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A Proposal for Introducing Digitalization in a City Administration

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Abstract. A medium sized city decided to uplift its services to the 21st century and take leap to the digital age. An upgrade in the services was decided to be made in order to better meet citizens' expectations. The intention was clear; to enable later development towards the ultimate goal of digital channels being the preferred mean for running official errands by the year 2025. To introduce the new ways of operation, a Digiprogram was founded comprising numerous smaller, quicker experiments in various areas of city administration. The program needed an organization and we present pro and con notions of this initiative to act as preliminary report on a way to introduce service innovation to a city administration.

Keywords: Public Sector, Digitalization, Service Innovation, Trials.

1 Introduction

Our children watch foreign TV shows on their smart phones. Our students deliver their presentations from their tablets and use their smart phones to aid them in their studies, to take notes in their thesis supervisory meetings. Our new graduates look for information in their hand held devices constantly. Are they prepared to take time and effort in conducting their official business in the traditional way of visiting the offices involved in establishing oneself in a new situation? Doubtful. Today and today's public sector is about services [1], [2]. This is also something that the case organization, the observed city operation, realized. In order to meet the overall objectives, and to serve their community in best possible and contemporary way by offering modern service on multiple areas a city entails on modern platforms, they decided to venture an entrance into the digital era in this traditional environment. Citizens using digital services in work, studies and leisure have also expectations to be able do so also when facing public sector. In society when in practice all active citizens have access to internet via computer or smartphone it would be a wasted opportunity if public services were still in the dark ages.

The previous examples of the future active citizens bears within the notion that the technologies offer possible solutions to be used in abundance. This in turn requires if not necessarily direct technological know-how and expertise, the right attitude to say the least. Should the amount of possible avenues to pursue seem overwhelming for the user, similarly the choice is to be made by the vendor and developer side too. To supplier this is a matter of great strategic importance. This goes to show that the deci-

sions of technology and even on solution level, however light-hearted they may seem to the end-users, are grave and the experimenting with them is not easy nor cheap. Also, the resources are under scrutiny everywhere, including the public sector, where there are numerous fields and branches requiring attention, activities and resources to develop but already to maintain the quality of service [3]. Yet the service promise is to be held and operation developed (ibid.). The research problem condenses on the cross section of the areas: public sector services, delivery of the services, ie. customer service, and ever-expanding digitalization. How, if at all, may these three areas be combined to a functional and well-designed solution? The more precise research question we seek to answer is “what are the notions in introducing digitalization to a city ICT community by experimentation?” This is about providing user services, as they are ready and willing to acquire them. On the other hand, it is about allocation of scarce resources of providing public service. Both perspectives are about increasing productivity in public sector, yet the effect is somewhat ambiguous and therefore the theme should be inspected thoroughly.

Should an organizations implement such changes they are likely to want their employees to still continue to be active and productive members in their everyday work. It is vital for successful change implementation for the management to deeply understand the dynamics that have an effect to the proceedings [4], [5]. In order to plan for these changes and then to introduce them to the organization, organizations need to win over their employees to adapt willingly to the situation and instead of resistance to show commitment to the changes [6]. Should the members of an organization be curious and actively learning the outcome is bound to be better than in a case where the employees are merely receiving the novelties passively [7], as expected by the organization [8], [9].

The paper is organized as follows: Section two illuminates the theoretical backgrounds for issues addressed in this paper. The following section three presents the research setting and methods. Then the findings are briefly presented in section four. The discussion section five summarizes the results, and the conclusion places the paper in a broader context.

2 Theoretical Background

A city is a complex multifaceted entity with numerous tasks. An administrative entity that has at least four kinds of tasks: democracy, economical, communal, and well-being [10]. This notion serves to point out that the administration of a city needs to take into account various angles from which the development schemes are to, or may, be approached from. Similarly, the development schemes may stem from different functions with different aspirations. Aspirations, which may or may not spiced with political agendas, as the decision makers are in some cases more strongly politically inclined than in others. The Finnish association for municipalities [11] divides the area into sections: legal, economical, education and culture, social and healthcare, community and environment, vitality and employment, democracy and administra-

tion. Each area has its own processes, even when comes to their support given by ICT entity as the needed solution differ. Thus to find generally applicable rules is challenging.

Digitalization or digital transformation has a few definitions. It may involve business model renewal, and the change in ways of how employees go on with their routine tasks. It may affect the way the resources are allocated and how the operation is executed. [12] Previous consists various business-related activities and functions but also the processes behind the concrete actions so far that it also starts go alter the organizational culture [13]. Agutter et al. [12] spans the area possibly covered by digitalization from the features of more strategic nature, such as business development, to areas of more traditional doing, such as marketing. How and how widely digitalization is introduced depends on multiple factors. One such factor is organizations and the CIO's eagerness to take part in experimenting and the overall positive attitude towards renewals [14]. These early adopters may receive competitive advantage when they are trailblazing in the area, however it may prove to be an arduous task to make way for the new developments [15].

Digital solutions are used with the expectation of improving the contact to the customers and making the organizational processes more innovative and even fluent [16]. The angle an individual organization takes on the issue may vary, the entering angle may be the cost reduction or equally well customer service improvement or even making new market openings (ibid.). Occasionally the IT community is not entirely up to the task; one or more of the three factors (people, technology, processes) may need improving prior to the endeavor (Hagen et al., 2004). This means that the organization needs to be developed to meet the challenge.

Previously it was stated that the public service has become more customer-oriented service than what it perhaps was before. This applies to ICT community as well. Today is labeled by the convergence of the supplier side and the user side which are narrowing the gap between the two [17]. The former model of planning, building and maintaining is no longer enough. Instead, the users are to be taken along already in and onwards from the defining phase for both products and services (ibid.). As the services are provided with easy access, i.e. services are digitalized; more attention should be paid on user experience. In the case of public services, user experience consists of at least technical usability, access, accessibility, and information ergonomics. It is plausible to assume that the very people using the application and having the background knowledge of the area are also capable of giving insights on how the issues should and could be handled even better. Heads of ICT need to be alert to rethink their operation when need be and also to be open to new ideas regardless where they come from. This is also a matter of organizational culture; how new, emerging ideas are received and accepted. In close contact with the previous is the handling of failures. When operation experiments with new ideas and tries new approaches, one is bound to both succeed and fail. Should the failures be punished or scorned on, the keenness to continue with these is limited to say the least, which in turn may have unwanted effects on the innovativeness and development of the organization. The CIO has a crucial role in both creating and promoting this kind of open culture or the opposite.

The management of this kind of initiative is demanding. The effectiveness of the operation should be measured. According to the proverb in this area or better yet, a rule of thumb: one cannot monitor what cannot be measured and one cannot manage what cannot be monitored. [18] The various areas are to be measured, but is it even possible? So, that the various areas would be comparable with one another.

3 Research Setting

The single case study [19] this paper is based on observes a dedicated group of individuals in a variety of organizational branches and areas of civil service of a city of over 230 000 inhabitants and some 15000 employees in over 2000 sites. The ICT sector, or community, of the city is there to serve all of these. The clients of the ICT community have various needs; the area is vast from the city planning to the employi.e. the city officials, from the top management to the summer help in the city tourist bureau have different needs but also capabilities when it comes to their use of technologies and tools within. The complexity of the settings presents the management with challenges. It became evident that modern ICT is to be taken on as it might have solutions to the challenges and offer more flexibility to the operation.

Smart Tampere –program has as an ultimate goal creation of digital services to ease the everyday life for the citizens, increase of wellbeing and security and promotion of smoother moving in and of the city. Also creating new business opportunities by enabling cooperation between various stakeholders is listed. [20] This program consists two related sub-programs: Ecosystem program and Digiprogram.

The qualitative data was collected by semi-structured interviews. First the key persons for the Digiprogram were suggested by our contact person, the CIO of the city, who also was interviewed. Further interviewees were invited by these suggestions. In total eighteen interviews, listed below in Table 1, were conducted face-to-face at the case organization premises.

The interviewees of the city were people working on following positions: CIO, Program manager, Productivity controller, ICT manager (AK), Service designer, Enterprise architect, Digimarketing manager, Development manager (city planning), Development manager (customer service management), Development manager (employment services, SO), Project manager (city concept), Project manager (city planning), Project manager (customer service), Project manager (early education, preschool HK), Project manager (employment services, JT), Project manager (employment services, MV), Project manager (grammar school), Project manager (infrastructure; tram), Project manager (space allocation, JS), Project manager (town planning).

All the interviews were recorded for further elaboration and fact-checking. The interview themes covered issues related to initiation and rationale of the program, resourcing and stakeholders involved, effectiveness and effects, also the process and communications relating to the Digiprogram, and the evaluation of the success.

The data analysis followed interpretive research approach [21]. The researcher went through the material several times to gain an overview of the procurement process, stakeholders involved, and different challenges, and to gather all relevant details.

After and already during this, the matters were discussed with another seasoned academic professional but also with the program manager to double check and to ensure that the approach was correct and right. Process diagrams and stakeholder maps were drawn to visually aid the interpretations. These visual maps were further iterated. Due to the size of these visualizations and space limitations, they are omitted from this paper. Finally the findings were compared to the literature.

4 Findings

4.1 General Notions on the Findings

The city decided that the best way to address this issue and to introduce digital transformation to the city was to enable the stakeholders to make experimentations themselves. The experimentation was going to be a joint effort of both the ICT community as well as the employees using the system and applications. To match the ‘demand of the times’ and to take a stand on the technological developments and to modernize its operation, at least to a degree, the city came up with Smart Tampere program. This program brings together the Ecosystem development scheme aiming at improving and enhancing the overall appeal towards the geographical area both for businesses and people and the Digiprogram looking inwards and aiming at developing the city’s operation and processes internally and towards citizens. A program was founded and a manager for it appointed. The objective, or slogan even, for the program is ‘Year 2025 the citizens preferred mode of services is digital’.

In the program, there are numerous projects and trials or experiments even, executed in tempo not all that familiar for ICT projects or public sector services, especially in the public sector ICT projects. The pace is quicker than in previous projects. This in turn requires a newer culture to emerge in which such approach is tolerated or even promoted. Quite logically also new expertise is required as there are new technologies and solutions that are introduced to operation. Similarly, the mere way of doing things was somewhat new to people in the city organization thus training took place in various areas, eg. planning, defining, purchasing of information systems and applications, but also in publishing in social media. Quite a bit attention was given to make the word of the experiments to spread. The project managers, development managers and program manager were encouraged to be active.

However, not all tasks were to be executed by the city officials as the aim was to combine the efforts of third parties and stakeholders also in broader scale, such as vendors and citizens. The vendors invested their time more than usually in development schemes with the ordering party so that they conferred together with the subject specialists about the possible way of solving the issues brought up. This way they together searched for the optimum solution, also in regard of the existing system landscape.

The citizens were also asked whether they would be prepared to take on a digital way of handling their matters, thus giving input in form of justifying even more strongly the implementation of the Digiprogram. The end-users, and in some cases the ‘customers’, ie. the citizens, took also part in these experiments for example in form

of ‘beta-testing’¹ [22] and then giving input on the development work and the functionality of the intended software.

The objective was to alter the operations to better meet the user expectations based on the successful trials and experiments. Already during the experiment, the performance was assessed. The actual benefits were evaluated as to give enough material for the decision making regarding whether or not the new way of operating was ‘good enough’ for making it permanent procedure and thus being scaled up to match the requirements in the particular area in question or even organization-wide use. The assessment proved to be more problematic and challenging than anticipated. The development managers and project managers had their expertise on their corresponding area but not all the features were operationalized to be measured thus making the baseline non-existent and the comparison between the states before and after the development scheme impossible. The person appointed to productivity controller conversed recently actively with the project teams and managers to form a plan for assessing the benefits and/or effects the development had. The need for such a person was acknowledged but the person was recruited and appointed only after the program had started, so that this function has yet to show results.

The assessing of benefits, or actually effects, was performed more on qualitative basis as there were few possibilities to bring on significant quantitative measures. The interviews revealed some reluctance to come up such measures as the argument of saving a certain amount time versus improved quality in meeting a customer for example in the employment services. Seems that trust is an issue also in this context and building trust is advised to be taken seriously.

4.2 Findings on the Experiments

The research project, which this paper is based on observed three areas of the city operation, which are all a part of the Digiprogram: City Planning (CP), Customer Service (CS), and Employment Services (ES). There are other areas in the program, but they are left out of this paper as they were not scrutinized in the study.

In the City Planning the process itself was taken under inspection and later decided to be renewed. Under old normal circumstances to apply for building permit would have taken approximately some 90 days and after the renewal it will have dropped to a third of that amount of days. According to interviews, this entails both technological innovating but more significantly a cultural change where the actual doing was taken under scrutiny and altered to be more customer-oriented one. Similarly, the supervisory function of the building in the city CP aims to deploy new type of material. In practice this means including 3d-modeling and -imaging for the city services to aid the operation of this area of city services.

The employment services is a very labour-centered activity where the relationship between two individuals is focal. The official needs to know the applicant, to assess whether there is a possible employment opening or whether the direst need is for ben-

¹ Beta testing is used to describe the phase of software testing in which a composition of the intended user group tries to use the product under real (life-like) circumstances.

efits (usually monetary) or further training or some entirely different type of service. Consequently, the officials need to get to know the applicants. This is traditionally done by interviewing the applicants, which is quite a time-consuming feature in the process. The city came up with the idea of using a chatbot for this. In effect, the chatbot innovation is said to be able to save up to three quarters of an hour of each customer meeting that are done in thousands. The obvious time saving there is vast. However, not all this time is directly saved as pure plus, as the officials still need to familiarize themselves with the customer records and to plan for actions. Yet such method is practical when conducting large scale interviews. Similarly, the customer needs still time to fill in the questions the chatbot presents him/her with. But still the time slot needed to spent together is cut down.

Another experiment is practical for both Customer Service and Employment Services; an appointment reminder. As simple as it may seem, this saves again tens if not hundreds of hours of time reserve. The customers make a booking for handling their affairs, depending on the busyness of that particular function, the appointment may be days or even weeks later. As the appointment comes closer, the application sends a reminder to the customer that this is the case thus enhancing the possibilities of the customer showing up at the agreed time. The feature seems perhaps a bit mundane, but put into the city scale, the potential saving is substantial.

The program leadership has introduced a 'team day' or a 'program day'; once a week the project managers from various schemes meet to discuss, confer, and learn. This is yet another investment to the program as the project managers are absent from their 'normal' position. During these days the project managers, otherwise in their locations, gather together in the city administration and present their projects current state and hear how the others are doing. This offers peer support in form of listening and sharing experiences. There is also education available in these meetings. The project managers praise the fact that they have enjoyed training in eg. public sector purchasing; some schemes have a need to invest in new(-er) applications or hardware needed for it. The project managers are not necessarily qualified to take part in these endeavors, as it is not a part of their normal routines. Similarly, the digital marketing or communications is a branch in which there is things and features to be learned in today's ever-changing communication landscape. This applies both to internal and external communications. Thus, the program management offered training also in this area given by the city's professional communicator. This training included some features and publishing policies in channels like Twitter, Facebook to name but a few. The city has a rather liberal attitude towards publishing news on various events within, but some ground rules are there. These were also elaborated. Main focus in this part was still exceedingly on how to address public, what is worthwhile and how one should report on one's doings.

The interviewees that voice their doubts whether the saved amount of time will be invested in making the operation better by their quality offer a discord to this otherwise exceedingly positive appearing reporting. There seems to a slight uncertainty whether the ultimate goal and objective of the Digiprogram is in enhancing the service organization of the city and to improve the quality of the services offered to the citizens. The other optional objective would be merely cutting costs. For the high city

officials who need to keep an eye on the both issues this is not an easy task to decide. The resources are increasingly scarce which makes it a plausibly lucrative opportunity to use the developments as a cost cutting method and at its extreme to let people go.

Similarly, a little was said about the individual objectives of the project managers and the measurability of the development schemes. At this point most of the individual objectives are qualitative and as such difficult to be measured exclusively so that they could also be compared with peers. Some voices were of the opinion that a first baseline should have been defined, ie. what and how the operation was handled prior to the development schemes. Then the operational effectivity after the development work could have been measured to form a picture of the effectiveness of the development scheme and the methods within.

The target group for the development activities, the project managers but also the city officials involved and their readiness to step into the digital era varied. Some were, quite logically, more advanced in their know-how than others. This particular fact alone justifies the claim that the project managers and others are to be treated as individuals and their level of expertise acknowledged when they are read in to the program. The area in which they are to experiment is scarcely directly comparable with their peers. The processes, the systems and applications they use, little is shared or same between the branches. Similarly, the services they require of the organization vary. Some are in need of more training in certain areas than others are. In other areas, the situation may be again different.

The integration of the experiments to the existing ICT infrastructure and enterprise architecture is something that the project managers need not to overly concern themselves with, as there is dedicated personnel in the ICT community to take a stand on this matter. However, should they be experts in their own field may help them to form a picture of the proceedings and support the development even more.

5 Concluding Remarks

When a public sector organization considers such a large development scheme, experimenting with small(-ish) and quick schemes appears to be worth considering as a way to do it. Even if moderate in size and with limited need for resources the experiments quite obviously require careful and capable planning of the actual measures to be taken. It is also notable, that even small success feeds enthusiasm to conduct experiment, yet failure causes critical demotivation. The personnel to be involved in such actions are preferably to be found amongst the existing personnel, as the knowledge of the organization and its ways of working are focal. It could also be argued that should a complete outsider be recruited as a project manager to such an initiative, there is vital tacit knowledge lost, or actually left unused in comparison with the situation where the project manager comes from within and thus the knowledge gap is to be overcome with different means.

An active and strong sponsor, like a CIO, is highly beneficial, if not a necessity, for an endeavor of this magnitude to be successful in this area of operation. There needs to be power and support behind the initiatives. A position of power, like that of a CIO,

may also act as a counter measure for the possible resistance for change and to actively promote the initiative. A sponsor's clear vision of the better tomorrow, how operation will be run after certain development procedures help the whole organization to proceed simultaneously defining the course.

The project managers are in a crucial role as they operate in between the change instigators and the organization that the change is implemented in. The project managers may affect significantly on how the initiative is received. Thus these people need to be chosen quite carefully. It is equally important that they are truly won over for the initiative and stand behind it.

It is important to get commitment of various stakeholder groups and even individuals. It is advisable to let them speak up. To ask for their participation and acknowledge it. Quite often, the basic idea behind crowd sourcing may be used to cover unexpected ends and to serve in creating better, more customer-oriented solutions to various organizational challenges.

Communications is a key to success. There are bound to be unclear issues along the way, some angles are not covered, some are neglected for a reason, some by mistake. A clear structure may help to minimize such occurrences and continuous and clear communication delivers the message to the stakeholders.

The finding brought about in the study are initial results of substantial paradigm shift in public administration and services provided to citizens. As presented here major guidelines on user expectations and ways to meet those are easily drawn. As the citizens have devices, skills and willingness to have service through digital platform the case is presented also as a national pathfinder on digitalization of municipal services. To larger extend the findings are transferable to other context too, yet further research is required to see to sum effect to productivity. It is inevitable that saved resources on supply side and saved time on demand side are motivating shift to 24/7 open digital society with services that are free of spatial or temporal restrictions. Moreover, digitalization of services increases transparency in administration since services are explicitly instructed and there is an event log on actions.

References

- [1] H. De Vries, V. Bekkers, and L. Tummers, "Innovation in the public sector: A systematic review and future research agenda," *Public Adm.*, vol. 94, no. 1, pp. 146–166, 2016.
- [2] B. Higgins, *Reinventing human services: Community-and family-centered practice*. Routledge, 2017.
- [3] M. Arnaboldi, I. Lapsley, and I. Steccolini, "Performance management in the public sector: The ultimate challenge," *Financ. Account. Manag.*, vol. 31, no. 1, pp. 1–22, 2015.
- [4] D. E. Beck and C. Cowan, *Spiral dynamics: Mastering values, leadership and change*. John Wiley & Sons, 2014.
- [5] M. P. Hekkert and S. O. Negro, "Functions of innovation systems as a framework to understand sustainable technological change: Empirical evidence for

- earlier claims,” *Technol. Forecast. Soc. Change*, vol. 76, no. 4, pp. 584–594, 2009.
- [6] S. Fernandez and H. G. Rainey, “Managing successful organizational change in the public sector,” *Public Adm. Rev.*, vol. 66, no. 2, pp. 168–176, 2006.
- [7] W. Huiitt, “A systems model of human behavior,” *Educ. Psychol. Interact.*, 2003.
- [8] M. H. Zack, “Managing codified knowledge,” *MIT Sloan Manag. Rev.*, vol. 40, no. 4, p. 45, 1999.
- [9] J. Zhou and J. M. George, “When job dissatisfaction leads to creativity: Encouraging the expression of voice,” *Acad. Manage. J.*, vol. 44, no. 4, pp. 682–696, 2001.
- [10] A. Jääntti, “Kunta, muutos ja kuntamuutos,” p. 245, 2016.
- [11] “Kuntaliitto.fi,” 2018. [Online]. Available: <https://www.localfinland.fi/>. [Accessed: 06-Jun-2018].
- [12] C. Agutter, R. England, S. van Hove, and R. Steinberg, *VeriSM - A Service Management Approach for the Digital Age*. van Haren Publishing, 2017.
- [13] i-SCOOP, “Digital transformation: online guide to digital business transformation
- [14] F. Ding, D. Li, and J. F. George, “Investigating the effects of IS strategic leadership on organizational benefits from the perspective of CIO strategic roles,” *Inf. Manage.*, vol. 51, no. 7, pp. 865–879, 2014.
- [15] E. M. Rogers, *Diffusion of innovations*. Simon and Schuster, 2010.
- [16] G. Bongiorno, D. Rizzo, and G. Vaia, “Cios and the Digital Transformation: A New Leadership Role,” in *CIOs and the Digital Transformation*, Springer, 2018, pp. 1–9.
- [17] F. Ahlemann, “How digital transformation shapes corporate IT: Ten theses about the IT organization of the future,” in *Computer Science and Information Systems (FedCSIS), 2016 Federated Conference on*, 2016, pp. 3–4.
- [18] P. Baily, D. Farmer, and D. Jessop, *Purchasing principles and management*. Pearson Education, 2005.
- [19] R. K. Yin, *Case study research: Design and methods*, vol. 5. Sage Publications, Incorporated, 2008.
- [20] “Smart Tampere,” 19-Oct-2017. [Online]. Available: <https://www.tampere.fi/smart-tampere.html>. [Accessed: 06-Jun-2018].
- [21] G. Walsham, “Doing interpretive research,” *Eur. J. Inf. Syst.*, vol. 15, no. 3, pp. 320–330, 2006.
- [22] “What is beta test? definition and meaning,” *BusinessDictionary.com*. [Online]. Available: <http://www.businessdictionary.com/definition/beta-test.html>. [Accessed: 08-Jun-2018].