DIGITAL INITIATIVES TO INCREASE THE DIGITAL SOCIAL SYSTEMS IN THE EUROPEAN UNION

CIVIC ENGAGEMENT INNOVATION: HOW ICTS SHAPE THE RELATIONSHIP BETWEEN STATE AND CITIZENS

Civic engagement is a vast and varied area of study including different initiatives with distinctive ownership and governance arrangements. Moreover, the pervasive nature of ICTs in and for social innovation in civic engagement is manifested differently across various initiatives. These findings make this topic important in the conceptualization and application to areas such as Smart City and e-Government. Whilst we pursue researching the classification and relative conceptualization of ICT-enabled civic engagement innovations, we have uncovered that such variety extends across the types of initiatives as well as transversally in the way technologies are applied. These considerations have implications for research and policy.

In general terms, the role of ICTs in the creation of civic engagement service innovation has been analyzed in functional terms with respect to the contribution to the innovation potential of the service embodied in the initiatives mapped. To a greater extent we have identified the two main avenues through which technologies are integrated in civic engagement innovations.

- On the one hand ICTs are operand in terms of fostering efficacy and efficiency in the delivery and fruition of services.
- On the other hand, ICTs work as operant, they are integrated part of service design.

In the first case, technologies are used to update and upgrade civic engagement services providing a modern support structure upon which delivery and fruition of services enables more effective and efficient civic engagement. In initiatives where ICTs have been fully integrated in the creation of new services or in new mechanisms for the delivery and fruition of services, we can also see that the technological infrastructure, typical of the operand role ICTs, is used as a basis upon which these new services/new mechanisms may be created. In other words, operand technologies often constitute the support ICT infrastructure upon which operant ICTs may be integrated for the creation, delivery and fruition of new services. This is more evident when we analyze the initiatives under the lens of the service design logic. We can see that whilst sustained or incremental innovation provide the means for the initiative to upgrade and update the organization behind the delivery of services, radical or disruptive civic engagement services manifest with the integration of new/customized technologies in all four phases of the service logic in some case enable the creation of a new ecosystem where integration of resources and delivery/fruition mechanisms may be institutionalized for the extraction/creation of new value for citizens and government. ICTs do not necessarily need to be cutting edge innovation to play a fundamental role in service provision. Well assessed and high performing ICTs might change the paradigm of a service, opening it to unexpected opportunities for managing public and private assets. This happens when ICTs act on the inner architecture of a service, changing the nature of interactions between core components, changing the intraorganizational levels, enabling new partnerships or business/financial models while reinforcing the core design concepts. In these cases, ICTs change the structure of a service allowing the inclusion of innovative features and additional means to create added value for the community.

New technologies might act as game changer in services paradigm, unveiling new collaborative social services. This is the case, for example, of the adoption of block-chain or artificial intelligence: the former providing transparency and accountability in the public services provision, while the latter enhancing the interaction between citizens and the services providers. Let us think for a moment to the application of machine learning algorithms to linked open data. In the medium-to-long term context of opening up data, services and decisions in the public sector through innovative ICTs, the opportunity offered may trigger new perspective on the ability to store and manage the data, opening also doors to non-state actors to provide state-like and complementary services.

Regarding service integration and distributed governance/ownership – there is not a clear-cut relationship between the ownership/governance system and the innovativeness of civic engagement initiatives.

Certain governance and ownership arrangements certainly have an impact on the type of innovation and on the kind of value the initiative provides. For example, those initiatives spearheaded by technology-savvy and innovation-driven social entrepreneurs or forward looking third sector organizations are more likely to propose substantial civic engagement innovations than government agencies looking at making efficiency savings on the provision of outreaching services. Though there are exceptions. For example, government agencies operating in highly digitized communities may be able to pass substantial reforms and, as a provision, deliver high-value innovative civic engagement services.

At the same time, traditional third sector organizations operating in digitally divided communities may be more conservative in the ideation, development and deployment of innovative civic engagement services. Along these lines of enquiry, more explanatory power may be obtained by looking at the innovation orientation of the ownership and at the ecosystem within which the initiative is operating. In particular, it is important to understand the innovation push/pull forces operating within the ecosystem and how these are conveyed by the social policy actors in order to identify a causal relationship.

One last point of discussion concerns the representativeness of the sample. In particular this work emerges from the need to understand and classify types of different social innovation initiatives in the civic engagement domain in terms of their innovativeness and the use they make of technologies, in particular digital technologies.

Integrating ICTs into civic engagement innovation may happen through two main routes. One entails that technologies are used to rationalize and increase efficiency in civic engagement services either through digitization of those supporting activities that once were undertaken in an analogic mode (i.e. back office and case management) or through the digitization of existing services so that its fruition by the beneficiaries may be enhanced (i.e. on line services access 24/7). Even though in these cases we may think of the introduction of technologies as a shift of civic engagement from the ‘real’ to the ‘digital’ world, new dynamics in the design and deployment of such services may entail changes both in the governance/ownership system and in the relationship between the service provider and the citizens. In particular we can see that re-organization and new management practice may be necessary to digitize these services to reach efficiency targets and/or to rationalization objectives. Rarely these capabilities are held in house by the service provider. Governmental agencies usually go through this process through procurement channels whilst initiatives led by the third sectors and private actors may be, at the beginning, of limited scope and then, once tried and tested, they may be scaled up so to roll on efficiency gains and rationalization through to the organization or via partnerships.

A second route consists in the integration of technologies within the service design providing new concept services or new ways of organizing service delivery and fruition. These cases may follow more efficient/effective new ways of providing value through applying novel technological solutions or provide

civic engagement services in new ways that otherwise would not be possible. Whilst in the first case we may think at a radical-type of innovation, in the second case the type of innovation is disruptive.

In both cases though, we can see that the role of ICT is key for the delivery of the services. In some cases the new technology constitutes the service itself. This class of civic engagement innovations are born digital. In those initiatives, the relationship between the service providers and citizens is completely re-designed because of the innovative approach of the service provided; there is no experiential blue-print, therefore the relationship between government and citizens is designed by the provision-delivery fruition of the services.

INNOVATION POLICIES AND BIG DATA: OPPORTUNITIES AND CHALLENGES

Innovation policies act as the main link between ideas and innovations with tangible results in the form of competitiveness, wealth creation and increase of welfare. From the beginning, innovation policies have been closely linked to analytical methodologies enabling in each case to know and improve the results of their implementation. Although all the techniques traditionally used show undeniable advantages and offer an added value compelling to the policies themselves, there are certain shortcomings that make the response of the traditional methods of analysis not to be entirely satisfactory, especially in the current and future context.

Part of the lack of effectiveness of these analysis methodologies can be explained by the huge and rapid technological change that the world is living in recent years. This change is defined by trends such as globalization, hyper-connectivity, the explosion of information and communication technologies, and others that endow our daily life with dynamism never seen before in history. Traditional methods of making and assessing innovation policies crash against this reality and the shortcomings deriving in part from the need to control the vast amount of information that is generated in the world at every moment and to respond quickly to the information contained in these data.

Thus, Big Data analysis applied to the public sector is presented as an ideal solution adjusted to these requirements and a step forward from traditional methods as it suppress technical barriers inherent in mathematical and statistical processes, it enables to handle a larger amount of information from different sources, it allows to identify new opportunities not foreseen in the initial analysis, and even it improves the performance of the private sector.

Currently the application of Big Data analysis to the public sector foretells potentiality, but there is still a long way ahead. As suggested by most of the current initiatives in the public sector do not use large data in the strict sense of the term, because projects normally do not use data in real time or they use unstructured data; in addition, the greater part of Big Data applications are being used by the private sector, and many of the most ambitious in the public sector are still in the preliminary stages of exploitation, what leaves a broad room for improvement in this field of analysis within the public sector.

In addition, the implementation of Big Data within innovation policies is not a straightforward process as lessons learnt from the private sector cannot be directly extrapolated to the public sector. In the first place, innovation policies are developed in a cycle that contains different phases. For each phase there is a more fitting technique dealing with the analysis of large data. In consequence, it is better to visualize policies not as a whole but as an achievement of different stages with particular needs.

On the other hand, developments in innovation policies and Big Data analysis are needed to remove some barriers that today make the application not so straightforward. It is needed to highlight the need for improve data quality, integration, access, reliability and privacy, the importance of establishing new

mechanisms of multilevel coordination, the need to make progress in other developments, technological or not (such as the Internet of things or open data policies), as well as the obligation to consider and adapt the specificities of the innovation policies cycle to the reality in such aspects as time frame, actors involved, consideration of subjectivity and values, rigidity of the public processes, and need for access to the best experts, among other factors.

And the most important thing: the application of this analysis method will lead to a radical and disruptive change not only in the outcomes of innovation policies, but especially in the processes of design and implementation, something that demands a deep reflection on the new forms in which innovation policies and subsequent actions will be developed to prepare the different ecosystems to the new reality of policy making.

USING DATA ANALYTICS RESULTS IN PRACTICE: CHALLENGES AND SOLUTION DIRECTIONS

Nowadays, organizations are searching for opportunities to take advantage of the explosive growth of data that is taking place in recent years. It is becoming a common practice in businesses and the public sector to collect and integrate data from different information systems and to apply advanced data analytics tools on them. There is a practical urge to improve business and public processes or to launch new services on the basis of the findings obtained with data-driven analytics.

However, the utilization of these findings in practice is not straightforward for several reasons. These reasons include, inadequate transformations of statistical truths to individual cases, chances to fall into the trap of system realities, and enormous efforts that are required to face the challenges involved with collecting and integrating data.

The above-mentioned reasons mainly have their origins in three fundamental concepts.

- First, the so-called closed-world assumption, i.e., the assumption that the data stored in information systems are true as facts, does not hold in practice. Due to poor documentation of the data, the unclear meaning of NULL values, neglecting part of the required data, and a changing environment, determining the semantics of the data is often founded on (implicit) knowledge of domain experts, which can be marked as an educated guess. As a consequence, uncertainty with regard to the truthfulness of the semantics of data is introduced.

- Second, the results obtained from data-driven analytics are based on induction, even when assuming that appropriate data analysis methods are devised, and therefore, the results may give rise to doubts and uncertainties.

- Third, each information system is a model of a real-world phenomenon, and therefore it is an incomplete description of the concerned phenomenon and its relation to other phenomena.

These fundamental concepts cause those findings obtained by data-driven analytics become uncertain, incomplete, and maybe biased. As a consequence, there is a gap between the findings of data-driven analytics and what occurs/occurred in the real world. This considerably complicates a proper interpretation of these findings.

Despite the challenges in interpreting the findings of data analytics tools, we argued that the findings may augment real-world ecosystems by proposing two strategies to facilitate the interpretation of the data analytics findings.

Both strategies consider these findings as a central body of evidence. However, one strategy tends to accept the findings by searching for evidences that support the central body of evidence, while the other strategy tends to reject the central body of evidence by means of counter-evidences. Depending on the application at hand, one of the strategies or a mix of both strategies may be chosen.

In the future, search for guidelines to tailor the strategies to different types of domains and application areas will answer questions such as:

- How many and what kinds of evidences are required to accept or to reject the central body of evidences?
- How should different evidences be weighed?

A MODEL FOR EVIDENCE-BASED SOCIAL POLICY MAKING, DRIVEN BY BIG DATA, DYNAMIC SIMULATION AND STAKEHOLDERS' PARTICIPATION

Research and policy efforts have been concentrated on the pivotal role of coordinating public and private initiatives for embedding innovation in welfare systems and pursuing social objectives.

On the one hand research has demonstrated that social innovation consists a core aspect of social investment and on the design of social policy reforms.

In parallel policy steps are taken to capitalize on social innovation for tackling wicked problems of the society and step up our social investments in human capital.

However, there is limited practice in what is called 'data driven innovation'. Although ICT in general is considered as fundamental element of social innovation and big data is forcing the paradigm of evidence decision making, there is a lack of an approach combining all these key drivers.

A framework for the incorporation of social innovation in evidence-based policy making is needed. Its process model includes a complete data management cycle, structured in serial and iterative steps targeting the needs of the policy formulation process. Then, a first proof of concept of the approach is presented to illustrate better its added value, through an indicative application scenario of social policy making in the migration domain, as one of the most challenging situation faced by European society.

A social innovation initiative driven by big data mining, modelling and visualization is demonstrated with the aim to introduce new social services targeted to migrants' access that will enable them to reintegrate into the labor market and the society in the destination place. The approach facilitates data sharing and collaboration among stakeholders, experimentation and knowledge co-creation, and stimulation of new ideas on social issues.

In addition, the application of data mining algorithms on large volumes of data and varied conditions can help towards this direction by identifying undefined patterns, correlations and providing predictive analytics on societies' operation.

The major benefits of the proposed approach is that:

a) it facilitates cooperation among all societal actors participating in social innovation initiatives, managing information flows across organizational boundaries and among the participants

b) it improves understanding of the social problem under investigation and its parameters, revealing hidden patterns

c) it consolidates governmental, scientific and behavioral data into a knowledge base. Particular emphasis is given to the inclusion of citizens insights and behavioral patterns, as extracted by Social Media data, opinion polls, questionnaires, Eurobarometer surveys, since citizen's wellbeing and hence societal wellbeing is affected by subjective considerations.

Yet the most compelling advantage of the approach it that this ICT-driven process enriches societal stakeholders' specific knowledge and competencies.

One of the limitations is that the framework has not been tested or evaluated. Hence, further research enriched with more case studies analysis, is needed in order to collect insights on the weaknesses and improve this conceptual framework before making it operation in a real policy making setting. Organizations should figure out how to integrate this process of social decision making in their operations.

Furthermore, the proposed process strongly relies on the ICT tools supporting the different steps. Due to the inclusion of acquisition and processing of large volumes of data, a challenge arises that poses the design of an infrastructure capable of handling the computational complexity of big data management and mining problems.

This prerequisites that all participants of the social innovation process should have skills of understanding, curation and analysis of big datasets, that will in turn foster their creativity and innovation capacity. To overcome this challenge, we need an ICT architecture capable of integrating user friendly and efficient tools that will not incommode any of the targeted users.

The proposed model for evidence-based social making makes a contribution on better measuring the social returns of social policy innovations and assess the outcome of social reforms. It promotes the use of ICT for leveraging the potential of new knowledge opportunities in the design of social protections systems and policies rooted in consensus. However, to promote the adoption of big data driven social innovation at national and EU level policy making the establishment of global data banks on complex issues is necessary.