



HAL
open science

Managing the accompanying path of people with disabilities in a medico-social network: a method to create a process model based on autonomous actors point of views,

Anderson Fabian Mosquera Varela, Lorraine Trilling, Thibaud Monteiro

► **To cite this version:**

Anderson Fabian Mosquera Varela, Lorraine Trilling, Thibaud Monteiro. Managing the accompanying path of people with disabilities in a medico-social network: a method to create a process model based on autonomous actors point of views,. 20th IFAC World Congress of the International Federation of Automatic Control (IFAC 2017), Jul 2017, Toulouse, France. hal-01978326

HAL Id: hal-01978326

<https://hal.science/hal-01978326>

Submitted on 11 Apr 2019

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Managing the accompanying path of people with disabilities in a medico-social network: a method to create a process model based on autonomous actors point of views

Anderson Fabian MOSQUERA VARELA*,** Lorraine TRILLING*
Thibaud MONTEIRO*

* Université de Lyon, INSA-Lyon, DISP, 69621 Villeurbanne, France

(e-mail: anderson.mosquera, thibaud.monteiro, lorraine.trilling@insa-lyon.fr)

** Fondation OVE, Ressourcial, 19 Rue Marius Grosso, 69120 Vaulx-en-Velin

(e-mail: anderson.mosquera@fondation-ove.fr, anderson.mosquera@ressourcial.fr)

Abstract: Medico-social sector includes a wide range of institutions and services to support vulnerable people. This sector has to ensure personalized support to meet the needs of each person in demand, and also faces a lack of coordination between actors that receive and accompany those people. The orientation process for people with disabilities aims to propose to each person a list of institutions based on their needs. Currently, this orientation process faces many difficulties, and leads sometimes to situations where the person remain without any support. The objective of this document is to present a method to create a process model based on autonomous actors, who have different points of view. This method is applied in modelling the orientation process for people with disabilities within the French context. It seeks to highlight interactions between actors and how the behaviour of each actor affects the whole process. At the same time, it seeks to identify the points of improvement within the behaviour of each actor in order to positively influence the entire orientation process toward the proposition of a more adapted offer to the person.

Keywords: Enterprise modelling, BPM, Enterprise integration, Healthcare management, Knowledge modelling and knowledge based systems, Method to create a process model

1. INTRODUCTION

In France, according to the Article L. 116-1 of the Social and Family Code, social and medico-social sector must promote autonomy, protection of persons and prevent exclusion with the help of various services put in place by the French Government, public institutions, associations and social and medico-social institutions. Further according to Article L. 116-2, social and medico-social activities must be conducted in order to give an adapted response to each person's needs.

One of the most important areas in social and medico-social sector is the implementation of personalized supports in health and social assistance to persons in a situation of vulnerability (people in situation of precariousness, exclusion, disability or dependency). This work focuses especially on the implementation of supports for people with disabilities. This specific group of people needs guidance from the CDAPH (Committee of the Rights and Autonomy of People with Disabilities).

A person with disabilities (PD) send an accompanying request to the departmental office of people with disabilities (MDPH) through a document called "life project" (LP). A multidisciplinary team (MT) analyses requests and proposes a list of social and medical-social institutions and services (SMIS) appropriated to needs. After that, CDAPH analyses the recommendations of the MT and sends an orientation notice to the PD.

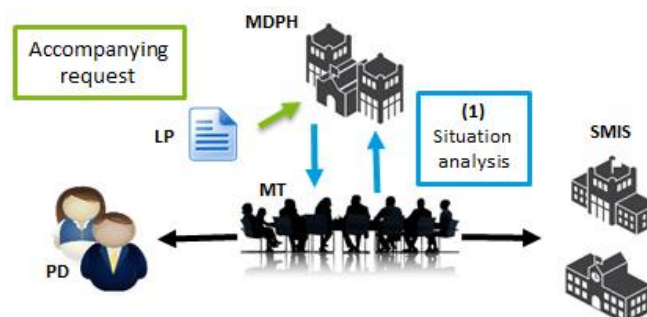


Fig. 1. Orientation process of PD.

Due to length of this process, proposal may not correspond to the actual needs of the person and the arrival of this proposal and its implementation takes a time often too long which can lead to a (1) the retention of users in solutions that were initially transitory, since they are not adapted to the needs of the person or a (2) breaking the accompanying path of a PD. This means that some PDs are staying without services to support their situation in order to reduce the differences with a person without disabilities. The situation of a person can be more and more critical, if the person does not receive the necessary support to his/her situation.

The aim of this project is to reduce these two difficulties. Thus, in this opportunity, we provide a method for creating a process model from the knowledge of autonomous actors. This method is applied in the orientation process of a PD, in order to visualize: the relationship between all actors in the orientation process; how the behaviour of each actor affects

the overall process; and which are the points of improvement of the process.

First, we present the problem of managing the accompanying path of people with disabilities, and then we present the state of the art about the modelling methods and how the proposed method is a contribution in reference to existing research. Subsequently, the proposed modelling method is presented, as well as its application in the given problem and the conclusions about its use.

2. THE PROBLEM OF MANAGING THE ACCOMPANYING PATH OF PEOPLE WITH DISABILITIES

The accompaniment for a PD, according to International Classification of Functioning, Disability and Health (ICF) of the World Health Organization (WHO), should provide to PD tools enabling the person to do the same things as a person without a disability. In France, the laws of 2 January 2002 and 11 February 2005 aim mainly to guarantee people with disabilities a free choice of their life project and to allow their effective participation in social life by seeking autonomy and accessibility. These laws are changing the paradigm of the assistance of people with disabilities by considering more autonomy for them.

Looking for this change, the government has developed several missions which point out important challenges of the orientation process: (1) to adapt services in order to answer to people's needs and (2) to undertake a reform to finance the sector.

The first mission produced the report called "Establishments and services for people with disabilities: offers and needs, funding arrangements" (Vachey et al., 2012). Some elements in this report state that: (a) in the absence of relevant tools for assessing the needs of people, the creation of places did not take place according to needs, but considering target offers; (b) the increase of adults under the Creton amendment (i.e., young adults who stay in a place for child because there is not an adapted place for their new situation), approximately 6300 person at the end of 2010, is a major factor in the breaking of the path. These people with an unsuitable solution mobilize resources normally dedicated to other PDs with other needs. This transfer of resources causes an increase in the number of people on the waiting list at the entrance to institutions; (c) the sector lacks a harmonized system for the exchange of unified data between MDPH (Departmental office of people with disabilities), SMIS (Social and Medico-social institutions and services) and those responsible for departmental and regional programs, which would improve the fluidity of decision process. For example, up-to-date information on the specialties, capacities and availability of medical and social services should lead to an improvement in the overall management of the system.

A second mission tries to analyse the **problem of people with disabilities who are not currently accompanied**. This mission produced the report called "Zero without solution: The collective duty to allow a journey of life without rupture, for people with disabilities and for their family circle" (Piveteau et al., 2014). Some prospects in this report state

that: (a) medico-social offer must be reorganized according to the needs towards a model that, not only offers places, but offers complete solutions considering all the dimensions of expressed needs; (b) it is important to integrate the evolution of the needs of each person in order to propose a personalized solution throughout its life path, and aiming at a goal of zero people without solution; (c) beyond the central role of MDPH, it is essential to set up an efficient information system able to "hoist" the professional know-how and thus, the capacity for the structures to take into account heavier situations.

All difficulties presented above can lead to a break in the accompanying path of a PD.

The first national balance of the "Regional scheme of medico-social organization" presented by the CNSA in 2013, was an assessment based on the analysis of 26 regionals scheme of medico-social organizations adopted by the ARS (Regional health agencies) during the year 2012. This last emphasizes **the lack of quantitative information, at the national level, concerning the rupture of the accompanying path problem**. However, there are some ARS's results like ones of the Indian Ocean in 2011, which have measured a regional average of *pressure rate (Number of people on waiting list / Number of places installed) of institutions and services* of 37%. In addition, the ARS Région Centre in 2014 states that 32% is the number of people accepted on their waiting list. The average waiting time in such list is more than one year.

A contribution of our work is based on the knowledge that can be obtained in the orientation process analysis thanks to the construction of a process model for the orientation process. These results will be exposed in a later section.

3. PROCESS MODEL

As Ducq et al. (2005) points out, the main purpose of modelling is the re-engineering of processes and organizations. System improvement must start for understanding its operations and processes. So, the process model is a fundamental stage for performance improvement. There are different concepts on modelling an organization based on the idea that it is a powerful tool to optimize its performance in different aspects (Vernadat, 1999).

In the health sector, many projects have been developed to analyse and understand how a system works in order to propose a strategy for its improvement (Martin et al., 2011). The key of success modelling is to have a systemic approach, because it considers all the aspects that are involved in the decision-making (Villa et al., 2014).

Several works around the best way to make a process diagram have been presented. Polančič et al. (2017) presents a study based on a systematic literature review, which highlights what are the complexity metrics that must be considered at the time of making a process diagram. Mendling et al. (2010) proposes 7 guidelines to consider when making a process model. Generally one can find several studies on best practices to consider in creating a process model (Claes et al., 2017).

Very few authors focus modelling methods for specific problems. An example is Osorio et al. (2014), who propose a list of operators to consider when creating a reference model adapted to heterogeneous organizations. Our work is in this context of modeling methods for specific problems. Our contribution, from the scientific and methodological point of view, is the proposal of a specific modelling method to create a global model of a process with autonomous actors.

When talking about a global model with autonomous actors, we are referring to a process where each actor is free to define how he performs his activities. However his behaviour has an impact on the way other actors behave. The global model should show the behavior of each actor and how it affects others.

4. PROPOSED METHOD

The proposed method is based on 4 stages. Aiming to collect and model, all the relevant information of the process are described in Fig. 2.

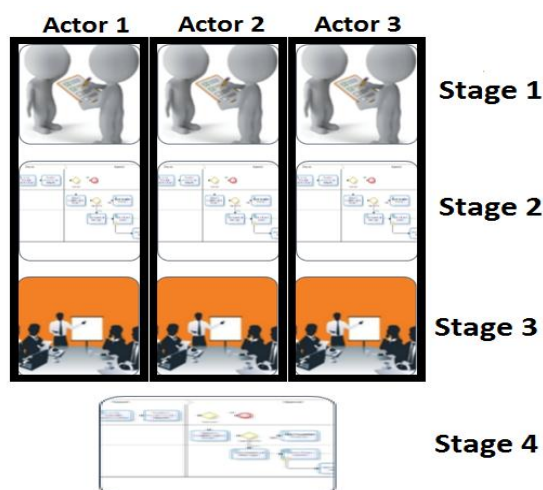


Fig. 2. Stages proposed to create a process model.

Stage 1: Interview with each actor involved in the process;
Stage 2: Create a process model for each process performed by one actor, considering the interactions with the others;
Stage 3: Validate the created model with each actor, considering the information collected from the other actors;
Stage 4: Create a global process model that shows behaviour of all actors and how they interact.

It is very important to highlight that each actor is autonomous, thus global process model must show the behaviours of each actor and how it affects the final result. The explanation of how each stage is developed will be further detailed in our specific case in the later section.

5. MODELING OF THE ORIENTATION PROCESS OF PEOPLE WITH DISABILITIES

5.1. Modelling language

Trilling (2006) explains that the way of modelling must be drawn from the expected objectives of a project: better understanding of the system, better communication between actors, assessment of performance, analysis of malfunctions,

simulation of the behaviour of the system (for sizing of resources, for example). Since we cannot intervene in the operation of the process, the main interest is the realization of a model for a better understanding of the orientation process.

In this project, modelling should be clear and easy to understand by all concerned actors. Over the years, many authors and organizations have developed languages, methods, tools and frameworks, to facilitate business modelling. Each of these developments crosses one or more of the different needs (functional, resources, organization and information) and considers the different systems of the organization (operating system, decision-making system, information system).

Due to the characteristics of the problem, there is an interest in the descriptive modelling of the orientation process focused on the functional point of view. UML, BPMN or IDEF0 are potential methods. Chapurlat (2008) presents a synthesized work about business process modelling methods.

Given the easy understanding of the BPMN (Business Process Modelling Notation) language by the actors, this is the modelling language that we chose to use. Also BPMN carries a great deal of experience with many of existing notations and works to consolidate the best ideas of all these notations to create a single standard notation. Another reason to use BPMN is that it allows a connection between the business process models developed by business people and the process representations required by the systems designed to implement and execute those processes (Geiger et al., 2017).

5.2. Modelling of orientation process

In this paper, we present the model of orientation process, that allows to: (1) Explain interactions between all actors; Identify information flow in the entire process and the means used; (2) Identify the critical points of the process that can cause a breaking of path or a proposition of orientation that is not the most appropriate for the person; (3) Find the different points in which improvement interaction between the actors could be achieved in order to propose a better accompaniment to the person. The modelling work was done respecting the 4 stages previously proposed. Below we give details for each stage and how it was applied in this case study.

5.2.1. Interview with each actor involved in the process

To understand the functioning of a process, it is necessary to know in detail the different activities at each stage, the actors involved and the information flow, among others. One way to acquire this information is to start by obtaining the information from the actors in the field.

Once the legislation has been reviewed and an exchange with the management the groups of structures, three actors have been identified. First, people with disabilities and their family circle: orientation process must begin and end with them, because the aim of this orientation is to propose a personalized solution according to needs. It is necessary before the orientation process begins, to identify the accompanying needs of the person. A second actor is the

MDPH: this agency has the mission to receive, inform, accompany and advise people with disabilities and their families, likewise raise awareness of disability among all citizens. This organization deals with the most important part of the orientation process, which is to propose an adapted SMIS to the person according to his needs. Finally, a third actor is the SMIS, which regroup are the institutions and workers who provide accompaniments to people with disabilities.

Different questionnaires were developed in order to carry out these interviews. The content of the questionnaire were adapted according to the objectives and the person interviewed. The construction of these questionnaires is based on the IDEF0 model. IDEF0 allowed developing a list of questions that seeks to obtain information about each activity developed in the process (input and output elements, resources used as well as the way that activity is controlled during its development). Then, from the obtained information from each activity, we created a model of the global process using BPMN. This one allows gathering all the information of the set of activities involved in the process.

The questionnaire used for the meetings with the actors of MDPH and SMIS, were very specific about orientation, admission and release processes. On the contrary, with PD and their immediate family, people could express freely around the subject of the life project and the path that they have followed, in order to allow the person to express the most important difficulties of their path, without influencing their responses. In the same way, during interview some questions were asked to the person in order to gather information about elements such as: what transport system they use? How did they obtain information about accompaniment possibilities offered by SMIS? What was the process followed from the first accompaniment demand to the effective admission?, among other elements.

5.2.2. Create a process model for each process performed by one actor, considering the interactions with the others.

BPMN language is widely used in functional representation. It has elements that allow to model the different flows between the actors, and the inputs and outputs of each activity. After each interview, a model of the specific process was created considering the different activities of each actor.

To model the behaviour of different groups of actors, several interviews were conducted: (a) Modelling the process related to people with disabilities and their immediate family: Interviews with 4 persons with disabilities and 3 parents; (b) Modelling the process related to MDPH: Participation as an observer of the orientation commission CDAPH and interview with a coordinating doctor ; (c) Modelling the process related to SMIS: Interviews with 10 directors and managers, 1 psychologist , 1 social worker and 3 specialized educators.

5.2.3. Validate the model created with each actor, considering the information collected from the other actors

Normally after an interview, there are missing elements that arouse interest at the time of interview, or simply during modelling. More information is often needed to create a

complete model. The most important thing, at this stage, is to validate with each actor the information given by other actors. This validation allows obtaining information about the behaviour of each one, given the behaviour of the previous actor in the process flow.

In order to ensure that all the necessary elements are taken into account and that the model represents correctly information gathered during interviews, it was necessary to ask for a validation from all the actors involved.

5.5.4. Create a global process model that shows behaviour of all actors and how they interact.

After modelling each actor individually and validating each model from the point of view of all actors, the last stage is the creation of a global model that shows all possible interrelations between actors.

The creation of this model has the following objectives: (a) understand how the orientation process works; (b) identify areas for improvement throughout the process; (c) understand information exchange between actors; (d) identify the different points of difficulty from each actor and understand them from a global perspective.

You can consult the complete model of the orientation process at the following link: <https://acapelha.ressourcial.fr>

6. ORIENTATION PROCESS ANALYSIS

The modelling of the orientation process aims to understand the current orientation process with its different flows (information and material) and to identify the behaviour that improves the final goal of the process (to propose to the person as quickly as possible an accompaniment adapted to their needs). The following is a brief analysis of the information obtained.

Orientation process must start with the identification of orientation needs. Thanks to the model, several actors that can help the family are identified but actually the results show that, for the families, it is not clear to identify the actors they should contact. The family's doctor plays usually the role of the guides towards the adequate institutions.

A PD will receive an accompaniment, after making a request to the MDPH, filling out the correct form and joining the necessary documents. During the creation and analysis of the request, problems were identified such as: People do not know how to make the request to have an orientation adapted to their needs. The applicant can ask for meetings with various committees of the MDPH. Given the amount of requests, meetings with applicants are not always possible. Only the multidisciplinary team offers meetings to people when it is necessary to have more information.

When the CDAPH makes the decision to refer the person to an institution, it usually sends a notification to the person with the list of SMIS. In very few cases the SMIS is notified of this decision, they report the notification when the person approaches the SMIS. This is a point of improvement, as it will allow the institution to predict how many people are likely to come.

One major problem of the orientation process is the information among the actors. **(a)** A person who applies to the MDPH could not expect an answer to his/her situation before more than 1 year, whereas from the legal point of view the response time should not exceed 4 months. During this period the situation of the person can change. Consequently the answer to give must change accordingly. **(b)** People do not necessarily notify the changes in their situation to the MDPH. Sometimes other solutions are found and the interest of the people changes, nevertheless this is not always notified. **(c)** When the MDPH sends the person a notification with several SMIS, the person can start an admission process in one or more SMIS, the SMIS should communicate with each other in order to avoid proposing the place in one SMIS when the person has already found a solution in another SMIS. **(d)** Sometimes, people make a first approach to the SMIS but then they do not want to continue this way. In this case, the MDPH should be notified to keep track of the person's history and why the SMIS does not suit the person.

All these difficulties highlight the requirement for creating a system that helps MT make assignment decisions. This system must consider the changes of the person's needs and services' offer. At the same time, this system must allow all actors in the process to know the state of each orientation.

7. CONCLUSION AND PERSPECTIVES

The main contribution of this work is a modelling method for cases, where several autonomous actors perform a complex process. Autonomous actors, in the sense that no actor has power over the other to tell him what he should do or not; and complex process, in the sense that the way each actor performs the activities of the process, influences the way other actors perform their activities.

The most interesting stage of the proposed modelling method is stage 3, aiming to validate the created model of the behaviour of the actor with him. At this stage the interviewer has a prior knowledge of the behaviour of the other actors and the point of view of each actor in reference to the others. Prior knowledge allows the interviewer to ask the actor for more information about aspects that were not previously mentioned.

The stage 4, dealing with the creation of a global process model, requires more attention. The representation of all actors activities in the same process model must be exhaustive enough to upwelling all possible interaction among the actors; at the same time, it should be clear enough to be understandable for all concern actors.

Considering the results obtained from the created process model, the next stage is the creation a system able to match the needs and wishes of the person (according to his life project) with the services offered and available in the different reception institutions spread over a territory (SMIS).

The system must be dynamic (able to evolve according to the availability of services and the needs of the person) and multidimensional (that considers aspects such as social, family, geographical, among others), in order to assist in the management of the life path of a person with disabilities, in a territory of medico-social institutions.

ACKNOWLEDGEMENTS

This research was funded by the Agence Régional de Santé (ARS) Auvergne Rhône Alpes. It undertaken within the research project ACAPELHA (www.ressourcial.fr/acapelha).

REFERENCES

- Chapurlat, V. (2008). *Vérification et validation de modèles de systèmes complexes: application à la Modélisation d'Entreprise (PhD thesis)*. Université Montpellier II - Sciences et Techniques du Languedoc, Montpellier, France.
- Claes, J., Vanderfeesten, I., Gailly, F., Grefen, P., & Poels, G. (2017). *The Structured Process Modeling Method (SPMM) What is the best way for me to construct a process model?*. Decision Support Systems.
- Ducq, Y., Deschamps, J.C., Vallespir, B. (2015). *Re-engineering d'un système hospitalier par l'utilisation de la méthodologie GRAI*. Journal Européen des Systèmes Automatisés (JESA), Lavoisier, 39 (5-6), pp.605-636.
- Geiger, M., Harrer, S., Lenhard, J., & Wirtz, G. (2017). *BPMN 2.0: The state of support and implementation*. Future Generation Computer Systems.
- Martin, M., Champion, R., Kinsman, L., Masman, K. (2011). *Mapping Patient Flow in a Regional Australian Emergency Department: A Model Driven Approach*, International Emergency Nursing, 19 (2), pp.75–85.
- Mendling, J., Reijers, H. A., & van der Aalst, W. M. (2010). *Seven process modeling guidelines (7PMG)*. Information and Software Technology, 52(2), 127-136.
- Osorio, G., Trilling, L., Monteiro, T., Albert, F., & Millet, P. A. (2014b, September). *A Method to create a process reference Model adapted to heterogeneous organizations*. In IFIP International Conference on Advances in Production Management Systems (pp. 232-239). Springer Berlin Heidelberg.
- Piveteau, D., Acef, S., Debrabant, F.X., Jaffre, D., Perrin, A. (2014). « *Zéro sans solution* » : le devoir collectif de permettre un parcours de vie sans rupture, pour les personnes en situation de handicap et pour leurs proches. Ministère des affaires sociales et de la santé.
- Polančič, G., & Cegnar, B. (2017). *Complexity metrics for process models—A systematic literature review*. Computer Standards & Interfaces, 51, 104-117.
- Trilling, L. (2006). *Aide à la décision pour le dimensionnement et le pilotage de ressources humaines mutualisées en milieu hospitalier (PhD thesis)*. INSA Lyon, Lyon, France.
- Vachey, L., Varnier, F., Jeannet, A., Auburtin, A., Foulquier Gazane, C.M. (2012). *Etablissements et services pour personnes handicapées : offres et besoins, modalités de financement*. Inspection générale des finances – Inspection générale des affaires sociales.
- Vernadat, F. (1999), *Techniques de Modélisation en Entreprise : Application aux Processus Opérationnels*. Économica, 129 pages.
- Villa, S., Prenestini, A., Giusepi, I. (2014). *A Framework to Analyze Hospital-Wide Patient Flow Logistics: Evidence from an Italian Comparative Study*, Health Policy (Amsterdam, Netherlands), 115 (2-3), pp.196–205.