Using the Fractal Enterprise Model for Inter-organizational Business Processes

Martin Henkel, Georgios Koutsopoulos, Ilia Bider, Erik Perjons

Department of Computer and Systems Sciences, Stockholm University, Stockholm, Sweden
{martinh,georgios,ilia,perjons}@dsv.su.se

Abstract. Inter-organizational processes are important for delivering complex services and products. While these processes are important, they are also difficult to design and change. In this paper, we examine how a particular kind of model, the Fractal Enterprise Model (FEM), can help in describing and analyzing changes to inter-organizational processes. FEM is asset-based, meaning that it is focusing on how processes share and consume resources. We use a case study performed at a health care region in Sweden as the base of our examination. In the case, potential changes that affect the organization have been identified, and we use these changes to create FEMs. Based on the case, the need to extend FEM to improve its utility for modeling inter-organizational processes is identified.

Keywords: business transformation, enterprise modeling, business process, inter-organizational, decision-making

1 Introduction

The collaboration of organizations, forming a network of interconnected organizations is not new [1][2]. This cross-organizational collaboration leads to processes that involve multiple organizations, leading to inter-organizational processes. Contrary to inter-organizational processes, business processes within an organization can be centrally controlled and the state of the process is transparent, leading to a reduced level of complexity of management tasks. The complexity is significantly increased for inter-organizational processes, hindering the management and change of the process [3].

Inter-organizational relationships and partnerships are formed in order to facilitate sharing and combining resources, knowledge and the results that are accomplished through the partnership. Sharing specific assets like human and financial resources, systems, equipment, work processes, skills and information provides not only access to a wide range of available tools but it is also providing it at a significantly lower cost than it would outside a partnership [4].

Apart from the benefits, collaborating organizations are facing several considerable challenges and problems which are mostly associated with the high degree of complexity which emanates from the changes in inter-organizational collaborations. For example, change in the collaboration may entail the alignment of IT systems, which is not only time consuming but also costly [5]. Thus, networked organizations need to handle inter-organizational cooperation in the face of increased change in the business context they operate in [6]. The inability to change an inter-organizational relationship that does not work well may even lead to the dissolution of the partnership [3].

Inter-organizational collaboration can be studied and modeled in several different ways, two common areas to study is to focus on the (1) products being exchanged or (2) process control flows. When it comes to the first area, supply chain management (SCM) focuses on the logistics of transferring products. Here cooperation between the enterprises is by one enterprise supplying goods to the other one, e.g. parts that are included in an assembly. The second area studies processes that cross the organizational boundaries, and investigates coordination between processes that run in parallel in different organizations. Typically, the focus is on control-flow, i.e. on hand-overs between activities performed in one organization to activities performed in another. However, there is another type of inter-organizational business processes that got less attention, namely, business processes for which participatory organizations contribute with assets/resources. Such resources can be people, equipment, buildings etc.

The focus of this paper is on the third type of inter-organizational process, which we will refer to as *asset-based inter-organizational processes*. The phenomenon is not new, for example, such assets as office space were often rented from somebody else. However, with the shift from product-oriented to service-oriented economy, the processes' assets, which are owned and managed by many different organizations, will become a norm rather than an exception.

The research reported in this paper is based on a practical example of an asset-based inter-organizational process owned by a Swedish health care region, a public organization which is responsible for healthcare in one of Sweden's 20 regions. The process concerns providing healthcare advice by phone to the residents and visitors of the region. The advice is given by professional nurses specially trained for this job and supported by various information sources incorporated in the software they use. The process is called 1177 that corresponds to the phone number to call. The stated strategic goal of 1177 is to lessen the burden of the other healthcare organizations by filtering the cases that do not require immediate attention.

The 1177 process is owned by the region, but has a number of participants that provide assets for it, both private and public, which makes the structure behind the process quite complex. The complex structure leads to any proposed change in the process requiring a detailed analysis of which parts of this structure will be affected by the change and how. To help the region in assessing areas that require attention when a new proposal on change in the process is received, a special research project has been started. The goal of the project was to try other types of modeling techniques than the ones that the region already had as a tool for analyzing incoming proposals. One of the modeling techniques that are currently under exploration is the Fractal Enterprise Model (FEM) [7]. This modeling technique is in the focus of the current paper. In its original form, FEM is not intended for modeling inter-organizational processes. Therefore, for the work described in this paper, FEM has been extended with means that allow to assign various assets and supporting processes to different organizations participating in the process, so that all responsibilities becomes visible. Thus, the goal of this paper is to *build a FEM for the 1177 process, and to elaborate changes to FEM that make it suitable for inter-organizational processes.*

The work has been conducted in the following manner: 1) By the use of unstructured interviews together with the case organization, a set of upcoming changes of the case organization's inter-organizational process was identified. 2) The changes were modeled using the original FEM syntax. 3) During modeling, the need for extensions of FEM, to capture the nature of the changes was identified and applied, resulting in new models. An overview of FEM and its use for the case organization is presented in section 3 and 4. The resulting FEM extensions are presented in section 5. The case changes that led to the identification of the needed extensions are presented in section 6. Section 7 contains lessons learned from using FEM in the project.

2 Background and related research

This paper deals with using FEMs to analyze changes made to cross-organizational processes. Thus it's related to both the modeling of inter-organizational processes and the study of changes.

As pointed out by [4] the ability to *change* is important for managing inter-organizational work. Describing and executing changes to an organization is related to the field of *change management* [8]. As pointed out by Huerta Melchor [9], a part of management of change is also to identify and deal with both intended and unintended consequences. Effort has been put into creating methods for performing changes [10][11]. In contrast to these approaches, we focus on aiding the detection of what needs to be changed, rather than how to perform the changes. We do this by applying FEM to a case study, thereby examining its applicability to model changes.

Several authors have described how *change impact analysis* can be used to discern how a change will impact a software system. Essentially the idea is that it can be analyzed how much a software system that is affected by a change, measured in the number of affected functions. As pointed out by [12], there are two basic approaches to know how a system will be affected. Firstly, a *trace and dependency* approach can be applied by having a comprehensive model of how the IT systems functions are related to organizational elements such as goals and processes. An example of such an approach to analyze the impact on software is given in [13]. Secondly, an *experiential* approach can be utilized where the analysis relies on experienced experts that can perform an analysis based on their tacit knowledge of the organization. The approach that we selected for this paper is the second one, we have relied on experienced experts describing the impact of the changes as described in the 1177 case. Our aim here is to examine if FEM can be utilized as support to such an expert – and if the changes can be documented using FEM.

Inter-organizational processes, and models thereof, are defined by that the process is jointly executed by at least two autonomous organizations aiming to create a specific output. As an autonomous organization, we consider not only a legally independent organization, but also autonomously acting units or subsidiaries within an organization [14]. As the quantity of external business relationships increases, business processes' close alignment across the boundaries of the organization is required. Therefore, modeling and designing business processes need to be enhanced or extended to fulfil these requirements. This can be achieved using existing modeling notations or any of their extensions. Specific concepts need to be included to describe for example external organizations, and what part of the process that should be public [15]. Existing approaches for modeling inter-organizational processes are making use of control-flows, depicting how the control of the process shifts between organizations. One example use of such an approach is to apply Business Process Model and Notation (BPMN), [16]. In this paper we explore another, complementary approach focusing on the use of assets. In particular, we are interested in how the asset-based FEM approach can be used to analyze changes.

Legner and Wende [14] conducted a literature search and identified seven challenges and associated requirements of inter-organizational business process design (Table 1). We will re-visit these challenges, and how FEM may address them, in section 7. Note that these challenges are for process design, run-time challenges for allocating resources may differ, as shown in [17].

Table 1. Challenges and requirements of inter-organizational business process design (adapted from [14]).

Challenge	**Requirement**
a. External processes as "black box". Business processes owned by external organizations are perceived as "black box", the associated activities and interdependencies are unknown to internal staff.	Representation of inter-organizational business process
b. Lacking clarification of responsibilities at company boundaries. The responsibilities for process activities which are shared among several organizations are inadequately clarified.	Allocation of tasks to actors
c. Different process logic and terminology. Aligning business logic and terminology of different organizations is hard and time-consuming, especially when different industries are concerned.	Alignment of semantics
d. Process autonomy. The actors of inter-organizational business processes' autonomy to design and change processes within their internal boundaries may result in complexity levels that may lead to time-consuming or impossible to align process life cycles.	Decoupling of internal and external processes
e. Confidentiality. It is not always desirable to share every piece of valuable or confidential information that is contained in business process design.	(Selective) visibility of internal processes to external partners
f. Contractual relationships. External organizational boundaries are significantly different than boundaries between internal organizational units and their coordination requires contracts.	Formal specification of process interfaces
g. Complexity of bilateral agreements. Aligning business processes owned by multiple partners may increase the cost of cooperation.	Support for alignment with multiple partners

3 FEM - Fractal Enterprise Model

The Fractal Enterprise Model (FEM) includes three types of elements: business processes, assets, and relationships between them, see Fig. 1a in which a fragment of a model is presented. Graphically, a process is represented by an oval; an asset is represented by a rectangle (box), while a relationship between a process and an asset is represented by an arrow. FEM differentiates two types of relationships. One type represents a relationship of a process "using" an asset; in this case, the arrow points from the asset to the process and has a solid line. The other type represents a relationship of a process changing the asset; in this case, the arrow points from the process to the asset and has a dashed line. These two types of relationships allow tying up processes and assets in a directed graph.

In FEM, a label inside an oval names the given process, and a label inside a rectangle names the given asset. Arrows are also labelled to show the types of relationships between the processes and assets. A label on an arrow pointing from an asset to a process identifies the role the given asset plays in the process, for example, *Workforce*, *Infrastructure*, etc. A label on an arrow pointing from a process to an asset identifies the way in which the process affects (i.e. changes) the asset. In FEM, an asset is considered as a pool of entities capable of playing a given role(s) in a given process(es). Labels leading into assets from supporting processes reflect the way the pool is affected, for example, a label *acquire* identifies that the process can/should increase the size of the pool.

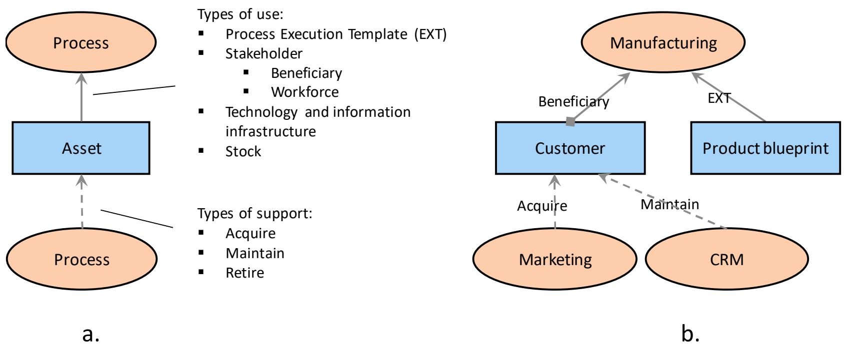

Fig. 1. The main constituents of FEM (a), and an example (b).

In FEM, different styles can be used for shapes to group together different kinds of processes, assets, and/or relationships between them. Such styles can include using dashed or double lines, or lines of different thickness. For example, a diamond start of an arrow from an asset to a process means that the asset is a stakeholder of the process (see the arrows *Beneficiary* in Fig. 1b).

Labels inside ovals, which represent processes, and rectangles, which represent assets, are not standardized. They can be set according to the terminology accepted in the given domain, or be specific for a given organization. Labels on arrows, which represent the relationships between processes and assets, however, can be standardized.

This is done by using a relatively abstract set of relationships, like, *workforce*, *acquire*, etc. (see Fig 1a), which are clarified by the domain- and context-specific labels inside ovals and rectangles. Standardization improves the understandability of the models.

While there are a number of types of relationships that show how an asset is used in a process (see Fig. 1a), there are only three types of relationships that show how an asset is managed by a process – *Acquire*, *Maintain* and *Retire*.

Creating a FEM consists of identifying a primary process, and then identifying the assets that the process is using. When the assets have been identified, the processes that Acquire, Maintain or Retire the assets can be identified. This creates a set of processes that can be further analyzed to find assets that are used, and the processes that support those assets and so on. Thus, the procedure creates a repeating (fractal) structure of process-assets patterns. The FEM has been successfully used to model a variety of cases, including the modeling of organizational capabilities [18].

4 FEM for the Health Guidance Process

As stated earlier, the 1177 Guidance service is complex. A part of the complexity comes with the wide range of health care issues that the service needs to cater to – ranging from trivial issues and even prank calls, to life-threatening issues. A part of the complexity is also due to that the health guidance is an entry point to the regional health care – thus there is a need not only for regional residents to know about the service – but the health guidance operators also need to know about the region's health care providers in order to advice the patients to the right provisioning of care.

A FEM of part of the 1177 Guidance service is shown in Fig 2. Central to the model is the identification of "Health guidance" as the main process. This main process has the users of the regional health guidance as the main *beneficiary*. In order to carry out the main process there is a need for a number of assets, as shown below the main process in Fig. 2. As *workforce* there are the expert nurses, that they are specially educated is shown by including the education process that *Acquire* and *Maintain* the expert nurses. The main process is following a process execution template (*EXT*) in the form of a set of principles referred to as LEON principles. These principles are also used as an asset in the education of the nurses. Essentially, the LEON principles state that the guidance should be performed to reach the most efficient level of care. For example, guidance to the emergency hospital should only be performed for those in need of emergency care.

As a support, the guidance process is supported by a number of assets pertaining to the *Technology and information infrastructure*. These assets include the telephone and journal systems. There is also a specific Guidance system that the nurses use as a way of guiding the conversation with the residents. This guidance system is developed at a national level, as indicated by the separate development process. Furthermore, a provider catalogue system works as an asset that allows finding care providers.

The FEM also includes processes for informing the residents about the guidance service, and the actual care provisioning process as performed by the care providers. The relation to the main process is that the information process *Acquire* a queue of informed residents that may call for guidance, while the guidance process may create a queue of residents that will visit care providers. We use the relation *Stock* to indicate that an asset is put in a queue to a certain process.

In Fig. 2 we have not included the owners of the process, the addition of process ownership will be included when we describe potential changes to the current business.

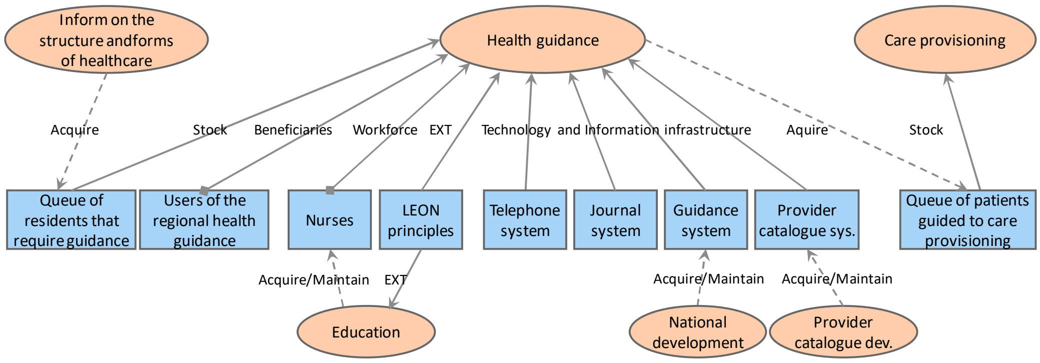

Fig 2. A FEM of the 1177 Health Guidance service.

5 The extension of FEM

While analyzing the 1177 service using FEM, it was clear that FEM needed a few modifications to deal with inter-organizational processes. We introduce these changes here, before we make use of them to analyze the changes that 1177 is going through. Two extensions to FEM are proposed – the addition of *process ownership* and the addition of *boundary control* (Fig. 3).

The *asset and process ownership* is visualized through coloring of the borders (Figure 3). The inclusion of the ownership is motivated by that inter-organizational process, quite naturally, includes several organizations. Including ownership makes it possible to visualize who is responsible for performing a process, and who the owner of a certain asset is. An explanatory ownership legend is placed in the model.

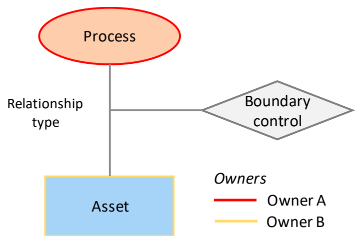

Fig 3. Process ownership (colour) and boundary controls (rhomb) in FEM.

A *boundary control* element is added as a rhomb to represent how the coordination between assets or processes that belong to different organizations is regulated (Fig. 3). The boundary control is connected to one or several support or use types. Thus, it works similar to the association classes existing in UML. The purpose of the boundary control is to depict needed coordination between two owners. Examples of such control include the use of contracts, or other form of rules governing the exchange of assets between owners.

In the next section we give two examples of how the extended FEM may be used to model changes in the 1177 service.

6 Assessing Changes

The region's health care and the health guidance service 1177 is in constant change. The impetus for change comes both via top-down and bottom-up developments. From a top-down perspective, politicians are pushing for reforms to both improve the overall quality, but also to make it easier for the residents in the region to use the service. From a bottom up perspective changes are also proposed by the staff of the service, and from partners involved. The service also needs to be maintained to keep abreast of new technology developments, such as the desire to use video calls.

Whenever a change is proposed, it needs to be analyzed to determine the effect on the service. To examine if FEM can help in this analysis, we have selected two recent change requests – a) a proposed change in the guidance support that allows the nurses to guide the residents directly to a care provider based on their symptoms and b) the desire for the health guidance service to book times at local emergency clinics. We have selected these change request to illustrate the use of FEM because they highlight both internal improvements that the residents may not be aware of (case a) and improvements that affect external partners that the residents have contact with (case b). As will be explained later, both changes affect external parties and IT systems.

In subsequent sections we describe the two change cases, and the analysis done using FEM. We further discuss the utility of the FEM approach for each case.

6.1 Case A – Guidance support improvements

General description of business before changing: One of the core supports that the expert nurses got when performing health care guidance is a Guidance support system. The support system is a national system enabling the expert nurses to search for symptoms. Based on the symptoms, the system presents possible sub-symptoms. For example, when searching for "throat pain" the system will list other more specific symptoms such as "difficulty to open the mouth" and "difficulties to swallow". Each sub-symptom is also connected to an emergency level, ranging from "Immediately" to "Wait and see". Given a symptom, the system also provides advice on self-treatments that the nurse may present to the patient. Depending on the emergency level the nurse could in the worst case call for an ambulance, if it's less acute the nurse could recommend a health care provider that the patient should contact. To support the nurse, a separate list of health care providers is provided in a catalogue.

Modeling in FEM: A subset of the FEM describing the 1177 Health Guidance use of assets to pinpoint symptoms and select health care provider to recommend is shown in Figure 4a. As can be seen in the figure, the main 1177 process is supported by the assets Guidance system and Provider catalogue system. These assets are currently each maintained by two separate development processes. The Provider catalogue is maintained by a private provider that has its own software, while the Guidance system is developed on a national level by a public company.

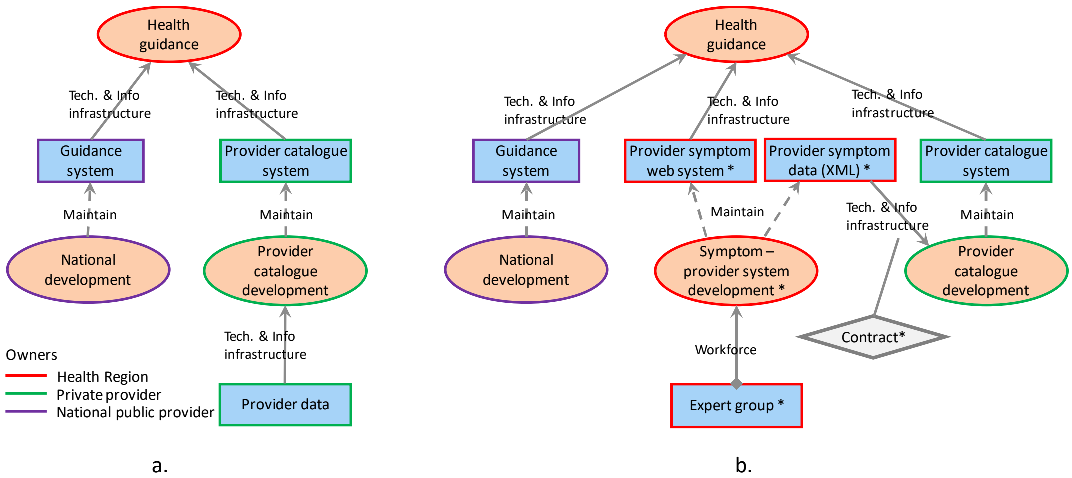

Fig. 4. The guidance support change, before (a), after (b)

The change: A proposed improvement of the support systems is to have better support for recommending health care providers in the region. The novel idea brought forward is to link each provider to the symptoms that they are likely to be able to manage. The novelty in this is that the nurses do not have to reach a diagnosis to select provider, as the identification of a provider may be done directly via the identification of symptoms. The proposed benefit with this change is improved service for the patient, since they will be guided to a provider. Furthermore, a benefit is that the patient can be guided to the providers with the best expertise. As the research project reported in this paper was running, the implementation of the change had started with forming an expert group of physicians that mapped the providers to symptoms. The work of the expert group would then result in both a web system than can be used directly, and a XML export file that may be used in other systems.

Analysis of the change using FEM: When the change has been performed the use of assets will have changed as depicted in the FEM shown in Fig. 4b; added elements are marked with a "*". Most notably there will be a new development process that maintains the new provider-symptom mapping data and associated web system. This development process will need to utilize expert physicians to map the symptoms to the providers. Furthermore, the development will produce data that feeds into the development of the provider catalogue, owned by the private provider.

Conclusions on the use of FEM extensions: As depicted in Fig. 4b, the change introduced both new processes and new combinations of assets. Most notably, the new development process is producing assets that are used by another organization. This can be made clear during analysis by indicating the owner of each asset using the FEM ownership extension. In this case Fig. 4b shows three owners – the region, a national public provider and a private provider. The change resulted in a shift of responsibility/ownership of data. Once the change is implemented (Fig 4b), the responsibility of maintaining the provider catalogue data shifts from the private provider to the health care region. Here the introduction of a boundary control element, "Contract" made it possible to depict that a contract letting the private provider use the data from the health care region need to be in place to perform the changes.

The use of FEM as described above provided some clear advantages to describe the complexity of the change. Most notably, the focus on assets enables an analysis of asset ownership. This may provide a good foundation for planning a change project – since access to the assets needs to be granted. Furthermore, the analysis may form the ground for writing contracts on how the assets from external organizations may be used.

6.2 Case B – Time booking at emergency clinics

General description of business before: An important part of health care managed by RS is the local emergency clinics. These clinics are meant to treat acute, but not life-threatening illnesses. For example, the clinics can handle acute allergy reactions, concussions and fractures. The local clinics have set openings hours, and when open, may offload the main emergency units at the major hospitals. Currently the expert nurses at 1177 can recommend the patients to visit a local emergency clinic if they deem that the clinic can handle the case.

Modeling in FEM: Selected processes and assets involved in handling of patients for the local emergency clinics are shown in figure 5a. A local emergency clinic has a queue of patients, currently waiting for treatment. In FEM, this is modeled as a stock of "Queue of patients" to the local emergency care provisioning process. While the 1177 nurses may recommend that patients visit the emergency clinics, they do not currently put the patient in contact with the clinic. As a part of the assets used by the clinics they have a journal system, most use a journal system developed by the same journal system developer (a private company). The clinics also got their own staff in the form of nurses and physicians, but for reasons of brevity, we omit those from the model.

The change: A proposed change is to extend the capabilities of the 1177 service to also include the ability to book time slots at local care providers. An example of local care providers is local emergency clinics. The purpose of doing this is firstly to provide better service to the patients, besides the convenience of having a booked time also makes the patient feel more secure. Secondly, the ability to book times also makes it possible for 1177 to have control of the flow of patients, enabling the booking of timeslots at clinics that are currently having the shortest queue.

Analysis of the change using FEM: The FEM of the proposed future state with booking included is shown in figure 5b. The first concrete change is that 1177 will now be directly acquiring patients for the clinics, thus the 1177 process acquire relation to the stock of the clinics process should be supported by manual routines or IT systems. As can be seen in the model, the change entails adding the support infrastructure for 1177 to enable the nurses at 1177 to use an IT system to book times. The maintenance of this need to be based on an API provided by the clinics' journal system developer. Another option not shown in the model was a manual routine that allows the clinics to indicate which time slots that are bookable. In the model we have added a *boundary control element* depicting a contract, since there is a need of a contract that regulates what kind of symptoms the clinics should be capable of handling and also the use of the journal system API. Things such as the duration of the patients visit, and the number of time slots that the clinics should provide may also be a part of the boundary control. If needed, several boundary control elements may be added to depict these.

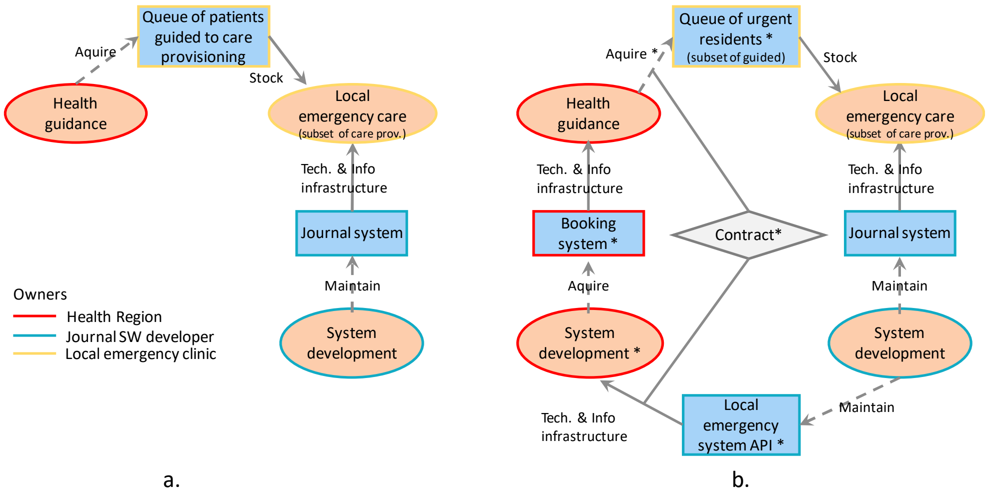

Fig. 5. The booking at local emergency clinics change, before (a), after (b)

Conclusions on the use of FEM: On an abstract level, the two cases presented in the paper (case a and b) are similar – both are about an improved connection between the 1177 Guidance and the health care providers. Similar to case a, this case also shows the need for collaboration with parties owning the IT system – the provider of journal systems need to be included in the change work. Using the ownership extension in FEM was proven valuable for clearly identifying when an external party is responsible for a process.

The added boundary control element clarified the need for controlling the new collaboration as required for the change. While using FEM to model the boundary control element the question of when to include a boundary control element was raised. For example, including a control element for all relations that cross boundaries may result in a cluttered model. Some initial guidelines on when to use the boundary control element could be based on different types of relationship among collaborating organizations. Lee & Kim [19] have identified two main styles of relationship in this kind of collaboration – the transactional and the partnership style. A transactional style relation is based on formal agreements that are put in place, and that there could be penalties for not abiding by a contract. Regarding modeling in FEM, the use of the boundary control element is crucial for these kinds of relationships – simply to signal that there is a need to write formal contracts. The partnership style of collaboration is more based on trust, and there is commonly a way to share risk and benefits. An initial guideline for FEM is that the boundary control element may be omitted for these types of relationships.

7 Discussion and lessons learned

The use of FEM to model the changes in the 1117 health guidance service led to the change of FEM, but we also made some general observations about FEM's ability to model inter-organizational processes and usefulness of FEM to analyze changes.

The *use of FEM to model changes* initially proved to be problematic, due to the lack of means to represent the ownership of assets and processes. However once FEM was extended with ownership and boundary controls we saw several strengths of the model. Firstly, FEM's focus on assets makes it easier to spot issues where changes need the collaboration or consent of several parties. This was evident in case a – where the change required access of data owned by another organization. A model focused on control flows would not be as useful in depicting this. Secondly, the inclusion of boundary control elements is also a strength since it made it clear where extra care must be put in to design rules about the use of assets that are used across organizational boundaries.

A limitation in using the FEM to *model changes* that were not amended in the extensions was that it is difficult to model how "strong" a relationship is between two owners. This was evident in case b – where the 1177 guidance operators should be able to book a time at the local emergency clinics. In the current business, a "soft" form of booking is done – 1177 can recommend the patient to visit an emergency clinic. However, performing a booking can be considered a stronger form of relationship – since it is both more likely that the patient will follow the advice, and it gives 1177 a better control of the flow of the patients.

According to our experience with the case, FEM with the proposed extension is suitable for *modeling inter-organizational business processes*. In order to argue for FEM's ability to support inter-organizational business processes we re-visit the seven challenges for inter-organizational processes as described in [14], see table 2.

Table 2. Addressing requirements with extended FEM.

Challenge	Addressed in FEM by
a. External processes as "black box"	Added by the ability to express process *ownership*.
b. Lacking clarification of responsibilities at company boundaries	FEM may address this by the use of sub-processes, and the allocation can be shown using *ownership*. The coordination of assets can be explicitly described by using *boundary controls*.
c. Different process logic and terminology	FEM support alignment by providing a manageable set of constructs for inter-organizational processes, thus it should be easy to adopt. However, FEM is not following more commonly available model constructs based on control flow, making it difficult to align with such approaches.
d. Process autonomy	Not addressed. FEM does not provide design principles to make the model itself more decoupled.
e. Confidentiality	Visibility and the ability to hide details for some partners are not explicitly part of the FEM, but could be developed in modeling tools that support FEM.
f. Contractual relationships	This is explicitly addressed in FEM using *boundary control* elements.
g. Complexity of bilateral agreements	FEM does not address the use of reference models or the ability to create abstract reference models.

As can be seen in the table, the extended FEM addresses most of the requirements. Most notably missing is the support for the creation of reference models (g) and that tool support is lacking for hiding details (d & e).

8 Conclusion

In this paper we have examined how the Fractal Enterprise Model can be used to model changes to inter-organizational business processes. We initially found two areas – process ownership and the control of assets – that were needed for the modeling but not included in FEM. Thus, we, in this paper, suggest extensions to FEM that address these issues.

Our examination of FEM was based on the need of a Swedish health care region to assess changes that would affect their business. An initial idea is that enterprise models, documenting an organization, could help in assessing the impact of the proposed changes. As future research we plan to examine more types of models, based on the case of the health care region.

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