Establishing Open Data Portals in the Process of Becoming Smart Cities

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Abstract

This paper presents a case study, where a group of midsize to larger municipalities in Denmark have established an open data portal through a very unusual organisational structure. They have formed and legally established an association, where each municipality (as a member) have equal influence on various decisions made about both the strategy behind and the technology used for the portal solution. The main objective for these municipalities is their struggle to become smart cities. The means to reach the status of becoming smart goes through innovation and development of a spatial data infrastructure, where governmental data are set free and where citizens are invited to participate actively. The association also wants to make it possible for private start-up companies and SMV's to establish new business opportunities, that will help to boost the local economy and strengthen the digital transition of society. This is done through a series of thematic events and hackathons, where data are used for modelling and visualisation. These events are also opportunities for networking and usually also where new innovative ideas for co-creation are presented. This way they add energy to the process of making their cities smarter.
Keywords: Open Data Portals, Smart Cities, Digitisation, Hackathons, Co-creation.

1 Introduction

The majority of municipalities in the developed countries from 50.000 inhabitants and up are in these years looking for growth and progress through the transformation towards becoming smart cities (Batty *et al.*, 2012; Batty, 2013; Townsend, 2013; Kitchin, 2014; Marvin, Luque-Ayala and McFarlane, 2015; Meijer and Bolivar, 2015). Among the initiatives launched in many cities are open data portals (Sandoval-Almazan and Gil-Garcia, 2016; Ruijer, Grimmelikhuijsen and Meijer, 2017; Thorsby *et al.*, 2017). They signal transparency and openness in the governance structure and at the same time they invite the citizens to involve themselves through data submission, data download and data integration into other domains.

The main goal for the municipalities are new business opportunities in the digital economy, where innovation and growth are secured through the activation of the vast amount of data that is constantly being generated from government offices, sensors and citizen sensors (Goodchild, 2007; Kitchin, 2014; Albino, Berardi and Dangelico, 2015; Kitchin, Lauriault and McArdle, 2015; Bodum, 2016). These data, with a clear predominance in the geospatial and environmental domains, represent a value for both the local governments and software developers (Batty et al., 2012; Landry et al., 2016; Zuiderwijk et al., 2016). One of the barriers for the dissemination of open data in municipalities is the investment in building up knowledge on how you develop an open data portal and the cost of running these services after the development process.

2 Previous work

There is a substantial amount of research done on governmental data portals. The ides of sharing data and making them accessible to the public has grown as an important part of both national as well as local government policies in the last 10-12 years (Harvey and Tulloch, 2006; Masser, Rajabifard and Williamson, 2008; Janssen, Charalabidis and Zuiderwijk, 2012). In recent years the work has been intensified through the Open Government Partnership (Open Government Partnership, 2017a). The Open Government Partnership (OGP) is a multilateral initiative that works to secure commitments from governments to promote transparency in governance. OGP mainly accept membership from national governments and through their membership, each country commit to develop an action plan and implement it after the principles as they are defined in the open government declaration. The first item on the list is a commitment to increase the availability of information about governmental activities and further down the list there is a commitment to increase access to new technologies for openness and accountability (Open Government Partnership, 2017b).

In Denmark it is the Agency for Digitisation (under the Ministry of Finance) that is responsible for the dissemination of the policies in the OGP declaration. They launched a new national strategy for digitisation in 2016 where one of the national goals were to see public sector data as a growth driver (Agency for Digitisation, 2016). There was three initiatives named in this section of the strategy:

- Open Public Sector Data
- Smart City Partnership
- Infrastructure for Positioning and Navigation Data

The national strategy covers the full spectre of public sector data which spans from the national basic data program to each of the 98 municipalities in Denmark (Hansen, Hvingel and Schrøder, 2013). The way that specific initiatives under the strategy are implemented are quite different whether it is national databases or more local datasets produced in the municipalities. It is also a fact, that the national data portals have been under way for some time now and the local governments lack behind in the implementation of spatial data infrastructures. The local governments have a difficult time establishing their own open data portals (Elwood, 2008;

Masser, Rajabifard and Williamson, 2008; Johnson and Robinson, 2014). This is mainly due to a combination of two reasons. Many municipalities lack behind in their technical competences needed to establish the data portals and the data portals are not prioritised in their budgets.

This emphasize the need to find new solutions for the organisation and implementation of public sector data portals in the municipalities. That is also the reason why it is interesting to look closer into the formalised cooperation between five municipalities and on region called OpenData.dk (ODD) as a special case for establishing a data portal with a broad range of public sector data.

3 Case study

The case study was built around semi-structured interviews with the responsible data managers in four of the involved municipalities. This was complemented with an investigation of the involved data portals and observations under one of the data events that was a part of the activities under the open data program. Finally the organisational setup around the open data in the involved municipalities were examined. The case is presented chronologically and with references to citations from interviews and other observations from the study.

3.1 The initial phase

The transition to become a smart city has been on the agenda in many Danish municipalities since the term was coined around 2007-2010. Smart cities were in this period defined through their ability to transform from organisations, that relied on a strong and in many senses closed governance structure to a more open structure where digitized information became available and downloadable from webpages. It was also closely related to the implementation of new technology, where handling of spatial data and tracking opportunities became available for a broader audience.

The international scene of Smart Cities has from 2009 and until recently been dominated by the large multinational companies such as IBM, Cisco and Siemens. They have had large conceptual frameworks for the transformation process and made partnership agreements with many larger cities around the world. The only city in Denmark that is large enough and complies to this concept is Copenhagen. They formed an agreement with IBM in 2013 under the Smarter Cities program that meant the realization of an IBM Innovation Centre (Vanolo, 2014; Arup and CEDI, 2016).

Some larger cities also started other activities with involvement of citizens. In the summer of 2011, San Francisco launched a row of hackathons where more than 500 citizens used up to 10.000 hours on developing new digital services and solutions from the open data of the city. The popular title of this period was the Summer of Smart (Townsend, 2013, p. 229).

This event and other similar smart initiatives inspired a lot of municipalities around the world. The second largest city in Denmark is Aarhus. With 269.000 citizens in the city and 846.000 citizens in the functional urban area, it has moved from being a medium-sized urban area into the group of metropolitan areas, according to the statistics from EUROSTAT and the new method for defining urban metropolitan areas defined by OECD (Rosina *et al.*, 2012; EUROSTAT, 2018). The municipality of Aarhus decided to go smart in 2012 and worked intensively towards the establishment of an open data portal in the following two years.

From the start in 2012, the city formed a group of local experts with strong interests in making Aarhus smart. They decided to launch a list of activities, and one of these activities was the open data portal. This portal, which was based on the open source technology named CKAN (most widespread software for open data portals), was launched soon after under the name Open Data Aarhus (ODAA) (Umbrich, Neumaier and Polleres, 2015).

3.2 Consolidation

The start in 2012 was difficult because the pioneers of Smart Aarhus had to convince the organization that an open data portal, where all public data from the organization in principle would be set free and be available for everyone to access and download, was an important part of the strategy. The main originator of the idea was the Chief Information Officer (CIO) of Aarhus municipality, Bo Fristed, who says this about the first time with ODAA [translated from Danish]:

> *["It was a bit difficult to explain to the organization. It has been particularly difficult because the most limited resource, when you work with data from a secured municipal network, is working time in particular. Working time for ICT employees, who is already very busy. When we realized this, it was not something that was particularly welcomed. We have, on the other hand, now as then, political backing to work with the smart city and with open data. It was the mayor who opened the portal when we launched it for the first time and put a dataset on etc. So it has helped us that there has been a political focus."]*

After the launch in Aarhus, the platform in 2014 expanded to become nationwide with 5 municipalities and one region as the founders of Open Data DK (ODD). This organization was a breakthrough for the local authorities. Instead of forming a corporate structure where each of the founding partners would have influence on the business proportional to their size or their economic capacity, they decided to go for a model where each member (municipality or region) have equal influence. This means that each member have one vote in the general assembly and one vote in the executive committee or in the board. It also means that each member pays the same amount in yearly dues. This was set to €3.400 for each member. The amount covers the technical support and the initial costs in relation to the events and hackathons that are arranged in the course of one year.

In 2016, ODD took another step and did some work to associate more members among the Danish municipalities. It succeeded, and in the spring of 2017 there were 33 municipalities and a few regions that were members. Bo Fristed, who was eventually elected as chairman of ODD, was asked where he sees ODD right now [translated from Danish]:

["If you compare us to a life cycle, I think we have just reached Confirmation age. We are well started. As mentioned, we have around 33 municipalities and 2-3 regions and have established partnerships with] Erhvervsstyrelsen [Danish Business Authority and] KL [Local Government Denmark]. We are officially participating in the national secretariat working with Open Data in a jointly announced digitisation strategy with] Danske Regioner [Danish Regions, Local Government Denmark and Danish Business Authority. So in this way we have also received a seal of approval and are considered as one that you can cooperate with. But we are still a grassroots organization that started with one municipality - then we became two and then we became five and now a lot more. We have chosen to organize ourselves in an association, so that those who work together with us have a legal entity to work together with, so you do not risk that a fiery soul will end up burnt-out and run from it all, and so that we have a board and we have a general assembly where we have statutes, so I think we are in a place now where we are ready to move on and support others."]

The other important part of the activities within ODD is their hackathons and meetings for members. They name a specific theme for each year and then they make sure that the municipalities have full focus on announcing datasets within the theme on the portal. This way ODD can focus their energy towards one area and get attention from citizens and developers. Bo Fristed says this about the activities that are arranged by ODD [translated from Danish]:

[Regarding activities, we have made events for the last three years. We have such a concept we call Open XX Days and then we change XX with a theme that we define with some who are interested in doing something. It's a 3 day hackathon that we started in 2015, where we made Open Culture Days. In 2016 we made Open Energy Days, and then with representatives from the energy industry...In 2017 we are planning to have the Open Tourism Days, which we will do together with major tourist organizations in North Jutland. In this way, we try to find a theme and then all the municipalities participating in ODD are finding the data sets that can support the fact that, for example, some good solutions can be made for tourism. That is the big event we make every year.]

The important outcome from both the common activities and from the local innovations made possible by the free open data launched by the municipalities will become inspiration for development of new apps, services or products. These innovations are also fuel and motivation for the cities when they launch the next strategy to become a smart city.

4 Conclusion

The case study shows, that by sharing knowledge and ideas between municipalities through alternative organisational structures such as the association ODD, where each member have equal influence no matter their size, you will accomplish a broader dissemination of technology and at the same time strengthen the democratic dimension of digitisation through participation and co-creation. That will probably be one of the most important elements of the spatial data infrastructure for the future. Co-creation is, by the way, the third star of five stars for open data portals as suggested by (Colpaert and Joye, 2013).

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