Analyzing Public Service Processes from Customer and Employee Perspectives by Using Service Blueprinting and Business Process Modelling

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Abstract

The conversation and modernization of the public sector is the ground of the good government and good governess. In our research, we examine a public service process of the Hungarian public sector. Our goal was to visualize the complex procedure as a whole (contact affair procedures in case of patchwork families) with Service Blueprinting and Business Process Modelling. After the process modelling, we used the discrete event simulation to analyze the elements of the process. Therefore, we are able to give a recommendation on how to improve the process for both the administrators and the legislators. With improving the effectiveness and efficiency, the government will be able to influence the satisfaction of customers and administrators. In the current procedure administrators are under the pressure, it is very stressful for them and the fluctuation is high in the office. We recommend for legislators to analyze the whole procedure in the public sector before the prescription of time limit. With the customer and administrator-oriented digitalization, the whole procedure can be more flexible and quicker.

Introduction

Nowadays there are significant changes in the public sector. Due to the fact that customers have higher expectations of more flexible and faster services there is an increasing pressure on governments who want to improve public services, and on service administrators as well to perform on a higher level of efficiency and effectiveness every day. The approach of New Public Management was a quite popular theory with numerous positive examples (Hood & Peters, 2004; Lindquist & Paquet, 2000; Stark, 2002;), however it proved to be ineffective, sometimes even contradictive especially in case of Eastern European countries (Bouckaert et al., 2011; Drechsler & Randma-Liiv, 2014; Drechsler, 2005; Drechsler & Kattel, 2008; Hajnal, 2004; Nemec, 2010).

NPM was not able to provide practical solutions for the problem of assessing and improving public service processes, but researchers and practitioners generated other types of approaches to improve the effectiveness of public services. The theory of Co-Production and Co-Creation (Alford, 2016; Durose et al., 2013; Nambisan & Nambisan, 2013; Osborne & Strokosch, 2013; Osborne et al., 2016) gives us a practical way to plan and deliver public services with focus on the process steps and its participants.

The goal of our paper is to visualise complex public service procedures as a whole (contact affair procedures in case of patchwork families). Our research is based on the theoretical background of Co-Production and uses the Service Blueprinting (SBP) (Bitner et al., 2008; Kazemzadeh et al., 2015a; Zeithaml et al., 2009), Business Process Modelling (BPM) (Ko et al., 2009; Recker, 2010, 2011; Vuksic et al., 2017) and Discrete Event Simulation (DES) (Banks et al., 2013; Garrido, 2011; Mes, 2017; Vuksic et al., 2017). After the process modelling, we used discrete event simulation to analyse the elements of the process. Therefore, we are able to give recommendation to improve the process both for the administrators and for the legislators.

While Co-Production and Co-Creation proved to be an effective approach towards the increasing of service efficiency and effectiveness with numerous examples (Alford, 2016; Osborne et al., 2013, 2016), there are only a few research papers using focusing on this theory in the Central and Eastern European region (Nemec et al., 2019). Our paper aims to help filling in this gap by focusing on intricate public services such as the contact affair procedure of the Hungarian guardianship office, highlighting its facilitators and inefficiencies.

With improving the effectiveness and efficiency, the government will be able to influence the satisfaction of customers and administrators. In this paper, we analyse a concrete contact affair procedure (from 2017) with a patchwork family to show the complexity of the process. At first, we define the patchwork family, then we describe the contact affair procedures and the service model. In the literature review we show SBP and BPM methodology, and use the discrete event simulation as we formulate our proposals.

Definition of patchwork family

Stepfamilies has a lot of different definition. To make a research related with stepfamilies it is important to establish definition bases. A stepfamily, also known as a blended family or reconstituted family, is a family in which one or both members of the couple have children from a previous relationship. The member of the couple to whom the child is not biologically related is the stepparent, specifically the stepmother or stepfather (Mintel, 2005). Blended family: A family that is formed when separate families are united by marriage or other circumstance (Barker, 2003). Reconstituted family: A reconstituted family (also known as a blended family) is the

sociological term for the joining of two adults via marriage, cohabitation or civil partnership, who have children from previous relationships.

A new family made up from the remnants of divorced families (Biblarz & Gottainer, 2000). According to Sager (1983) stepfamily is formed by the marriage (or cohabitation) of two partners from which at least one had already been married. Visher and Visher (1995) define stepfamily as a symbiosis where at least one adult has the role of stepparent. McGoldrick and Gerson (1987) completed the family map with a genogram. Seen from outside the stepfamily doesn't really differ from the nuclear family, however seen from nearer there is a significant difference between these two (Hetherington, 1999).

Legal background of the contact affair procedure

Primarily it is the guardianship office where employees know much about patchwork families. The workers of guardianship offices every day face with such cases the subjects of which are members of patchwork families. The cases typically affecting patchwork families too are the followings:

- cases related to the advancement of alimony by the state,
- contact affairs,
- open adoption matters.

According to the 9 § of the 331/2006. (XII.23.) Governmental Decree on the roles and responsibilities in child protection and guardianship affairs and on the authority and jurisdiction of guardianship offices, the county government's district office acting on child protection and guardianship affairs (henceforth guardianship office):

- decides about the communications between the child and the parent, or other person in charge of contact, orders monitored contact in justified cases, and in contact affairs also orders the mandatory child protection mediation procedure or the use of mandatory supported procedure,
- disposes of the enforcement of the court's or the guardianship office's regulation on communications.

The following laws are normative and determine the conduct of procedure:

- The 4:178 § - 4:185 § provisions of Chapter XVIII on exercising parental supervision of the Fourth Book (Family Law) of Act V of 2013 on the Civil Code pertain to communications.
- Article 4 (27§-33/B§) of 149/1997. (IX. 10.) Governmental Decree on the guardianship offices and on the proceedings of child protection and guardianship cases deals with contact affairs.
- Act CL of 2016 on general administrative order, which entered into force in 1 January 2018, disposes of the rights and obligations of the clients, of the general administrative deadline and of the rules of conducting administrative procedure. Act XXXI of 1997 on child protection and on guardianship administration disposes of the rights and obligations of the child and the parent, and on the main rules of child protection and guardianship administration.

County government office judges the requests for legal remedy handed in against the decisions of the official procedure of the first instance, the office also states its own professional case regarding unique decisions, and according to a determined plan, they execute the control of the authority of the first instance and the target examination of each field, and doing so it has a supervision over the authorities of the first instance. The law ensures 60 days for the administrator.

Research questions:
RQ1: Is it possible to carry out a contact affair procedure until the deadline, which was determined by legislators? (Legislative determination)
RQ2: With the changing of which elements is it possible to improve the effectiveness of contact affair procedures? (Customer satisfaction)
RQ3: With the changing of which elements is it possible to improve the satisfaction of administrators? (Administrator satisfaction)

Methodology

In our research we are using the Service Blueprinting and Business Process Modelling methodologies to map and visualize a complex public service process called contact affair procedure. Service Blueprinting (Bitner et al., 2008; Fließ & Kleinaltenkamp, 2004; Kazemzadeh et al., 2015a; Kingman-Brundage 1989, 1991, 1993; Shostack, 1981a, 1981b, 1984, 1987; Zeithaml et al., 2009) is based on the customer view and can be used to map and visualize the interactions between the service providers and service users to get a whole picture about a given service from the start to the end. Business Process Modelling (Ko et al., 2009; Recker et al., 2010) categorizes the activities of the service participants based on their responsibilities and based on the communication between these participants.

According to Milton and Johnson (2012) the two methodologies have different perspectives but Milton and Johnson (2012) showed how Service Blueprinting and Business Process Modelling can support each other. We can use blueprinting to understand the customer perspective and reveal what drives their satisfaction while process modelling can be used to diagram the organizational perspective, thus these two methodologies can be used effectively together to map and understand a service process which can help further to improve the efficiency and effectiveness.

As shown in Figure 1 we collected both qualitative and quantitative data regarding the contact affair procedure by making deep interviews with guardianship office administrators and by processing step-by-step information of individual contact affair procedures. In our current study first we used the Service Blueprinting and Business Process Modelling tools to provide the visual diagram of the process from both customer and organizational perspective. Second, we presented and analysed an individual case in order to show the complexity of the process. Third, we used a discrete event simulation software to create the representation of the process in a simulation environment, showing preliminary results and highlighting deficiencies where improvements could be made by legalizations of the process in order to increase both efficiency and satisfaction regarding customers and administrators.

According to Buics and Eisinger Balassa (2020) due to legal restrictions, the administrators have 60 days to finish a process or they have to pay a fine. Partially because of this burden and because other service inefficiencies administrators are sometimes forced to exclude the involvement of outside parties from the process as waiting for their response could potentially lengthen the process beyond the deadline. Administrators generally consider this process very stressful as they have to manage multiple cases at the same time and especially because – as we will see in our example – due to the dissatisfaction of the customers regarding the result they often submit applications to trigger the start of the process again, which can lead to the distortion of a family case for several months, even a year in extreme cases. Thus burning out in this work is a possible risk as they accumulate dissatisfaction as we

have seen in other employment relations (Cančer et al., 2017; Merkac Skok et al., 2013).

Figure 1
Methodology of the research
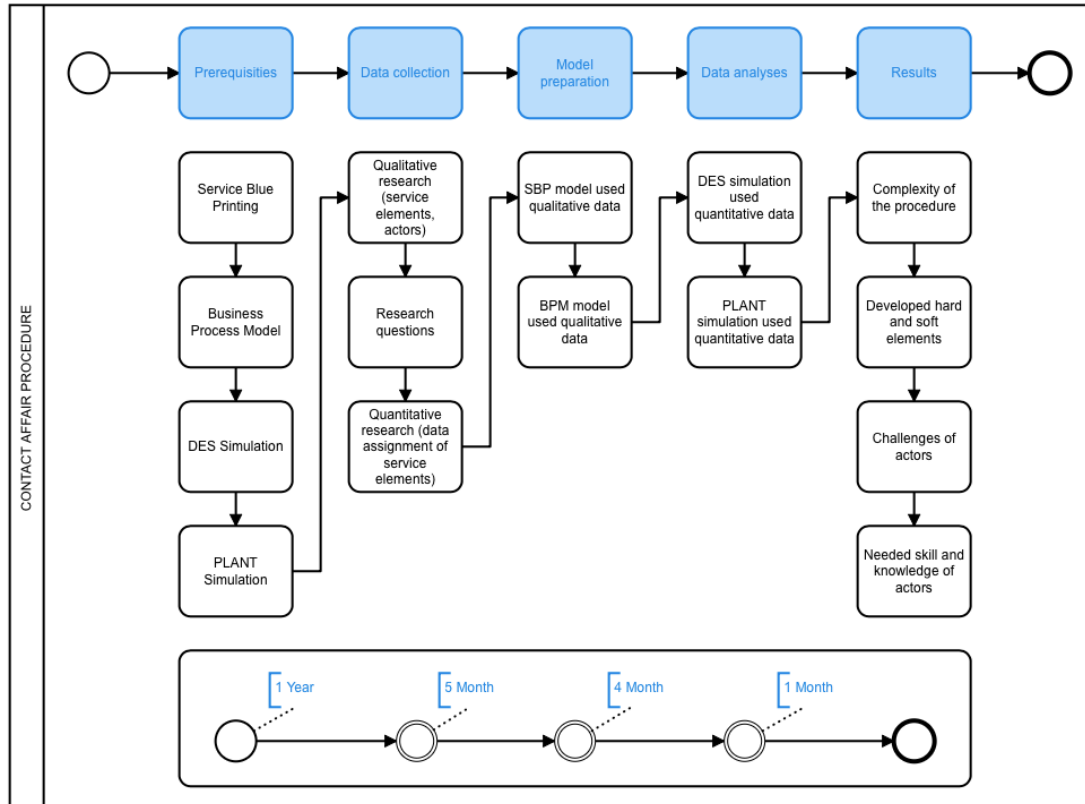
Source: Author's illustration

Service Blueprinting

Services can be seen as processes (Gronroos, 2000) and service blueprinting is an effective method, which can be used to model complex business processes. It was developed with the purpose to be used for service design and innovation. (Kingman-Brundage, 1989, 1991, 1993; Shostack, 1981a, 1984, 1987) This method is based on the customer view and can be used to map the interactions between the service providers and service users in order to visualize a service from the start to the finish (Bitner et al., 2008; Kazamzadeh et al., 2015a).

The service blueprint has two dimensions: "the horizontal axis represents the chronology of actions conducted by the service customer and service provider. The vertical axis distinguishes between different areas of actions. These areas of actions are separated by different lines" (Fließ & Kleinaltenkamp, 2004). It is the overall picture of all relevant actors, resources and activities which are connected and needed to a service (Ojalalo, 2012), so this method offers a well suited approach on the field of service planning and delivery.

According to Bitner et al. (2008), Zeithaml et al. (2009) and Kazemzadeh et al. (2015a) as we can see in Table 1. the blueprinting method consists of six steps:

Table 1
Steps of Service Blueprinting methodology

1.	clear identification of service process
2.	identification of specific customers targeted by this service
3.	map and design interactions between customer(s) and service provider
4.	map and design onstage and backstage employee and technology actions regarding the customer
5.	linking customer and employee with each other and with the supporting actions
6.	adding physical evidence for customer actions

Source: Author's illustration based on Bitner et al. (2008)

Business Process Modelling

Business Process Modelling is a widely used modelling approach to analyse and improve business processes (Kazemzadeh et al., 2015a, 2015b, 2015c, 2015d; Milton & Johnson, 2012; Muehlen & Recker, 2008; Vuksic et al., 2011, 2013, 2017) and for public service processes as well (Chinosi & Trombetta, 2012).

According to Ko et al. (2009) and Recker (2011) it has a core set of constructs, which can be used for modelling processes and activities, and it has an extended set of constructs which can be used to add further details and design and depth and complexity.

In our research we only consider the core set of constructs, as we want to use BPM together with blueprinting which is able to show further details of customer actions in the service process.

According to Kazemzadeh et al. (2015a) the basic construct of BPM consists of four categories: flow objects (event, activity, gateway), connecting objects (sequence flow, message flow, association), swimlanes (pools, lanes) and artefacts (data object, group, text annotation) In Business Process Modelling an event (which is shown by a circle) can be triggered three different ways: when the process begins (start event), in the middle of the process (intermediate event) and when the process ends (end event) (Kazemzadeh et al., 2015b). In BPM activities are shown with rounded rectangles. These activities can be specific which cannot be broken down to further individual steps, or they can be complex activities as well (Kazemzadeh et al., 2015b).

In the process gateways are shown by diamonds and they allow the divergence or convergence of process flows. Depending on their type, they are differentiated by their markings inside of the diamond (Kazemzadeh et al., 2015b).

Activities can be organized by sequence flows, which orders them by a solid line with an arrow showing sequence of activities. Message flows can be used to show messages flowing between activities where dashed line with a solid arrow indicates the direction of communication and labels indicate the type of communication. A sequence flow orders activities and is shown by a solid line with an arrow showing sequence of activities. A message flow, with attached label, shows a message flowing between activities and is denoted by a dashed line with a solid arrow, which indicates the direction of communication, the label showing the type of communication (Kazemzadeh et al., 2015c).

Pools and lanes can be used for grouping, where a pool can represent a group of participants (customers, administrators, etc.), lanes are used to categorize activities within a pool (departmental tasks, internal systems, ect.) but their usage is not strictly tied in BPM, it depend on the designers and their definitions, however they must be clear in order to be understandable (Kazemzadeh et al., 2015d). Associations are

used to connect artefacts with flow objects and they are represented by dotted lined arrows, indicating their direction. Groups can link activities, which are related logically, and they are represented by dash-dotted boxes around the activities. A text annotation allows comments to be included for readers (Kazemzadeh et al., 2015b).

Discrete Event Simulation

The purpose of discrete event simulation is to analyse the behaviour of a given system as it allows us to apply changes during experiments to see how the system reacts without affecting the real system (Vuksic et al., 2017).

A discrete-event simulation model is defined as one in which the state variables change only at those discrete points in time at which events occur. Events can schedule other events such as an object entering a machine, which schedules an event for the same object to leave the machine. Discrete-event simulation only shows the state changes of the model components at certain points in time, not continually over time. When certain events take place, certain model components change their state and thus control the simulation (Zeigler et al., 2000; Bohács, 2012).

A simulation is a test in which a system or the expected or actual behaviour of the system is studied in a physical or computer model of the process. Accordingly, simulations are simplifications of reality that focus more on the system as a whole and less on its details. The purpose of the simulation is to create the same or very similar conditions for users in the virtual environment at the model level as the simulated phenomenon. This allows us to use a virtual environment that mimics the operation of the original system to accomplish a specific task, which greatly facilitates, for example, various efficiency and optimization efforts (Garrido, 2011; Zeigler et al., 2000).

The purpose of simulation is to understand the features and essence of processes, and it allows us to answer the question to "What would happen if…?" without any financial or safety risks. We can change parameters and try different setups in order to find the optimal solution during design or a review phase. The model not only describes the relations and the steps of the processes, but features of the steps are also described. These features involve parameters such as processing times, input rate and so on. In case of modelling an existing process, such parameters must be measured or estimated as distributions in order to simulate significantly more cases than measured. The way the model is described is based on the framework that is used. Usually simulation frameworks provide ways and tools to describe the models, while also allowing to "operate" or "run" these models (Mes, 2017; Prateek, 2015).

Results

In a contact affair procedure separated parents are involved to settle their differences with the help of the guardianship office administrator. The procedure starts with a submitted application by one (or both) of the parents which goes through an examination. After formal and substantive checking an interlocutory decree is made by the administrator and official letters are sent out by regular post to all interested parties to inform them officially about the next steps. This step can take significant time depending on the circumstances and cooperation willingness of the opposing parties. After this several more steps occur, the parties are summoned to make statements, provide evidence and finally participate on a negotiation. During the negotiation a decision is made to resolve the issue based on the collected and verified evidence and the statements of parents, experts and the child (children) (Buics & Eisinger Balassa, 2020).

In the Service Blueprinting method the focus is on customer opinions and experiences, and interpersonal relationships. Services are interpreted from three perspectives in terms of blueprinting: (1) Service as a Process (2) Service as a Customer Experience (3) Service Development and Design. Table 2 shows the components of the guardianship contact affair procedure and Figure 2 shows the developed blueprint representation of the contact affair procedure.

Table 2
The components of Service Blueprinting

Physical Evidence	Guardianship offices, home of clients, experts' office
Customer Actions	Application submission to initiate procedure Receiving official letters, Attaching evidence. Personal appearance in the office, personal appearance at the experts, making statements
Onstage/Visible Contact Employee Actions	Making an interlocutory decree within 8 days Call for making a statement, summons for counter party, holding a negotiation Hearing of witnesses, experts, and the child Presentation of evidence, making statements, Decision
Backstage/invisible Contact Employee Actions	Receiving and filing the application Formal and substantive examination of the application Clarification of the facts of the case
Support Processes	Official digital system of administrators, Post

Source: own creation based on Bitner et al. (2008)

When interpreting the service process, we focus on the relationships between the activities that create the service. We examine how much each activity is related, how well they are able to unite and build an efficient service. Considering the role of the customer within the service elements is a critical point in the process of services. The service blueprinting method is capable of visualizing the participants of a service operation, the entire process, highlighting critical points of contact with customers and physical service and other key functional and emotional elements.

Figure 2
Blueprint representation of the guardianship office contact affair procedure
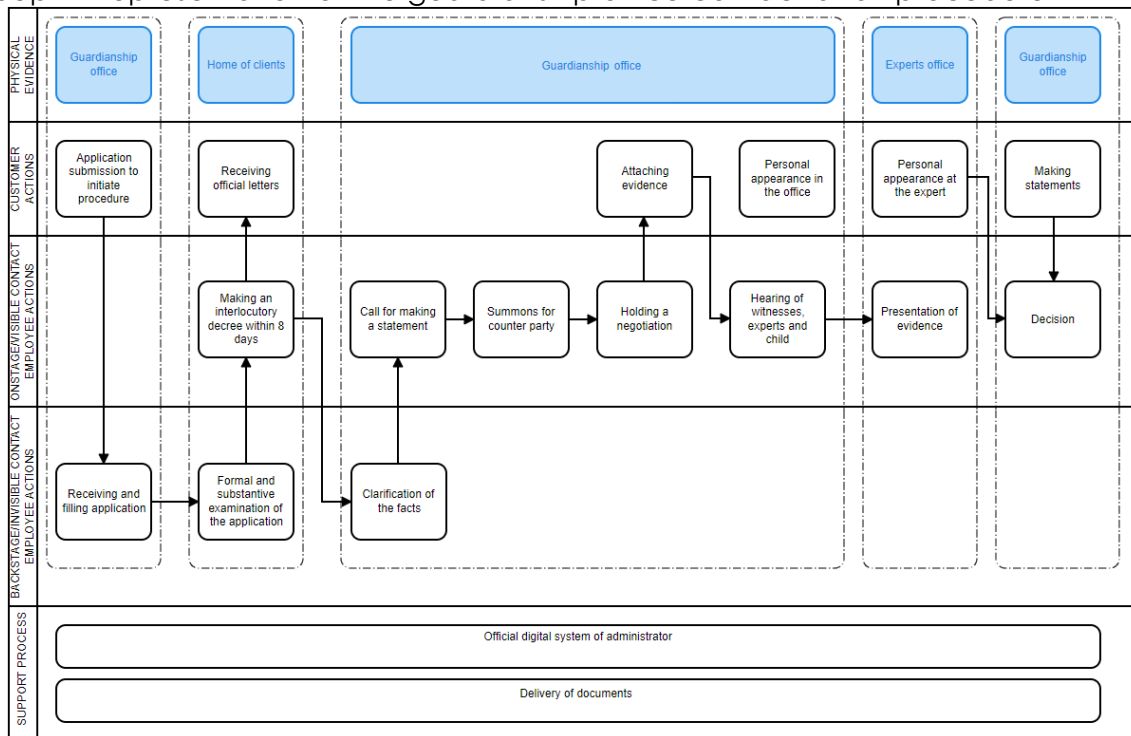
Source: Author's illustration

With the help of the Business Process Modelling approach, we aimed to visualize the contact affair procedure from the company's point of view as it focuses on the administrator's tasks during the process from the employee perspective. The BPM representation of the process can be seen on Figure 3.

Figure 3
Business Process Modelling representation of the guardianship office contact affair procedure
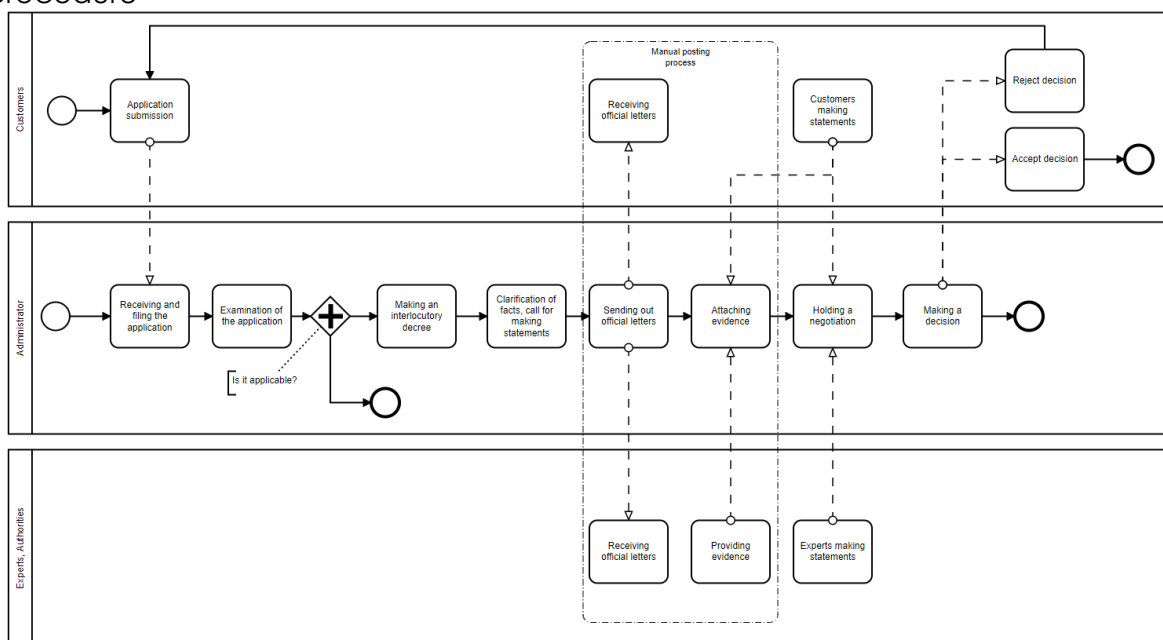
Source: Author's illustration

Regarding complexity, our next step was to analyse an individual case in order to extract valuable data regarding the processing times of each step in order to see how we should change the simulation to represent better the real life process.

Table 3 shows the main steps of the process and the dates when these steps were administered by the employee who handled this specific case. The length of each process iterations are also shown in Table 3 and Figure 4.

Table 3
Dates of main process steps during the case

Iteration	Submission of an application	Receiving and filling the application	Formal and substantive check	Making an interlocutory decree	Call for making statements, attaching evidences	Holding a negotiation, Making statements	Decision	Length in days
1.	03.09	03.10	03.10	03.10	03.10	03.30	03.30	21
2.	03.28	03.29	03.29	03.29	03.29	04.21	04.21	24
3.	03.28	03.30	03.30	03.30	03.30	04.26	04.26	29
4.	04.04	04.05	04.05	04.05	04.05	04.25	04.25	21
5.	05.02	05.03	05.03	05.03	05.03	05.11	05.22	20
6.	05.03	05.03	05.03	05.03	05.03	06.01	06.08	36
7.	05.19	05.22	05.22	05.22	05.22	06.19	06.20	32
8.	06.08	06.08	06.08	06.08	06.08	06.30	06.30	22
9.	06.08	06.13	06.13	06.13	06.13	06.30	06.30	22
10.	06.12	06.13	06.13	06.13	06.13	07.06	07.07	25
11.	06.12	06.13	06.13	06.13	06.13	06.28	06.30	18
12.	06.30	07.03	07.03	07.03	07.03	07.25	07.25	25
13.	07.27	07.27	07.27	07.27	07.27	07.27	07.27	0
14.	08.02	08.02	08.02	08.02	08.02	09.01	09.01	30
15.	08.07	08.08	08.08	08.08	08.08	08.17	08.17	10
16.	08.14	08.15	08.15	08.15	08.15	08.17	10.04	51
17.	08.16	08.17	08.17	08.17	08.17	08.17	10.04	49
18.	08.30	09.05	09.05	09.05	09.05	10.03	10.16	47
19.	08.31	09.01	09.01	09.01	09.01	09.15	09.16	16
20.	09.05	09.06	09.06	09.06	09.06	10.16	10.16	41
21.	09.05	09.06	09.06	09.06	09.06	10.16	10.16	41
22.	09.27	09.29	09.30	09.30	09.30	10.30	11.13	47

Source: Author's illustration

In this specific contact affair procedure case several applications and appeals for previous decisions were submitted by the separated parents, which altogether triggered the process to start twenty-two times. From the beginning of the first application submission until the closing of the whole case it was almost a year long (from 2017.03.09 to 2017.11.13.). According to the time stamps, several applications were submitted simultaneously at the same day and among the applications there

were several ones, which were submitted before previous iterations of the process ended, resulting in parallel processes connected to a single case. Moreover, this data is just from one single case while the administrators have to handle multiple active cases at the same time with at least one running process in each case at the time.

Figure 4
Length of process iterations
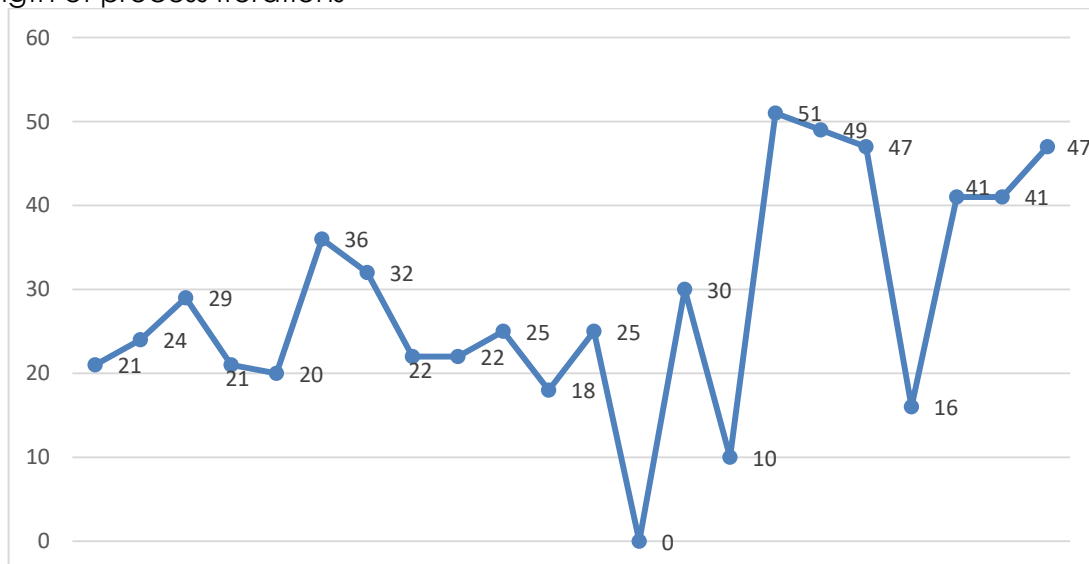
Source: Author's illustration

While in this case each iteration remains under sixty days length as required by the law, it is mostly because the administrators try to minimize the involvement of outside parties. Based on the in depth interviews made these involvements can lengthen the process significantly as they are waiting for responses from different authorities and experts. However according to administrators the exclusion of experts and mediators often leads to general dissatisfaction of the customers and usually as they are not accepting the decision the submit an appeal or a new application.

After the application of Service Blueprinting and Business Process Modelling, and the deep analysis of an individual case to show the complexity of contact affair procedure we can see the process from different perspectives and they all helped us to develop the first iteration of the discrete event representation of the process for further analysis.

In our research we used the Technomatix Plant Simulation software by Siemens, which offers a wide range of tools to build and operate process simulations which can imitate the behaviour of the real process. As we can see on Figure 5. we built the process and defined its parameters based on how it should look like according to the laws and regulations.

In our simulation the moving objects that are moving from the source to the sink are the individual cases. Each station of the simulation represents a main step of the contact affair procedure such as the examination on an application, evidence attaching, decision-making, ect. By using methods to create simple programs, the simulation becomes highly customizable which is a great benefit of this simulation software as many different and complex scenarios can be defined.

Figure 5
Plant Simulation representation of the guardianship office contact affair procedure
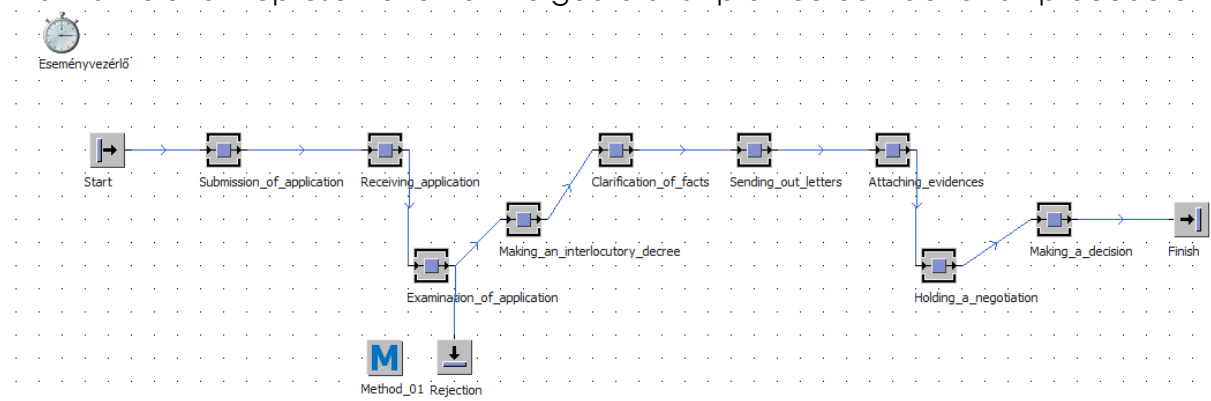
Source: Author's illustration

Based on further data gathering we conducted multiple simulations on this process and concluded that the average time needed to finish a process was 49 days, which is within the 60 days frame. According to this simulation an ordinary case really can be closed before the deadline, which is regulated by the law. However as previously discussed there are steps, which could take significantly longer time to finish according to the information, collected during the in-depth interviews. For example, the complexity of posting and notification could increase the duration of the procedure by several weeks according to the experience of the administrators, but these steps are not detailed in the original service process. Based on this we changed the length of the posting and notification process in simulation model and defined its parameters according to the experience of the administrators.

After running the simulation again, the results showed that the average time needed to finish a case was 81 days, which is above the current regulation by 21 days. Our simulation results correspond with the experience of the administrators who stated that cases could run for several months in some cases and there are examples for even longer processing times due to the nature and complexity of the given case.

Discussion

RQ1: Is it possible to carry out a contact affair procedure until the deadline, which was determined by legislators? (Legislative determination)

Based on the simulation we can realise, it is possible to end the process until the deadline. Despite of this, this procedure is very complex and there are hidden steps in it, which can take a long time. The administrator is under the pressure to end the process until the deadline, so many times the quality of the service becomes inappropriate.

Figure 6 represents, that within the process iterations where were third parties (experts, authorities) involved. If administrators use experts when conducting the process they are risking to run out of time. They do not want to pay a fine for exceeding the deadline of sixty days, therefore, in most cases administrators do not use other witnesses, nor experts (psychologist, teacher, kindergarten teacher, paediatrician, mediator) if it is not absolutely necessary, because administrators are afraid of the lengthening of the administration process. As we can see on Figure 6, there are iterations where the process was more than forty days long from start to finish even without the involvement of third parties.

Figure 6
Length of process iterations (red indicates where third parties were involved)
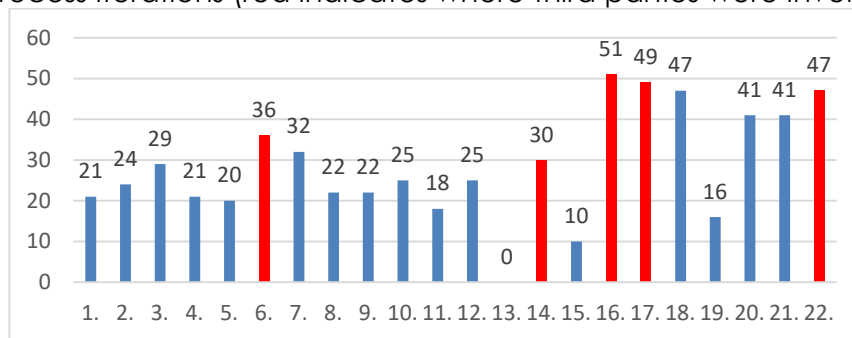
Source: Author's illustration

RQ2: With the changing of which elements is it possible to improve the effectiveness of contact affair procedures? (Customer satisfaction)

Based on qualitative and quantitative researches (modelling and data collection), we identified some elements, which could improve the customer satisfaction: shorten the process, time factor, simpler procedures, aspects of the child, common agreement and solution. The customers expect the solution of the controversial situation from the administrators.

RQ3: With the changing of which elements is it possible to improve the satisfaction of administrators? (Administrator satisfaction)

Administrators do not have enough information, time and the right skillset to manage so complex and long-term procedures. On the top of that at the beginning of the process administrators do not know how long and how complex the process will be. People in charge can only rely on their previous experiences (if they have) which makes the process utterly stressful. Additionally, since the administrators do not get training to manage this complex situation, the fluctuation of the administrators is very high in this office.

Conclusion

The aim of our research was to use Service Blueprinting and Business Process Modelling methodologies to examine a complex public service process. After mapping the process steps from the administrators' and from the customers' point of view by using these methods, we collected statistical data regarding the processing times of the service steps and applied a discrete event simulation software for further examination of this public service. We used the process simulation based one concrete situation. By visualizing the step of the process, the actors involved, their roles and connections we gained new insights from different perspectives.

According to Co-Production theory customers and administrators are an inseparable part of the service process, and their feedback and experience can be used from the inside to map and analyse the process and find improvement possibilities. Our paper aims to contribute to the usage of Co-Production theory approach. Only a few studies were conducted so far in case of the Central European Countries by using this approach and our study is one of the firsts regarding complex Hungarian public service processes.

Contact affair procedure is a public service process used by Hungarian Guardianship Offices to settle issues between separated parents regarding their

child (children). According to our research and interviews made with administrators because the legal regulation prescribe sixty days to finish the procedure the administrators are often forced to finish it at the expense of quality by excluding third party experts and advisors. We presented and analysed an individual case to show the complexity of this procedure as customers can submit several applications and appeals against previous decisions, which altogether can trigger the process multiple times. In this specific case from the beginning of the first application submission until the closing of the whole case it was almost a year long. And this was just a case of only one family, however administrators have to handle the issues of multiple families continuously keeping in mind the time frame regarding each individual process iteration of each case.

For the process analysis and simulation we used the Plant simulation software based on a case study, but we selected the most complicated example. Our plan is in the future research to analyse more situations in order to collect and use more quantitative data in order to add more layers of complexity to the simulation process. With comprehensive analyses, our aim is to be able to give a general recommendation for the legislators and for the administrators on how to improve the processes in public sector.

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