data, most of the newly developed projects were aiming to increase transparency (like OpenDataBot, Prozzoro, Суд на долоні, and many more). Those projects that are not using open data are, in most cases, trying to establish better communication with the government (participatory budgeting, petitions, various city bots, and others).

To conclude, the Revolution of Dignity has drastically effected the citizens’ mindsets making them demand more transparent and accountable governance. Such a tendency resulted in the introduction of numerous Civic Tech initiatives, which, in their turn, affected the development of the Civic Tech sphere in Ukraine.

Node 2-3: IT activists and citizen initiative

Nevertheless, state and civic organizations are recognized as one of the main facilitators of the Civic Tech sphere development, it would be impossible without the activists who were motivated to implement their ideas.

This statement can be justified with the following quote.

"The next component may be the general development of the IT community and bright people who are sincerely interested in making the country better with the help of Civic Tech and know how to combine business interests and the benefits for the citizens. So, when we talk about society in the civic tech, it's not those who vote for the projects, but those who develop the instruments in the first place" (Borysenko).

When researching the Civic Tech sphere in Ukraine, a number of different organizations and initiatives can be found. Just SocialBoost itself connects more than one thousand activists. Besides, there are many other organizations and individual projects. Considering that, it can be summarized that the activists who are sincerely passionate about the Civic Tech and are willing to work on the important project are one of the main enablers for the field's development.

Category 5: External support

This category will discuss the importance of external support for the development of the Ukrainian Civic Tech sphere. Namely, the role of the international funding will be covered since those nodes were brought out by the interviewees.

Node 1: International funding

International donors play a fundamental role in the life of Ukrainian Civic Tech projects because of the lack of state funding, which would be discussed later in the work. Without this money, most of the current Ukrainian Civic Tech projects would not exist. Considering that, support from international donors is recognized as one of the main enablers. This statement can be illustrated by the following quote.

"International donor funding plays a major role (USAID, UNDP) since they make us look at other countries' example and think of the project which we need. That's how the

PB project was launched –to boost the financial initiatives in the cities, and we didn't even prognosis such a success. No one knew how it should look or work like, but we were said to make it, and it worked out. Thus, international aid and expertise are crucial for our Civic Tech sphere".

Civic Tech attracts a new class of impact investors in the country. The difference between these investors from the classical ones is that they invest not intending to return investment, but with the goal of obtaining a high social or economic effect (Гурський 2019).

The development of the Ukrainian Civic Tech sphere was greatly facilitated by the Omidyar Network Foundation, founded by eBay founder Pierre Omidyar and his wife Pamela since it provided significant support for civil technology in Ukraine. Thus, the fund financed the Social Boost initiative, providing a grant of USD480,000 for the opening and development of the 1991 Civic Tech Center, the first in the CEE region (Omidyar Network 2017). Among other things, the Omidyar Network supports the events of Seedstars in Ukraine and Seedstars CEE (Гурський 2018).

Other CivicTech projects in Ukraine are supported by other organizations, such as the Western NIS Enterprise Fund. The Giant Project is being developed as part of the DOBRE (Decentralization Brings Better Results and Efficiency) program with support from USAID and Global Communities. These organizations help both financially and in matters of expertise and mentoring. At the local level, support for civil technology initiatives is provided by the Renaissance International Fund, TAPAS, UVCA, Aspen Institute (Гурський 2018).

At the same time, EGAP is financed by the Swiss Agency for Development and Cooperation and is implemented by the East Europe Foundation and InnovaBridge Foundation (EGAP 2020).

To conclude, numerous international funds initiate and support the Civic Tech initiatives in Ukraine. During previous years international donors were the most significant facilitator of the Civic Tech field development in Ukraine. This fact was confirmed by all the interviewees. Therefore their contribution should not be underestimated.

Category 6: Technology

The availability of Internet connection in most of the territory was brought out as one of the enablers; therefore, it is discussed in the separate category.

Node 1: Internet penetration

The available and affordable Internet connection plays a significant role in the development of the Civic Tech sphere as it allows people to work on the projects and use the existing ones. The following quote serves as a justification for this statement.

"The next factor is the penetration of the Internet – the cheapest in Europe and the second cheapest in the world. Now, most of the territory is covered with a qualitative connection" (Poremchuk).

The number of Internet users in Ukraine is 22.9 million people. This is stated in the Factum Group study for the Internet Association of Ukraine for the third quarter of 2019 as seen in Figure 6 below.

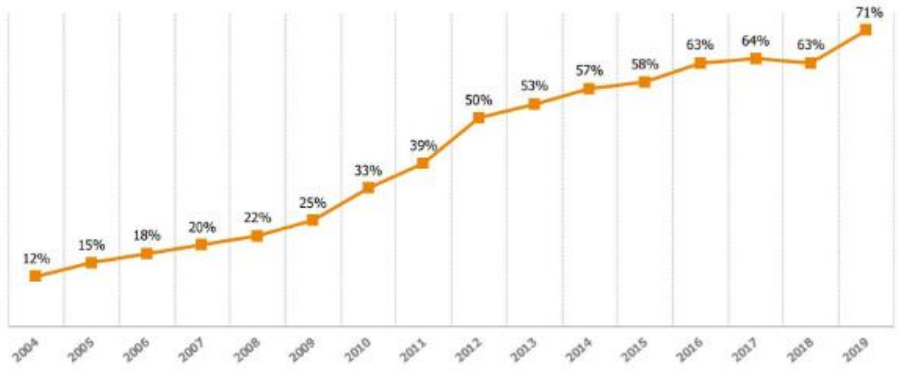

Figure 6 Internet users (Internet Association of Ukraine 2019)

For the first time in three years, the number of Internet users has increased by 7% - up to 71% (Figure 6).

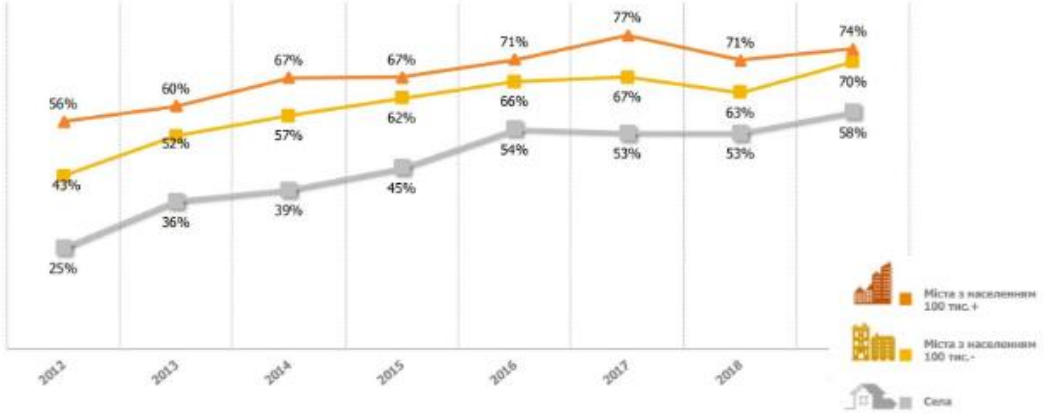

Figure 7 Internet users by categories (Internet Association of Ukraine 2019)

The number of users by the categories is illustrated in Figure 7. The orange line represents the cities with a population of more than 100 thousand people, yellow of less than 100 thousand, and grey denotes the villages. It can be seen from the figure that the number of Internet users in villages and towns with a population of up to 100 thousand has increased. 65% of Ukrainians have Internet at home.

To summarize, the number of Internet users in Ukraine is quite high. Besides, there is a stable growth of the indicators. However, the digital divide between the cities and rural areas amounts to 16 percent. Despite this fact, the general level of Internet penetration in Ukraine is still considered to be an enabler for the development of the Civic Tech sphere in Ukraine.

To conclude, all the enablers played a vital role in facilitating the development of the Ukrainian Civic Tech. It is difficult to say whose influence was stronger since all the factors complemented each other. In general, the development timeline can be illustrated in the following scheme.

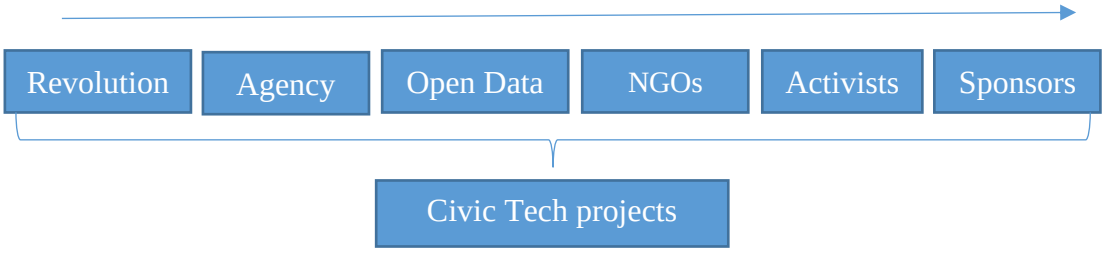

Figure 8 Enablers' dependancy

Thus, the Revolution of Dignity resulted in the change of citizens' mindset who started to require more transparent governance, and in a change of people in power. That, in turn, lead to the establishment of the State Agency for E-governance that introduced a number of "digital reforms" that included the open data reform. These factors, along with the support of the NGOs, incubators, and sponsors, resulted in the creation of Civic Tech projects that were mostly financed by the sponsors.

5.2. Identified barriers

After coding the interviews, the barriers were grouped into several categories based on the stakeholders, similar to enablers. Each of the categories was discussed using the information from the interviews and literature on the topic.

Table 6 Groups of identified barriers

№	Category	Node	Number of mentions
1.	Government	Lack of systematic policies and common standards (duplication of the projects)	3
		Lack of governmental strategy	3
		Lack of order	1
		Lack of promotion	1
		Lack of funding	2
2.	Open data	Lack of qualitative open data	2
3.	Society	Citizens are not willing to pay for the services	1
		Low digital literacy	2
4.	Activists	Lack of information	1
		Difficulty in getting funding	2

Category 1: Government

This category will discuss the barriers stemming from the governmental side. Nevertheless, the government was mentioned as an enabler previously, it was stated by the interviewees that the support of the sphere is not sufficient.

Since all the nodes are related, they will be discussed together.

Node 1: Lack of systematic policies and common standards

This problem was mentioned by several interviewees in the different wordings. The quotes to justify that statement are presented below.

*"…the decentralization reform is taking place now – municipalities get more autonomy, rights, and money. These cities take the money and develop a new system for their citizens (similar to PB or other), which is a duplicate for the existing ones that could be reused. They are just wasting money since there is no joint standards and policy. It is better to do one qualitative product that can be used by different municipalities than spending local money for the questionable projects" (*Borysenko*).*

"There is no refactoring from the bottom. Everyone is trying to do something quickly, just to show that it is done, but in most cases, it is not successful" (Poremchuk).

"The other problem is that there is a number of similar projects and there's no collaboration between them. Not like the competition, but they just duplicate themselves, so there's no systematic approach to this problem" (Sakalosh).

"In Ukraine, a "zoo" of IT solutions is being formed (a term used by the ITD experts to support the development of eGovernment "EGAP" to describe the state of development of IT solutions for municipalities). According to the estimates of the Center for Innovation Development experts, as of August 2019, Ukraine has implemented 350+ unique projects to provide electronic services to citizens, whose development is engaged in 100+ IT vendors. There are many alternative solutions to the same topic. In some cases, local governments are offered more than ten alternative IT options at one time, for example, to run a petition service or to conduct electronic surveys, to keep records of territorial communities, communal property, etc." (Litvinova).

It can be understood from the quotes that there is a serious issue with duplicating Civic Tech solutions because of the lack of regulations and common standards, which should be imposed by the government.

Node 2-3: Lack of governmental strategy and order

This node states that the government does not recognize the priority of Civic Tech development, which should be recognized on the national level.

"There is no collaboration in the Ministry of Digital transformation. They should connect the market participants in different segments, but not concentrate on one important project and leave others behind" (Borysenko)

"…also the lack of institutionalized approach, on the national level" (Sakolosh).

Both of the quotes illustrate that the state "ignores" the Civic Tech sphere while concentrating on other projects. Such a situation can be summarized by the following quote:

"So basically, our main problem is not the lack of money or capacity, but lack of order on different levels and ability to negotiate and be sincere, since IT is the sphere in which if you are sharing something you don't get less" (Borysenko).

Node 4: Lack of promotion

Another issue that stems from the previously noted problems is a lack of promotion, which can be illustrated by the following quote.

"One important thing we are lacking is the support from the ministries in the promotion of the products we are developing. We have products, but we don't have a resource to inform all the municipalities about it. So, ministries should help to spread this information and cooperate more" (Borysenko).

Such a situation results in the low citizens' awareness about the existing instruments. Thus, *"the problem is that we don't have enough participants using the existing e-democracy instruments" (Poremchuk).*

Node 5: Insufficient funding

As it was already stated previously, sufficient funding is one of the most significant enabling factors for the Civic Tech development. Several interviewees have noted that Ukraine lacks the governmental funding of the sector, which can be illustrated by the following quote.

"The main problem is the lack of state support in the first place. Now we have these small startups who exist to the point when the money from international funds is gone. The same happened to RozumneMisto – when we already had 110 cities and 2,5 million active users, and we couldn't get any financial support from the state" (Poremchuk).

All of the nodes stated above are connected and can be summarized together. Thus, the main problem regarding that matter brought out in the interviews is a general lack of order, vision, and support of Civic Tech projects in the government.

One of the main issues in this section is that cities and municipalities are trying to develop e-solutions for the citizens inhouse in the pursuit of digital trends. However, such a tendency is not effective since usually, it results in the introduction of low-quality products that could be substituted with the already existing solutions. Such a step would provide a better quality of service to citizens and save money of the city.

The main reason for this situation is a lack of systematic policy and general standards for the cities and municipalities that would prevent the duplication of the projects. If the state introduces the regulation in this field and promotes the usage of existing products, it would be highly beneficial for both citizens and the government.

Another issue mentioned in the interview is the lack of strategy and collaboration in the Ministry of Digital transformation. Now they are focused on several big projects, while other spheres are left out without proper attention. This problem also combines with the insufficient promotion of available products and area, in general, which results in the

low adoption and citizen participation. Such a situation slows down the development of the Civic Tech sphere. Therefore, there is a high need for a common vision and strategy that would help to solve the existing issues.

The last point mentioned by the interviewees is a lack of state funding. Since the Civic Tech is not recognized as a priority, the projects in the sphere experience difficulties at getting funding and are dependent on international donors. This fact decreases the motivation of the Civic Tech enthusiasts and, therefore, harms the development of the field.

Category 2: Open Data

Even though Ukraine holds high positions in the open data rates, the issues in this area still exist. The current category will discuss the limitations of the open data usage for the development of the Civic Tech sphere in Ukraine.

Node 1: Lack of quality

Several interviewees mentioned the lack of the quality of the Ukrainian open data sets, which becomes an obstacle for the project's development. Thus,

"...the state should proceed with opening the needed datasets and guaranteeing its quality since now it's often not the best so that Civic Tech has more possibilities for developing new projects" (Karelin).

"So now the quality is better, but still it is not enough. One of the main characteristics of any information is its topicality. It the data is not topical – it's not important. The main thing is not quantity but quality" (Poremchuk).

Data quality directly correlates with ease of use. Unfortunately, in Ukraine, most temporary datasets are heterogeneous due to excellent methodological approaches to their collection across administrative regions (Popelyshyn 2017). Government and private actors tend to publish the data required by Regulation #835, but often the data sets lack the quality. For this reason, frequently, startups that develop their open data solutions need to guarantee a single format for the data they use before launching the tool or

solution. Such a problem results in difficulties in launching and maintaining Civic Tech projects that, in turn, complicates the development of the sphere in general. Therefore, the quality of open data is crucial and needs to be taken into account at the first place.

Category 3: Society

This category will discuss the societal factors that hinder the development of the Civic Tech in Ukraine. Based on the received information, low usage of Civic Tech projects can be explained by three main factors: unwillingness to pay for the services, lack of information, and insufficient digital skills.

Node 1: Citizens are not willing to pay for the services

One of the stated issues is the citizens' reluctancy to pay for the services. This phenomenon can be explained by the following statement:

"Ukrainians are not willing to pay for the services. They think that everything provided for them must be free of charge. Now the situation is getting better, and people start to understand that they need to pay for some of the services, but this change in mentality will take a longer time, considering the lack of money. When citizens earn more, they can afford to pay for the services. For instance, streaming services. When people are used to that, and they see that the service is helpful, they are ready to pay. People also pay for their obligations. When they need to get a public service, and it is upon the fee – people pay, but in the Civic Tech, it is difficult. If the person does not get any additional value, there is no motivation to pay for such a service, and that becomes a barrier for many" (Karelin).

In general, the unstable economic situation and low income of the significant part of the Ukrainian population result in low interest in using the Civic Tech instruments. Besides, one of the interviewees also mentioned the psychological barriers as an obstacle to the usage of new technologies.

Node 2: Lack of information

This node discusses the insufficient citizens' skills and awareness about the existing e-instruments, which creates obstacles for Civic Tech development. Thus, Karina Litvinova from the Centre for Innovations Development states:

"Even though electronic services are used, there is no change in the citizens' philosophy regarding the use of the latest technologies *for interaction with the authorities. Besides, there is a lack of knowledge of local governments on the implementation of new e-governance practices"…Today, the main challenges now are a) inadequate advocacy with local officials as well as citizens; b) lack of knowledge of the latest e-government practices in the field: development of open data, public procurement, etc.".*

As can be understood from the nodes, both the citizens and officials lack the knowledge regarding the available technologies. Such a situation results in the low adoption of the e-instruments. Thus, when the authorities and citizens are not interested in the implementation of Civic Tech solutions, that shortens the number of potential end-users, which, in turn, influences the cost-benefit of the product. Therefore, the lack of information is a great obstacle for successful Civic Tech development.

Node 3: Insufficient digital literacy

Despite the quite high number of Internet users overall, Ukraine is still characterized by the digital divide between the cities and rural areas and the lack of digital skills of the population. Such a problem was recognized by the interviewees as a major obstacle for the Ukrainian Civic Tech sphere. Thus, the experts have noted:

"Another thing is the level of digital literacy, especially in the regions" (Borysenko).

"Also, it is worth paying attention to the level of digital literacy of both the population and the officials…One of the current challenges is ignorance of the population (unpreparedness of community residents to e-services)" (Litvinova).

These statements can also be confirmed by the official statistics. In 2016 Digital Agenda of Ukraine stated that just 35% of the Ukrainian population had necessary digital skills (Діджитал адженда України 2020). In December 2019, the results of the first nationwide study of digital literacy of Ukrainians - 53% of the population of Ukraine (using the methodology of digital skills assessment, which is used by the European Commission) were below the basic level (Кабінет Міністрів України 2019, Іонан 2020). Thus,

- 37.9% of Ukrainians aged 18-70 have digital skills below the baseline
- 15.1% do not have them at all

Another striking figure concerns the actualization of digital skills training - only 47% of Ukrainians aged 18-70 years believe that digital skills are relevant to them (Іонан 2020).

Considering the numbers, it is clear that digital illiteracy is a significant problem for the proper development of the Ukrainian Civic Tech sphere. When the citizens do not understand how to use the e-solutions, it makes it unreasonable to develop them. Therefore, it is crucial to work on ways to increase the digital skill of the population.

Category 4: External support

This category will discuss the barriers concerning external support. Since most of the Civic Tech projects are funding dependant, the difficulties in getting money would have adverse consequences on their realization. Therefore, it was recognized as a major obstacle and brought out into a separate node.

Node 1: Difficulty in getting funding

Serhii Karelin has mentioned the following:

"The main problem, for now, is the fact that after the project ended the incubation period, it is difficult for it to get funding. We do not have enough angel investors. In this

case, such projects have to either move to other countries or look for the investors ready to allocate the money for such kinds of projects".

Besides, he pointed out that: *"Civic Tech project must become profitable to survive. If the project addresses the issues of civic society that it should either become a part of the GovTech or become "attractive" to people so they will finance it."*

This means that even if the project got the funding for the realization, it does not guarantee its success since when the money is gone, the founders need to think where to get it once again. The number of external donors is limited. Besides, as it was already stated in previous categories, the government does not provide sufficient funding for the projects, and the society is reluctant to pay for the services. All these factors pose a serious risk for the Civic Tech sphere development since it may result in the decreased motivation to launch the projects and missed valuable ideas that could not find a sponsor.

5.3. Proposed solutions

This segment provides the interviewees' answers for the sub-question 3: *"What should be done to boost the development of the Civic Tech sphere in Ukraine ?"*

The condensed version of the results is presented in the table below (Table 7). In the next chapter, they will be categorized and discussed.

Table 7 Interviewees' recommendations

Interviewee	Answer
1	– Responsive governance – Disclosure of qualitative open data sets; – Unchanged policies towards innovative development; – Popularization and qualitative communication;
2	– Cooperation between NGOs – Cooperation with government – Introduction of common standards – Promotion and broader usage of existing products

3	– To fix the importance of Civic Tech development in the law – Provide possibilities for the incubators; – Create an ecosystem for the seamless development of the projects; – Initiate civic movements/initiatives; – Activists shouldn't be afraid to try; – The existing project should learn to "position" themselves;
4	– State support; – State order for Civic Tech projects: – Educational courses; – Make the product's code opensource; – Unchanged direction; – Focus on the quality of open data; – No interference (tax/police);
5	– Collaboration; – Consideration of citizens' needs; – Inclusivity; – Increase of digital literacy;

In this chapter, the expert interviews were analyzed. Based on the results, the main enablers, barriers, and recommendations for the development of the Civic Tech in Ukraine were identified.

The main enablers included the activity of the State Agency for E-governance (now Ministry of Digital Transformation), disclosure of open data sets, Internet penetration, the activity of the NGOs and incubators, international funding, and social activism.

The main barriers were identified as the lack of state support and regulations, lack of cooperation and promotion, low digital literacy, and difficulty getting financing.

The condensed list of the recommendations, which will be discussed in the following chapter, was formulated.

Further, this information will be used to discuss the key findings and propose recommendations for the future development of the Civic Tech field in Ukraine.

6. Analysis and contributions

In this chapter, the key results from the literature review and interview results will be integrated. Besides, the answers for the interview sub-question 3: *"What should be done to boost the development of the Civic Tech sphere in Ukraine ?"* will be discussed in detail. The results will be used to provide recommendations for the further improvement of the Civic Tech sphere in Ukraine.

6.1. Key findings

If we compare the theory on the public sector innovation with the interview results, the clear connection between the enablers and the barriers of the public sector innovation and the Civic Tech can be established (Table 8).

Table 8 Key findings

	Theory (Publin Report 2005; Bugge et al., 2011; Agolla et al. 2013)	Interviews
Enablers	– Political push – Growth of innovative culture – Support mechanisms – Capacity for innovation – Competitive drivers – Technological factors – Collaboration – Incubation – Public organizations – Business – Citizens	– Political push – Change of mindset – Open Data – Civic organizations – Civic activism – Internet penetration (technological factor)

Barriers	– Lack of flexibility in the law – Lack of incentives – Lack of funding – Risk of failure – Lack of cooperation – Professional resistance – Internal barriers (time or incentives) – External barriers (rules, suppliers, resistant users) – Technological	– Lack of state support – Lack of regulations – Lack of promotion, – Lack of cooperation – Low digital literacy – Lack of funding

Thus, comparing the theory with the results of the interviews, it can be seen that most of the enablers and barriers of the public sector innovation are applicable to the sphere of Civic Tech. Both theory and interviewees identify political push, civic activism, collaboration, and public organizations as the main enablers. Open data was mentioned as one of the success factors in the interviews as well. However, its disclosure was a result of the collaboration of public organizations, government, and citizens, which are also identified as enablers in theory.

Concerning the barriers, both theory and interviewees mentioned the lack of incentives, cooperation, funding, and technological factors as the main barriers.

Analyzing the development of the Civic Tech sphere in Ukraine, it can be assumed that the model of free innovation was applied since most of the initiatives were initiated from the bottom up by the public organizations and the citizens once the government supported the general development of the field (Bekkers and Noordegraaf 2016).

To conclude, the research showed the correlation between the enablers and barriers for the public sector innovation and the development of the Civic Tech sphere. Considering that, it may be assumed that the recommendations for the Civic Tech sphere's improvement in Ukraine that are going to be provided further may also be applied for boosting the public sector innovation, in general.

6.2. Recommendations

The following table presents the condensed answers of the interviewees (Table 7). Further, the answers to SQ will be grouped into the categories and used to provide recommendations.

Based on the interview results presented in the prev, the following groups of tasks were identified by the author based on the stakeholder:

Table 9 Recommendations by categories

Category	Main tasks
Government	– Cooperation with NGOs, Civic Tech project founders, citizens, and other stakeholders; – Introduction of common standards; – Disclosure of qualitative open data; – The state as a customer; – The popularization of existing Civic Tech products and qualitative communication; – Creation of state-financed contests; – Increasing digital literacy; – Fix the importance of Civic Tech in the law;
NGOs and incubators	– Cooperation with each other, government, citizens and other stakeholders – Promotion of broader usage of existing products – Education

Activists	– Consider monetization of the projects before launching; – Do market research before launching; – Consider citizens needs and inclusivity;

Having analyzed the literature and interview results, the author suggests the following recommendations for the further development of the Civic Tech in Ukraine:

Category 1: Government

The current research showed that one of the main problems in the sphere of Ukrainian Civic Tech is the lack of support and cooperation from the government. The state does not pay enough attention to the sector since it is focused on the implementation of other more significant projects. Considering that, the first recommendation for the government would be to recognize the importance of the Civic Tech sphere and fix it in the law. Such a step will reflect the recognition and the priority of Civic Tech sector development. At the same time, *"Ukraine should follow the unchanged direction towards the innovative development, meaning that there are no roll-backs in the policies" and "guarantee the responsive governance, which means that the state is not interfering with an introduction of the innovative technologies for the public sphere"*. These steps will lay a groundwork for the Civic Tech ecosystem. As it was stated by Karyna Litvinova: *"It is important that the authorities are active and motivated to develop this sphere, and are open to innovations."*

At the same time, the qualitative cooperation between the government, non-governmental organizations, citizens, and other involved stakeholders is essential for effectively leveraging civic tech to engage citizens (Russol 2018). But most importantly, the technology "must be a facilitator for creating a new type of communicative environment" where the people and the institutions of the city interact and collaborate" (Albino et al., 2015, p. 11). Unfortunately, today Ukraine lacks a joint strategy in this domain. Therefore, *"It is important to guarantee collaboration in building a Civic Tech*

ecosystem based on shared values and established rules, such as considering the interests and needs of citizens when developing IT solutions, inclusivity"(Litvinova).

Considering the existing barriers, it will be very beneficial if the government acts as a client of Civic Tech solutions. Sofia Sakalosh, a regional coordinator at EGAP has mentioned that "it will be good if such projects (hackathons, events) wouldn't be ad hoc, but would be fixed in law, institutionalized and be held on a regular basis not just when it's urgently needed". Thus, it is recommended to launch the national contest or hackathon for the Civic Tech startups. In that case, the state should create a "bank of issues" (list of the problems in the public domain), provide a task to the activist, and they, in turn, propose the solutions to these problems. Such an approach would help to solve several currently existing issues simultaneously. First, in this way, the government will show its interest in the sphere and provide support for the participants. Second, it will result in qualitative solutions to urgent problems and avoid the duplication of projects. Third, it will prevent the development of irrelevant projects and decrease the dependency on international donors.

In order to change the paradigm of cooperation between business, society, and the state, the initiative must come from all sides. In doing so, the parties must trust each other, share the same mission, recognize mutual interdependence, and maintain constant dialogue. The state should act as a customer, and other stakeholders should be involved in solving urgent problems and developing valuable instruments.

Another significant issue is that we lack common standards for the introduction of Civic Tech instruments on the local level. As it was said by Kateryna Borysenko, *"…common standards would make the solutions more efficient, save the local money, and eliminate the corruption components."*

Due to insufficient regulation, multiple projects duplicate and are lacking quality, which results in the waste of money from the local budgets and the instruments with poor user experience. Therefore it is recommended to implement the common standards that will regulate the usage of Civic Tech instruments by the different local authorities. Besides, the state should facilitate the implication of the already existing products that have already shown their functionality.

To conclude, digital technology and innovation do not substitute for effective public management, but rather are an integral complement. When data, tech, and innovation are treated separately from the question of public management, they become an "island off

the mainland" (Russol 2018). Therefore, the Ukrainian government should develop a joint strategy to achieve better results of the Civic Tech activity and collaborate with other stakeholders to achieve the best results.

Another essential problem that needs to be addressed by the government is data quality.

As was illustrated in the research, open data is one of the most significant enablers of the Civic Tech segment's development. However, the quality of the available datasets in Ukraine is often poor or insufficient. Therefore it is recommended to increase the quality of open non-personal data. To do that, it is important to publish the data sets defined in the updated Regulation #835, as well as to ensure their obligatory pre-moderation, which occurs before the publication of the open data sets on the portal data.gov.ua. Such measures will ensure that they are published in an appropriate format, which, in turn, will guarantee that it can be processed, simplify the task for their future users and make their sharing and use easier.

Besides, to achieve this goal, it is recommended to work on the strengthening of the discipline of public authorities by initiating the responsibility of information stewards for non-disclosure or disclosure of open data sets. The implementation of permanent and independent public control body would be beneficial as well.

At the legislative level, it is necessary to (USAID 2018):

- strengthen controls in the area of supervision and control over access to public information by creating a separate regulator;
- identify those responsible for disclosing information in the form of open data;
- develop and adopt a draft law on simplifying the holding of information managers accountable for non-disclosure, untimely or incomplete disclosure of open data;
- strengthen state control and develop effective measures and organizational mechanisms for state regulation of access to public information and open information;

Besides, it is important to shift the emphasis from the quantity to quality since there is no added value of the hundreds of published data sets if their quality does not allow them to use them as a basis for e-solutions. For this matter, Evgeniy Poremchuk has mentioned that *"…to solve it is needed to change the emphasis from quantity to quality – open 100 main data sets, appoint responsible people, some responsibility for the outdated data, maybe take a fee to support its topicality".*

The next crucial task for the government is to increase the level of digital literacy in Ukraine. The rapid and profound consequences of the transition to "digital" will only be possible when the "digital" transformation becomes the basis of the life of Ukrainian society, business, and public institutions. In the era of "digital" economies, the delay in closing the "digital" gap in Ukraine is a threat to its competitiveness and a severe challenge to socio-economic development. To solve this problem, it is essential to guarantee fast network deployment all over Ukraine.

The Ministry of Digital Transformation already plans to increase the digital literacy of 6 million Ukrainians during the next three years. According to the plan, 70% of those people will be between 35 and 65+ years old and reside in the regions.

The project includes two parts:

- Online - all educational programs on the webpage
- Offline - own and partner hubs for learning or accessing digital gadgets

On January 21, 2020, the Ministry launched the National Digital Literacy Education Portal "Action: Digital Education" in test mode. Today numerous courses are already available for the citizens (Дія. Цифрова освіта 2020).

Considering that the plan for raising the level of digital literacy has already been adopted, it is recommended to follow it. Such measures will help to increase the digital skills of the population and bridge the digital divide between the urban and rural areas.

Lastly, it is recommended to guarantee the effective promotion of the existing Civic Tech solutions. It was stated in the interviews that the Civic Tech organizations do not have capabilities to launch a nation-wide marketing campaign. In contrast, the state has all the possibilities to do that. Such a step will be useful for both citizens, government, and product owners since the application of e-solutions can bring numerous benefits discussed in the theory part.

To conclude, the government could profoundly affect the development of the Ukrainian Civic Tech by fulfilling several tasks. Some of them require considerable efforts once for some the will, and interest and intention is needed. However, now as Sofia Sakalosh mentioned: *"when the economic situation is intense, and Ukraine cannot allocate enough money to the projects, the state should at least provide the activists and existing projects with support, advertisement, and at the same time take money from the sponsors."* If the state recognizes the importance of the Civic Tech sectors and follows at least some recommendations, the positive dynamics would be expected.

In addition to the government, NGOs, incubators, and other civic organizations have issues that can and should be solved. The recommendations to them will be discussed further.

Category 2: NGOs and incubators

Since NGOs and incubators are one of the main facilitators for the development of the Civic Tech projects in Ukraine, it is highly important that they work effectively.

It was stated by one of the interviewees that numerous NGOs working in the sphere are lacking cooperation, which can have a negative effect on the sphere in general. In this regard, Kateryna Borysenko mentioned that *"NGOs should cooperate more, not to promote separate projects but to develop the Civic Tech sphere in Ukraine in general."* Therefore it is recommended to introduce joint programs that will help facilitate the creation of valuable Civic Tech solutions.

Besides, these stakeholders should organize nation-wide educational campaigns and projects to enhance the digital skills of both citizens and civil servants. Such measures will facilitate the wider application of the Civic Tech instruments, which, in turn, will benefit the interests of the society.

Additionally, the existing solutions since lots of people and communities are not aware of the instrument that can be applied. Besides, every topic of civic technology needs to be further promoted to inform and motivate the civic activist who may later propose a worthwhile project.

To conclude, the actions from both government and civic organizations are of paramount importance. However, if the citizens are not willing to work on the Civic Tech projects or their projects lack the quality, the support from the later is pointless. Therefore, the activist should follow the recommendations provided in the next category.

Category 3: Activists

When it comes to civil activists, the first thing they need to think about is whether their project brings added value to the people. Therefore, it is highly important to research the market at first - understand who the consumer is, what the needs are, who is the competitor, what is happening in this market, what are the financing options for this project. The primary research will also help to eliminate duplicating projects.

In this regard, Karyna Litvinova said: *"There are many ideas for innovation, but it is worth knowing exactly what kind of innovation a particular community needs - communicating with people, exploring their lifestyles and needs to understand the user as accurately as possible."*

Besides, understanding of the market, how the solution can be scaled, and the availability of the target audience will significantly increase the possibility of getting investment. Thus, by supporting civic technology, the funds take into account the added value that can be created through the project - reducing corruption, increasing citizen participation, saving the state budget, creating smart partnerships (Na Chasi 2018).

To sum up, a lot needs to be done by each of the stakeholders to improve the state of Civic Tech's development in Ukraine. In this case, the application of the enforced or focused innovations will be recommended by the author since these models foresee the top-down initiative, support, and constant cooperation between the professionals, internal and external stakeholders (Bekkers and Noordegraaf 2016).

Having summarized all the recommendations, the author proposes the following model that includes the components and actions needed for the sustainable development of the Civic Tech sector in Ukraine (Figure 8). The suggested model can also be implied in other contexts.

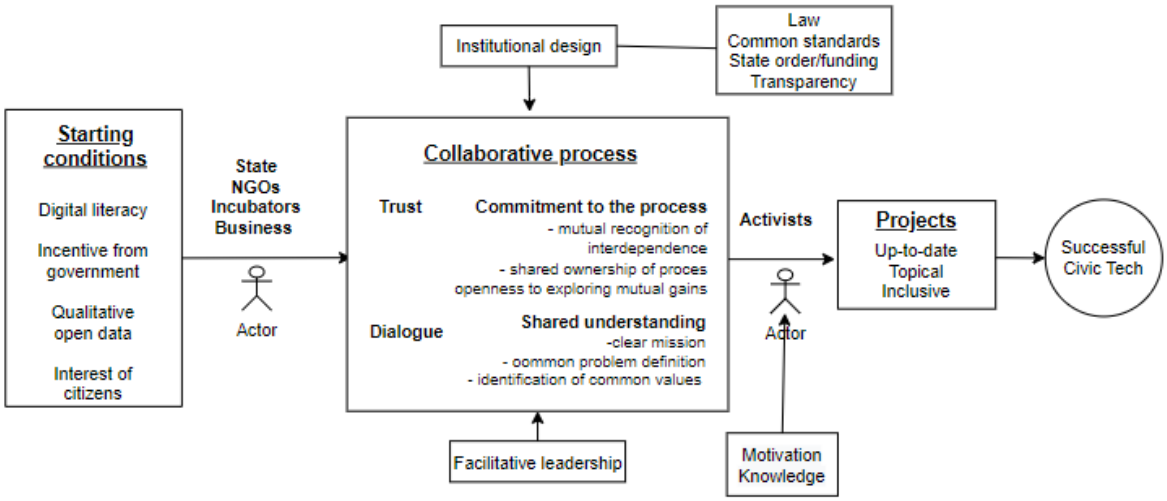

Figure 9 Model of successful Civic Tech

The first block of the starting conditions for the Civic Tech development includes the interest and sufficient digital literacy of the population, incentives from the government, and availability of the qualitative open data. Nevertheless, open data is not an obligatory element, it provides numerous possibilities for the sphere. Therefore, the author considers it to be a pre-condition for the successful Civic Tech development.

The second block represents the collaboration process between the involved stakeholders. It is important to sustain the constant dialog, achieve a sufficient level of trust, guarantee the commitment to the process, and shared understanding of the mutual goals. All of the involved parties should have a clear mission and cooperate for its achievement. Facilitative leadership and institutional design are stated to be additional success factors. The first includes the general empowerment and initiative of the parties. In contrast, the second one includes the institutional elements such as availability of the special law, common standards, state funding, transparency, etc. These conditions will facilitate fruitful collaboration for the sake of public good and will result in the creation of the Civic Tech projects, which are the next block in the model.

When it comes to the projects, it is crucial that their authors meet several conditions. Thus, it should be guaranteed that the projects are topical, consider the needs of the population, and are inclusive. The motivation and knowledge of the activist serve as a prerequisite for meeting these conditions.

In the end, the combination of these factors in the three main blocks creates a supportive ecosystem result in effective and successful Civic Tech development. The points in the blocks are not self-excluding, and additional factors can be added to each of the building blocks.

Summarizing, to achieve the profound changes in the Civic Tech sphere's advancement, Ukraine should officially recognize the priority of the sphere and create a favorable ecosystem for the seamless development of the projects. Besides, it is essential to establish close cooperation between the involved stakeholders to promote the sphere, motivate and educate the citizens, facilitate the development of new projects, and share the information about the existing solutions. At the same time, the activist should guarantee the quality, topicality, and inclusiveness of the developed projects.

In the end, all of these factors are expected to result in the successful development of the Civic Tech sphere that has a valuable effect on society.

6.3. Research results

To answer the main research question: “How Civic Tech is used to innovate the public sector in Ukraine?” the author provided the answer to the four sub-questions.

Thus, by overviewing the theoretical background in chapter 2, the author answered the sub-question: “*What enables innovations in the public sector?”* The main identified enablers included political push, collaboration, technological factors, and citizens initiative.

The literature review conducted in chapter 3 helped to answer the sub-question *“How can Civic Tech be used for innovating the public sector”.* The main implications were identified as instruments for increasing government transparency and accountability (such as open data-driven solutions), instruments to foster government-citizens communications (petitions, consultations, etc.) or citizens' role in decision-making (participatory budgeting, etc.).

Further, the formulation of the case study helped to answer the sub-questions 3 and 4: *“How are Civic Tech initiatives implemented in Ukraine” and “What are the limitations of Civic Tech development in Ukraine?”.* The last two questions were answered with the help of field experts’ interviews. The limitations were identified as the lack of state support and regulations, lack of cooperation and promotion, low digital literacy, and difficulty getting financing. Based on identified limitations, the recommendations for future development were provided, and the model of the successful Civic Tech sector was built.

The research helped to understand the prerequisites and success factors for the field’s growth as well as the existing problems. The received findings may be applied by the governments or other stakeholders to boost the development of the Civic Tech sector both in Ukraine and abroad or as a basis for future research. Besides, considering the correlation found between the enablers and barriers for the public sector innovation and for the development of the Civic Tech, the provided model might also be applied for innovating the public sector in general.

7. Conclusion

Several years ago, in Ukraine, the Civic Tech sphere was almost not existent. Recently, this trend has become more intensive - the activist community and the number of services and tools that simplify communication between citizens and authorities has grown sharply.

Nowadays, civic technologies are especially important for Ukraine, as they are a direct tool for combating corruption, enhancing the involvement of citizens in the processes of managing cities and the country as a whole, which are the most pressing issues.

This research was conducted under the main question: "How to innovate Ukrainian public sphere with the help of Civic Tech," aiming to identify the main enablers and barriers for the development of the Ukrainian Civic Tech sphere and provide the recommendation for coping with existing issues. For that matter, an exploratory case study was performed.

The research has shown that despite the general success of the Civic Tech field in Ukraine, numerous obstacles for its development exist. Thus, the main issues were identified as lack of incentives and support from the government, lack of cooperation between the stakeholders, lack of funding, low digital literacy, and some others, which correlate with the barriers for the public sector innovation identified in the theory part.

To cope with these problems, the set of recommendations were proposed by the author. In the end, these recommendations were presented in the model that can be applied by the states to facilitate the development of the Civic Tech sphere.

The research has shown that digital transformation, especially in the public sphere, is always a challenge. Therefore, only the synergy of politicians, government, the public, and business will be able to support such structural changes and transformations that will allow us all to live, learn, work, rest and conduct business in a "digital" world, directly involved in its creation and use of the technological solutions.

If Ukraine follows the recommendations and the needed level collaboration is achieved, the country will have the potential to become one of the leaders in the world. As it was stated in one of the interviews: "*If the tempo is not changed, we will be one of the world's leaders, at least at top 20 if not better. We have a really high intellective and social potential. The main task is not to burn out".*

8. Further research

The exploratory nature of research allowed the author to investigate the sphere, formulate the problems, and create recommendations on possible solutions and the framework that may be implied by other states. However, the generality and limitations of the study bring possibilities for further research.

Thus, the current study qualitatively overviewed the development of the Civic Tech sphere. Further research could investigate how to leverage the benefits and evaluate the impact of the Civic Tech implication in Ukraine. This knowledge, in turn, can be used for the research to identify if the implication of civic technology projects accelerates the public sector innovation and technical development faster as compared with similarly situated governments that do not implement Civic Tech. Such information would be helpful for future research and might be implied in the different contexts.

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Appendix I. List of interview questions

List of main interview questions to the interviewees:

1. How do you understand Civic Tech?
2. How would you rate the level of Civic Tech's development in Ukraine?
3. What are the main enablers of public sector innovation in Ukraine?
4. What are the main barriers to public sector innovation in Ukraine?
5. Who are the main stakeholders in the development of the Civic Tech sphere?
6. What role does the government play in the development of the civic tech sphere in Ukraine? Is there any "support" programs?
7. What is the main lesson you have learned while working in the sphere? Would you do something different?
8. What is the most successful Civic Tech projects in Ukraine, in your opinion? Why?
9. What are your recommendations for the successful Civic Tech development in Ukraine?
10. How do you envision the future of Civic Tech in Ukraine?