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# Mapping International Civic Technologies Platforms

**Aelita Skaržauskienė [1,*] and Monika Mačiulienė [2]**

[1] Social Technologies LAB, Mykolas Romeris University, Ateities g. 20, LT-08303 Vilnius, Lithuania

[2] Faculty of Creative Industries, Vilnius Gediminas Technical University, Saulėtekio al. 11, LT-10221 Vilnius, Lithuania; maciuliene@mruni.eu

* Correspondence: aelita@mruni.eu

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**Abstract:** The new communication paradigm supported by Information and Communication Technology (ICT) puts end-users at the center of innovation processes, thereby shifting the emphasis from technology to people. Citizen centric approaches such as New Public Governance and Open Government in the public management research suggest that government alone cannot be responsible for creating public value. Traditional approaches to public engagement and governmental reforms remain relevant, however our research is more interested in the ability of a networked society to resolve social problems for itself, i.e., without government intervention. In seeking to gain insights into bottom up co-creation processes, this paper aims to collect and generalize information on the international civic technology platforms by focusing on three dimensions: identification of the objectives (content), classification of main stakeholder groups (actors), and definition of co-creative methods (processes). In view of a paucity of research on Civic Technologies, the content analysis will extend the understanding of this growing field and allow us to identify the patterns in their development.

**Keywords:** civic technologies; co-creation; information and communication technologies

## 1. Introduction

A number of the EU strategic documents (e.g., Europe 2020 Strategy, EU Digital Agenda) stress the importance of the ICT-enabled society and open information access as the basis for fostering social innovations. Certain EU member governments are making significant investments in the eGovernment and eDemocracy projects to encourage citizen participation. To this end, since the year 2000 the EU has financed more than 70 projects in the field of ICT-enabled governance addressing issues at local, national and European level according to Prieto-Martín et al. [1]. Nevertheless, Europeans have much lower—and declining—confidence in European institutions, national parliaments and governments [2]. According to a 2016 Pew Research Centre survey, most people believe that the EU and its institutions are simply not listening to their concerns [3]. Hence, the EU desperately needs to make progressive innovations if it is to enhance public value co-creation processes and take them to the next qualitative level.

Customer-centricity such as this finds expression in the private sector in the concepts of service-dominant logic and open innovation. There is abundant evidence for this in the success of Google, Wikipedia, and Facebook which create shared value through Web 2.0 approaches. In the public sector, new public governance theories and open government initiatives suggest that government alone cannot be responsible for creating public value. Such a co-creative outlook is fundamentally different from traditional public engagement methods because it focuses on the collective influence and shared responsibility of quadruple helix entities. While civic engagement mostly refers to participation and

contribution to the existing initiatives and campaigns, a co-creative approach empowers citizens to generate their solutions, create new tools and find new ways of self-organization.

Traditional forms of public engagement and governmental reforms are still relevant; however, our research is more interested in the ability of a networked society to resolve social problems for itself, i.e., without government intervention. There is clear evidence this appears to be working globally with non-governmental organizations, individual citizens and socially oriented businesses developing digital tools to increase government transparency, efficiency and improve the lives of their communities [4]. Public organizations and individuals voluntarily are lending their talent and resources to help governments solve societal problems more efficiently

ICT-enabled co-creation entails several preconditions and challenges due to diverse context, backgrounds of the actors involved, and variety of methods used. The subjects of this research study are international civic tech platforms and their communication strategies as presented in their websites. The websites of organizations have become an important mechanism for communication of the economic and social goals, mobilizing stakeholder support and enhancing reputation. It is especially relevant in the ICT-enabled platforms, which conduct their operations and communications with users through digital means. Hicks et al. suggest that the organization's website is a valuable and easily accessible data source for researchers [5]. Our task was to better understand co-creation processes regarding civic platforms: to identify the objectives (content); to define the main groups of involved stakeholders (actors); and to determine the co-creation methods (processes). Given the paucity of research on civic technologies, our analysis will extend our understanding of the development landscape and note the patterns from which theories could later be generated.

## 2. ICT-Supported Co-Creation in Civic Technology Platforms

Together with governments becoming more user-centric and an increasing number of research studies focusing on the servitization (creating value through additional services) of the sector [6,7], design thinking efforts [8–10], and ICT-enabled citizen engagement initiatives [11–13], there has been an increase in digital solutions oriented towards co-creation developed by entities outside the government, such as civil society organizations, individual citizens and businesses. Civic technology (i.e., civic tech) is an umbrella term to define digital initiatives by civil society, private organizations and individual citizens. Developments in this field are influenced by innovations in three areas of communication including the growing connectivity through ICT, open data movement, and diversity in digital collaboration forms [14]. Mass participation in online interactions boosts intellectual capabilities, whilst open data increases the visibility and the more rapid identification of societal problems, and new collaboration and knowledge aggregation methods enable self-organization and collective decision-making. Yet, diversity in types of mediums, technologies and generated information leads to problems of cohesive coordination and decision-making, security and privacy, credibility, quality, and many more. Moreover, some Civic Tech initiatives focus only on the voice of citizens and tend to downplay the feedback from government and the importance of co-creative synergy [15,16].

For the most part, research on such platforms and tools fostering co-creation is bundled together with research into eGovernment and digital engagement strategies. The distinction between top-down technologies created by institutions and those created outside government control, however, is vital because government-initiated participatory systems "can be vulnerable to institutional biases and rationale, and the resulting tools may be built with inherent assumptions concerning the users' needs" [17]. The literature review resulted in a definition of two perspectives for the analysis of co-creation of public value. The streams differ on the understanding of the roles of governmental entities in the processes. Thus, top-down co-creation approach refers to the implementation, design, and evaluation of public services, participation in government-initiated platforms, data and content contribution, improvement of existing processes and services, user-centric approaches to service design (e.g., design thinking, service co-production). A bottom-up co-creation approach referring to the platforms emerging from outside the governmental sector. Such differentiation of research efforts allows to understand the co-creative use of ICT in the public sector better. According to Badger [18] and Suri [19], bottom-up platforms are not necessarily designed to be disruptive. In most cases, their

aim is to complement, overlay or disrupt existing information and communication channels previously monopolized by governmental institutions. The term civic technologies refers to the bottom-up approach to co-creation in the public sector. We note that the popularity of the term is growing in academic circles.

Although there is a wide agreement that ICT application in governance leads to positive effects for society [20,21], they should not be seen as an antidote for all problems. According to Bruns & Swift [22], such projects frequently lack measurable impact on policy processes and may generate endless debates with diminishing outcomes. In this sense, technology acts as an enabler of information diffusion [23], improve insights and facilitate coordination [24]. Yet, social interactions remain highly complex and technology alone is incapable of fueling collaborations [25]. According to Cobo [26], despite the potential to produce powerful results, most initiatives fail to yield innovative solutions, the consensus among stakeholders or even collective action of any kind. Hence, a more structured approach to ICT-enabled initiatives is needed in order to synthesize and generalize current research efforts. As discussed before, civic technologies accurately represent the digital co-creation because of the involvement of various groups of society, the employment of Web 2.0 tools and also their social orientation. Due to their small scale, the components and networks of civic technologies are more evident and more open to analysis than the more complex national systems of ICT-enabled services.

The research presented in this paper will contribute theoretically and empirically to the research stream on co-creation by focusing on the ICT-enabled collective actions of citizens, communities, governmental organizations, business entities, NGOs (Non Governmental Organization) and other stakeholders.

## 3. Methodology for Mapping Civic Technology Platforms

In seeking to gain insights into ICT enabled co-creation processes, this paper will collect and generalize information on the international Civic Tech platforms. The objectives of the research are three-fold—to identify the objectives (content), to define the main groups of involved stakeholders (actors), and to determine the co-creation methods (processes). The content dimension includes deliberation of the main goals and objectives of the actors involved. Knowing why individuals and organizations build platforms and why citizens participate in them, can guide the organizations and civic leaders in fostering ICT-enabled platforms. The value creation in the public sector and third sector is very different from the public sector—the inputs are the same, but the outputs are very different, e.g., social cohesion, increased social good, etc. [27]. The goals of organizations in the field, hence, should be related to the mission of the organization and the central concept of this dimension is the value proposition [28,29].

The actors' dimension refers to individuals and organizations participating in the service ecosystem, their roles and resources. Several research studies propose that roles, perceptions and capacities of actors involved play a central role in co-creation. The authors suggest that three broad groups participate in public service co-creation i.e., public administration, citizens or citizen organizations and businesses consisting of various subgroups. These players can be both the drivers and barriers in the co-creative processes. Hardy et al. [30] suggest not all collaborations realize their potential. "Many collaborations fail to produce innovative solutions or balance stakeholder concerns, and some even fail to generate any collective action whatsoever". Hence, the understanding of the actors involved in ICT-enabled co-creation and the roles they can perceive is crucial. Åkesson [31] argues that heterogeneity of actors and resources involved in the ecosystems leads to productivity. The research literature emphasizes the role of intermediaries in ICT-enabled co-creation, especially initiatives requiring more technical knowledge. The intermediaries can be NGOs, media or individual citizens with specialized knowledge. Van Schalkwyk et al. [32] claims that such actors can increase utility of open government data and serve a democratizing function by translating it to the masses. Reggi & Daves [33] add that intermediaries are key in representing citizen interests or helping citizens represent themselves. Despite the diversity of actors involved in any ecosystem, it is possible to identify different types of actors, and segment them and understand the nature of their relationships within a defined context.

Regardless many and varied efforts in pursuing collaborative agendas, the public sector is lagging behind the adoption of co-creative methods [34]. Some ICT-enabled initiatives of co-creation within the public services context have failed [35] or led to modest outcomes [36,37]. Collaborative methods refer to the transformation of citizens and other stakeholders from the passive onlookers to the active contributors. According to Sherriff [38], co-creation happens through three dimensions: (1) horizontal movement—learning and working with parallel organizations, (2) vertical movement—working with stakeholders in the service delivery chain, and (3) intensity—fact-finding engagement through to shaping an outcome with citizens. Hilgers [39] suggests three dimensions of citizen engaged governance through citizen sourcing: (1) citizen ideation and innovation i.e., general knowledge and creativity potential within citizenry through open innovation platforms, (2) collaborative administration i.e., integration of citizens for enhancing existing public administrative processes and (3) collaborative democracy i.e., new ways of collaboration to improve public participation in the policy process. The notions discussed also place great emphasis on the role of ICT tools in enabling co-creative processes. Based on literature review we designed our research methodology on methods around following dimensions: maintaining networks and communities (vertical and horizontal movement), developing and applying ICT technologies and digital communication tools, and employing data through open data movement.

## 4. Empirical Research Design

Our study was conducted in three stages (from January to May, 2019 and from July to September, 2020): (1) sample collection; (2) textual data scrapping; and (3) quantitative content analysis. The steps are described in detail in this section. Firstly, the non-probability sample selection method has been used based on the characteristics and objectives of the study [40]. The civic tech platforms were identified through the review of previous studies on citizen engagement, eGovernment, and social technologies by scanning scientific databases and other direct sources (European project databases, venture funding databases, webpages of municipalities, popular blogs, etc.), searches for applications based on a list of major NGOs and original Google searches on a variety of civic engagement-related terms. Civic technology, or civic tech, enhances the relationship between the people and government with software for communications, decision-making, service delivery, and political process. The initial list of samples included 1702 organizations found in the research outputs of leading research organizations in the field (GovTech100, Microsoft Civic graph, digitalsocial.eu, Nominet Trust, Knight Foundation Research). Included in the sample were 614 Civic Tech platforms operating on a global scale based on the criteria detailed in Table 1, "The Research Sample Selection Criteria". A larger sample of platforms allowed us to add quantitative dimensions to the research findings.

**Table 1.** The Research Sample Selection Criteria**.**

| Criteria | Description |
|---|---|
| ICT-enabled | The platforms deploy and adopt Information and Communication Technologies. |
| Interactive | The platforms are open, inclusive and collaborative. |
| Profit orientation | The platforms may be for non-profit as well as for profit; but their overall objectives should serve the community. |
| Contributors | The platforms are capable of including a large number of members. |
| Social orientation | Civic technologies with identified common social goal and use innovative collaboration technologies. |
| Duration | Projects with minimum of 1 year of activity. |
| Data availability | Goals, metrics, initiators listed on the platform website. |
| Collaborators | Projects allow collaboration between citizens and/or business and/or NGOs and/or governments. |
| Language | All civic tech platforms reviewed had to present their activities in English. This facilitated the work of assessing the platforms and comprehending their use. |

Source: developed by authors. Information and Communication Technology—ICT; Non Governmental Organization—NGO.

In the second stage of the research, semi-automated text mining techniques were applied to extract information from website content [41,42]. Publicly available information on platforms' goals, partners, and participant groups was collected by using the data mining tools 80legs (Datafiniti, LLC, Austin, TX, USA) and VOSON (Virtual Observatory for the Study of Online Networks Lab, The Australian National University, Canberra, Australia). Various text-mining techniques allowed us to identify and trace the patterns, trends, and models in unstructured textual data sets. The broader understanding of the co-creation context was provided in the third step combining other data collection methods with content analysis. To analyze textual data, we used NVivo software (QSR International, Burlington, MA, USA) to increase the level of accuracy, obtain more details and standardize the coding by processing large quantities of data, NVivo is especially useful when processing large quantities of data in early stages of the analysis process—identifying the themes and patterns. Later coding and analysis stages, however, are heavily influenced by the personal traits of the researcher. Notwithstanding, NVivo has methodological limitations despite its wide applicability and benefits, and whilst it is intended to facilitate research it cannot independently analyze data and draw conclusions. In our case, the coding procedure produced data generalization reports by summarizing the prevalence of codes in different segments, highlighting the differences between various codes and their groups, and comparing the relations between the codes, contexts, and sources. In this way, the analysis was converted to conceptualization and theorization.

## 5. Mapping International Civic Technology Platforms: Goals, Actors and Methods

This section presents empirically derived data used to design civic platforms classification regarding their goals, the actors involved, and methods applied. The analysis of content sought to link research insights identified during literature analysis with the data, their categories and contexts obtained. During quantitative content-coding, three main content categories where established: the goals of the civic technology, the target groups and the methods used to achieve the goal. The categories and subcategories identified are illustrated in Figure 1 "Content Analysis Coding Categories" below. Later in this section, we present a detailed review and analysis of the categories in comparison to each other.

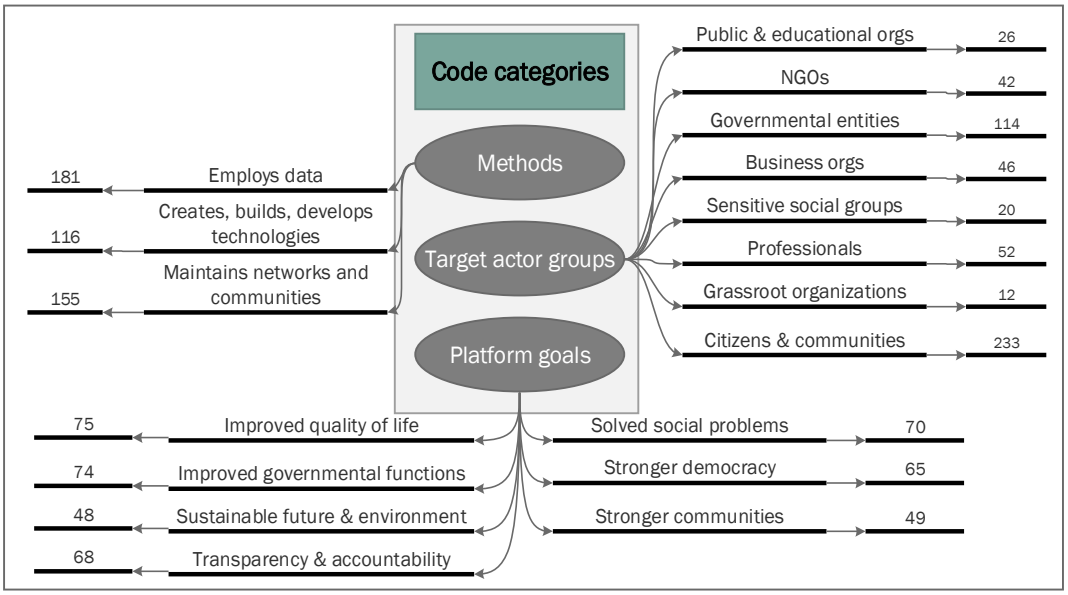


**Figure 1.** The Content Analysis Coding Categories. Source: developed by authors. Non Governmental Organization—NGO.

Analysis of the content in websites of the platforms allowed us to identify the main goals these platforms were seeking. (See Table 2) For example, the first group of goals—improved government functions—refers to the digitalization of public services, improved organizational capabilities of public institutions and improve public decision-making processes. The second group—improved quality of life—refers to civic technologies aiming at improving day-to-day activities of citizens e.g., healthcare services, improved education, make accessibility a priority. The third group—solve societal problems—refers to platforms aiming to tackle complex challenges in societies (e.g., closing the gender gap, sexual harassment) and increasing awareness about such issues. Platforms oriented towards strengthening democracy provide tools to improve voting, civic engagement and freedom of expression in society. Platforms aiming at the creation of stronger communities provide us with the means to create and mobilize networks and online communities. Sustainable future and environment platforms are oriented to protecting the environment by creating tools on sustainable transportation, conscious shopping or maximization of circularity of digital devices. The last group—transparency and accountability—refers to platforms making government data open, accessible and understandable to transform and improve governance. The distribution of platforms in the sample by goals is equal, with slightly lower numbers of platforms oriented towards stronger communities and sustainable future.

**Table 2.** Structured Goals of International Civic Technology Platforms.

| Category | Platform Count | Illustrative Quotes |
| --- | --- | --- |
| Improved governmental functions | 74 | *"helps cities make sense of their data" (Cityzenith); "fully integrated, Web-based platform for government affairs professionals who need to accurately identify congressional staff, monitor activity on Capitol Hill, and engage with members and staff" (LegiStorm Pro); "offers the only complete true cloud solution that can meet all operations management needs for government" (BasicGov)* |
| Improved quality of life | 75 | *"improves education for millions of students and educators through educational resources powered by cloud technology " (Boundless); "makes life easier for people with a visual impairment by connecting them with sighted helpers through a smartphone app" (Be My Eyes); "mission is to make cities better places to live" (Metropia)* |
| Solved societal problems | 70 | *"designed to provide social organizations with the pro bono data science innovation team they need to tackle critical humanitarian issues in the fields of education, poverty, health, human rights, the environment and cities" (Code for Australia); "enables society to collaborate and solve the most urgent challenges of our time" (Babele); "believes in technology's huge potential to empower activists and humanitarians to create lasting and impactful social change" (Hack4Impact)* |
| Stronger democracy | 65 | *"aim at exploring new and exciting ways of enhancing population involvement in society, helping people changing their own tomorrow" (Changetomorrow); "Our mission is to* |

| | | |
|---|---|---|
| | | *strengthen the democratic process by making it easier for people to get involved and implement solutions that improve their communities" (Civicnomics); "location-based consultation platform that solves the problem of how to engage with people online within specific geographical boundaries" (PlaceSpeak)* |
| Stronger communities | 49 | *"provide the means for communities to come together and drive positive change in their area" (Civicrowd); "empowers communities in need by creating scalable technology solutions" (Benetech)* |
| Sustainable future & environment | 48 | *"allows socially conscious users to scan bar codes as they prowl store aisles and determine whether a product's maker has any marks on its record they should consider when making a purchase" (Buycott); "the only App for parking space sharing that features a physical wireless sensor providing its users reliable check-in/check-out control" (PickParking); "technology-driven non-profit with a mission to protect the environment by making more of it visible" (SkyTruth)* |
| Transparency & accountability | 68 | *"mission is to spur corporations to be transparent and responsive" (WikiRate); "Upload, Visualize, Analyse public budget and spending data" (OpenBudget.eu); "We bridge the digital divide between the public and government data, tapping the potential of open data to help you cope, communicate, collaborate, and grow" (Vizalytics)* |

Source: developed by authors.

The next analysis dimension refers to the target groups identified during the content analysis of international civic technology platforms. See Table 3, "Target Groups of International Civic Technology Platforms" for distribution of target groups in the sample. This table shows that the platforms are mostly oriented towards citizens and governmental organizations and rarely include other relevant groups in their activities.

**Table 3.** The Target Groups of International Civic Technology Platforms.

| Target Groups | Number of Mentions | Illustrative Quotes |
|---|---|---|
| Business organizations | 46 | *"enterprises", "private enterprises", "entrepreneurs", "funders", "property owners", "SME's"* |
| Citizens & communities | 233 | *"civil society", "communities", "commuters", "consumers", "crowd", "households", "families", "good people", "individuals", "people", "real people", "residents", "the public", "voters", "anyone interested"* |
| Governmental entities | 114 | *"cities", "municipalities", "local government institutions", "institutions",* |

| | | |
|---|---|---|
| | | *"parliament", "law enforcement institutions", "government"* |
| Grassroots organizations | 12 | *"advocates", "local activists", "grassroots movements"* |
| NGOs | 42 | *"advocacy organizations", "change makers", "civic organizations", "non-profit professionals", "social organizations", "social movements", "watchdogging organizations"* |
| Professionals | 52 | *"artists", "layers", "tech talent", "experts", "creative practitioners", "programmers", "IT specialists", "technologists"* |
| Public & educational organizations | 26 | *"colleges", "universities", "cultural institutions", "schools", "libraries"* |
| Sensitive social groups | 20 | *"disabled", "people in need", "people with visual impairment", "wheelchair users, "older people"* |

Source: developed by authors.

A comparative analysis of the identified dimensions in the sample is illustrated in Tables 4 and 5. Analysis of the variety of target groups indicates that platforms rarely include more than two groups of stakeholders in their activities, which can be seen in Table 4, "Distribution of Target Groups in the Sample", showing the appearance of the target groups in the platform content.

**Table 4.** The Distribution of Target Groups in the Sample.

| | **Business** | **Citizens** | **Gov. Entities** | **Grassroot Orgs.** | **NGOs** | **Professionals (ind.)** | **Public & Edurgs** | **Sensitive Social Groups** |
|---|---|---|---|---|---|---|---|---|
| Business org. | - | 1 | 1 | 0 | 1 | 0 | 2 | 0 |
| Citizens & communities | 1 | - | 17 | 3 | 6 | 1 | 1 | 1 |
| Governmental entities | 1 | 17 | - | 0 | 1 | 2 | 2 | 1 |
| Grassroots organizations | 0 | 3 | 0 | - | 3 | 0 | 1 | 0 |
| NGOs | 1 | 6 | 1 | 3 | - | 0 | 1 | 1 |
| Professionals (individual) | 0 | 1 | 2 | 0 | 0 | - | 0 | 1 |
| Public & educational orgs | 2 | 1 | 2 | 1 | 1 | 0 | - | 0 |
| Sensitive social groups | 0 | 1 | 1 | 0 | 1 | 1 | 0 | - |

Source: developed by authors.

Table 5, "Distribution of Platforms in the Sample based on Target Group and Goals Dimensions", shows that platforms oriented towards citizens and business organizations represent the widest spectrum of platform goals. International civic technologies geared towards the improvement of life quality and solving social problems include the broadest range of target groups in the content of their platforms.

**Table 5.** The Distribution of Platforms in the Sample based on Target Group and Goals Dimensions.

| | Improved gov. Funct. | Improved Quality of Life | Solved Societal Problems | Stronger Democracy | Strong. Communities | Sust. Future & Environment | Transpar.& Account. |
|---|---|---|---|---|---|---|---|
| Business org. | 0 | 0 | 2 | 0 | 2 | 3 | 3 |
| Citizens & communities | 17 | 11 | 12 | 19 | 20 | 9 | 12 |
| Governmental entities | 27 | 6 | 2 | 3 | 5 | 3 | 9 |
| Grassroots organizations | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| NGOs | 1 | 1 | 5 | 3 | 0 | 1 | 1 |
| Professionals (individual) | 0 | 2 | 3 | 1 | 4 | 2 | 1 |
| Public & educational orgs | 0 | 6 | 0 | 0 | 0 | 0 | 1 |
| Sensitive social groups | 0 | 3 | 3 | 0 | 0 | 0 | 0 |

Source: developed by authors.

Another dimension of analysis allowed us to evaluate platforms based on the methods they are employing to reach their goals. Three groups of methods were established, including the development of technologies (155), the employment of data (116) and the maintenance of networks and communities (181). The first group refers to the development of software, mobile applications, and other technological solutions. The second group relates to the employment of data by the collection of information, ideas, and content, data exploration, and management, the creation of databases and publishing of critical data in simplified formats for wider audiences. The last group refers to the maintenance of networks and communities. This method uses tools, which allow us to connect different social groups and build alliances, communities of practice, and networks aimed at advocacy, etc.

Table 6, "Distribution of Platforms in the Sample Based on Dimensions of Methods and Goals", shows that platforms maintaining networks and communities represent the broadest variety of goals.

**Table 6.** The Distribution of Platforms in the Sample Based on Dimensions of Methods and Goals.

| | Creates Tech Solutions | Employs Data | Maintains Networks and Communities |
|---|---|---|---|
| Improved gov functions | 11 | 8 | 13 |
| Improved quality of life | 3 | 7 | 14 |
| Solved societal problems | 9 | 2 | 10 |
| Strengthened democracy | 7 | 8 | 8 |
| Stronger communities | 6 | 5 | 9 |
| Sustainable future & environment | 7 | 7 | 2 |
| Transparency & accountability | 3 | 9 | 9 |

Source: developed by authors.

Table 7 "Distribution of Platforms in the Sample Based on Dimensions of Methods and Target Groups" shows that citizens are the most represented group in the sample through the perspective of methods applied, followed by governmental institutions.

**Table 7.** The Distribution of Platforms in the Sample Based on Methods and Target Groups Dimensions.

| | **Creates Tech Solutions** | **Employs Data** | **Maintains Networks and Communities** |
|---|---|---|---|
| Business orgs | 7 | 6 | 4 |
| Citizens & communities | 37 | 22 | 44 |
| Governmental entities | 21 | 13 | 25 |
| Grassroots organizations | 1 | 0 | 1 |
| NGOs | 8 | 6 | 7 |
| Professionals (individual) | 4 | 2 | 16 |
| Public & educational orgs | 2 | 2 | 6 |
| Sensitive social groups | 0 | 2 | 3 |

## 6. Conclusions

In view of the relative absence of research on Civic Technologies, this paper presents generalized results on the platforms' development landscape and identifies the patterns and tendencies from which theories could later be generated. The subject of the research study was international Civic Tech platforms and their communication strategies as presented in their websites. Our objectives of the research were three-fold: to identify the objectives (content); to define the main groups of involved stakeholders (actors); and to determine the co-creation methods (processes).

Our content analysis of international Civic Tech platforms' (sample of 614 international platforms) was both quantitative and extensive, deepening our insights into what goals they seek to achieve. In the course of our research into communication strategies of the platforms, we identified three vital groups of tasks. The first of these was improving government functions, which refers to the digitalization of public services, improved organizational capabilities of public institutions, and improve public decision-making processes. The second was enhancing quality of life which refers to civic technologies aimed at improving day-to-day activities of citizens e.g., healthcare services, education, accessibility, etc. The third task was tackling complex challenges in societies (e.g., closing the gender gap, sexual harassment) and increasing awareness about such issues. The variety and amplitude of tasks can be described as wide and covering the most important social challenges of modern society. Communities in pursuit of their vision and desire to implement their mission, solve problems and perform actions, adaptively reacting to the essential problems. Platforms oriented towards strengthening democracy, protecting the environment and sustainable future represent smaller group of communities. These platforms mobilize networks and online communities with the task to create sustainable future by creating tools on sustainable transportation, conscious shopping or maximization of circularity of digital devices, etc. The last group—transparency and accountability—refers to platforms making government data open, accessible and understandable to transform and improve governance. We can conclude, that the variety and amplitude of tasks is wide and covering the most important social challenges of modern society. Communities in pursuit of their vision and desire to implement their mission, solve problems and perform actions, adaptively reacting to the essential problems.

Even though networks are considered to be an important part of co-creation processes, current research provides a limited exploration in this subject. Our research on the distribution of target groups revealed limited involvement of different stakeholders in platforms activities. The civic tech are mostly oriented towards citizens' communities and governmental organizations and rarely include other relevant groups or communicate with stakeholders in their campaigns. International civic technologies geared towards the improvement of life quality and solving social problems include the broadest range of target groups in the content of their platforms. However, most of the initiatives focus only on the formation of a societal "voice" and do not emphasize the feedback from government and the importance of co-creative synergy. Hence, more governmental support and broader stakeholder involvement are needed to achieve sustainability of such initiatives. Online platforms rely on the effects of networks' power—the more actors they attract, the more valuable they become for those actors in terms of value creation.

The tools and platforms enabling co-creative processes bring a number of advantages to the communities, governments and other involved stakeholders. Three main groups of methods used in civic tech platforms were established by analyzing: empirical research data; the development and application of ICT technologies; employment of open source data; and the maintenance of networks and communities. The results show that platforms initiated by citizens and communities are the most represented group in the sample, considering the perspective of methods applied, followed by governmental institutions. Nevertheless, ICT enabled tools have several shortcomings which need to be discussed in more detail to get a more in-depth view of the concept. The first drawback is the lack of integration of such tools in daily lives of citizens. New technologies are being introduced daily, yet the metrics in the platforms (i.e., a number of users, return visitors) show that most of them are not viable when compared to metrics of tools created for everyday use (e.g., taxi rides, shopping).

Platforms focusing on the maintenance of networks and communities represent the broadest variety of goals. Participatory technologies are developed with the aim of expanding participation opportunities for all, but the way it is set up and designed may exacerbate political and social inequalities. Many citizens and potential platform users have limited or no access to digital technologies or even the Internet, so that civic tools may increase the divide and further marginalize those already limited in exerting power. It also continues to focus on segments of society which is already high on privilege scale based on education, tech skills, social class, thus limiting the expected recreation of civic society. Civic technologies also involve risks related to information security, privacy and data protection. Some types of platforms gather the personal information of citizens (e.g., location, activities, political opinion). If multiple data sets are combined, they might reveal sensitive information. Hence, careful screening and regulations are needed from data protection perspective.

Further, since collaborative platform users create added value, applying various communication and knowledge sharing methods supports the successful implementation of the objectives. In summary, and concerning the results on co-creation methods, we argue that online platforms should be designed to pursue a particular objective and that the methods used must explicitly represent the pursuit of this objective.

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