# Some Empirical Evidence on Business-IT Alignment Processes in the Public Sector: A Case Study Report

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**Abstract**

An empirical study that explores business-IT alignment processes in a networked organization among the province Overijssel, the municipalities Zwolle and Enschede, the water board district Regge & Dinkel and Royal Grolsch N.V. in The Netherlands, is summarized in this report. The aim of the study was to identify processes that contribute to improve such alignment. This study represents a continuation of previous validation efforts that help us to confirm the business-IT alignment process areas that should ultimately be included in the ICoNOs MM. Evidence was sought for the alignment of business and IT through the use of information systems to support the requirements of the organization in a specific project. The results of this study in the public sector also are relevant to the private sector where (i) business-IT alignment plays an increasingly valuable role, and (ii) the characteristics of collaborative networked organizations are present.

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# Chapter 1

# Introduction

Aligning IT with the business remains one of the top priorities for both business practitioners and researchers. Interest in business-IT alignment (B-ITa) is stimulated by cases of organizations that have successfully aligned their IT to gain competitive advantage [1] and to improve organizational performance [2].

Within the broad scope of literature on alignment, a number of authors have stressed the importance of assess B-ITa in order to plan B-ITa improvement actions (e.g. [3, 4, 5, 6]). In support of this, these authors have developed maturity models (MMs). MMs describe the development of a specific domain over time. Based on maturity assessments, organizations know the extent to which processes in such domains are predictable. That is, organizations can be aware of whether a specific area is sufficiently refined and documented so that the activities in such area now have the potential to achieve its desired outcomes. Notwithstanding the effective application of such models in single enterprises, to the best of our knowledge there is no MM that specifically addresses the processes needed for achieving alignment between business and IT in collaborative networked organizations (CNOs). In our research, we are developing a MM to assess B-ITa in CNOs: the ICoNOs MM[1]. We believe that achieving B-ITa in CNOs is more complex than in single organizations because in such settings, B-ITa is driven by economic processes instead of by centralized decision-making processes.

In previous work [7, 8, 9, 10, 11], we have reported on our motivation for developing the ICoNOs MM, on how we began to validate the model, and on the MM itself. In this report, we present a case study conducted in a networked organization among the province Overijssel, the municipalities Zwolle and Enschede, the water board district Regge & Dinkel and Royal Grolsch N.V. in The Netherlands. We used this case study to empirically identify whether the B-ITa process areas included in the ICoNOs MM are present in a real-life CNO. To make this report self-contained, in the remainder of this chapter we first briefly present the ICoNOs MM. The rest of this report is organized as follows: in

[1]The acronym ICoNOs MM stands for **I**T-enabled **Co**llaborative **N**etworked **O**rganization**s** **M**aturity **M**odel

| | PARTNERING STRUCTURE | | IS ARCHITECTURE | |
|---|---|---|---|---|
| 5 | | | Risk analysis and mitigation | RAM |
| 4 | Metric-based roles exploration | MRE | Quantitative IS portfolio management | QPM |
| 3 | Governance structure and compliance<br>Roles and responsibilities specification<br>Inter-organizational policies definition | GSC<br>RRS<br>IoPD | IS architecture target formulation<br>IS capabilities definition<br>IS architecture verification and validation<br>IS portfolio management | ATF<br>IsCD<br>AVV<br>IsPM |
| 2 | Business model definition<br>Service level agreements definition<br>Organizational structure definition | BMD<br>SLA<br>OSD | Baseline IS architecture description<br>Standards and principles definition<br>IS requirements management | BAD<br>SPD<br>IsRM |
| 1 | | | | |

| | PROCESS ARCHITECTURE | | COORDINATION | |
|---|---|---|---|---|
| 5 | Inter-organizational process optimization<br>Causal analysis and resolution | IoPO<br>CAR | | |
| 4 | Organizational process performance<br>Event logs formal consistency | OPP<br>EFC | Quantitative coordination relation analysis | QRA |
| 3 | Organizational process focus planning<br>Process architecture target formulation<br>Process architecture definition<br>Process portfolio management | PFP<br>PAF<br>PAD<br>PPM | Standardization<br>Communication-oriented coordination | STD<br>COC |
| 2 | Baseline process architecture description | BPD | Informal communication adjustment<br>Direct supervision | InCA<br>DTS |
| 1 | | | | |

Figure 1.1: The ICoNOs MM.

Chapter 2, we outline our definitions and assumptions. Chapter 3 describes our research approach. Then, Chapter 4 and Chapter 5 present the case study findings and discuss their implications, respectively. Finally, Chapter 6 concludes the report.

## 1.1 The ICoNOs MM

The ICoNOs MM is a two dimensional framework (see Fig. 1.1). These dimensions represent the maturity levels and the domains to which these levels apply. The ICoNOs MM has five levels of maturity: level **1** incomplete, level **2** isolated, level **3** standardized, level **4** quantitatively managed, and level **5** optimized[2]. Levels are used to describe an evolutionary path recommended for a CNO that wants to improve processes to achieve B-ITa.

The domains included in the ICoNOs MM are groups of processes that help to have improvements in a particular CNO area. In the following, we give a short summary of these domains:

- Partnering structure, defined as the inter-organizational work division, organizational structure, and roles and responsibilities definition that indicate where and how the work gets done and who is involved.

[2]A detailed explanation of these levels can be found in [11]

- IS architecture, defined as the fundamental organization of the information management function of the participating organizations embodied in the information systems, i.e., software applications, that realize this function, their relationships to each other and to the environment, and the principles guiding their design and evolution.
- Process architecture, defined as the choreography of all (individual and collaborative) processes needed to reach the shared goals of the participating organizations.
- Coordination, defined as the mechanisms to manage the interaction and work among the participating organizations taking into account the dependencies and the shared resources among the processes.

The cells of the ICoNOs MM contain B-ITa process areas. Because space constraints, we do not define each of the process areas in this report. For a detailed definition of these process areas, please refer to our previous work [11]. Several theories and models, developed elsewhere, were potentially useful to identify these process areas. A process area is a group of practices in a domain which, when implemented collectively, satisfy goals considered important for making an improvement in that domain. The case study presented in this report has been useful to identify such process areas in a real-life CNO. This serves as empirical evidence for their inclusion in the ICoNOs MM.

# Chapter 2

# Theoretical Framework

In this chapter, we outline our definitions and assumptions concerning B-ITa in CNOs. This helps to clarify our research context serving as theoretical basis for the rest of the report.

## 2.1 Business-IT Alignment

For the purpose of our research, we define B-ITa as the *process to make IT services support the requirements of the business*, whether such services are individual or collaborative offered. We do not consider alignment as a steady state but as a process that needs to be performed continuously. By 'IT services' we mean services offered by computerized information systems. By the 'requirements of the business' we mean the systems requirements derived from analyzing the goal(s) of the CNO. We will focus on operational B-ITa, which consists of aligning the operational activities of IT systems and people to each other so that optimal IT support for business requirements is achieved. This contrasts with strategic B-ITa, where business and IT goals and policies are decided without fixing operational details [5, 12, 13].

We analyze the B-ITa concept in CNOs based on the scheme shown in Fig. 2.1. The horizontal layers classify entities in a service provisioning hierarchy in a business: physical entities provide services to a software infrastructure, which provides services to information systems, which provide services to businesses. In the business layer, we take four views on businesses: businesses provide services that have a utility, they perform processes to provide these services, they communicate with one another as part of performing these processes, and while doing that, they exchange data that has semantics. Participating organizations in a CNO need both to fit the different entities (horizontal arrows) as well as to address B-ITa (vertical arrow). Our interest is in the upper two layers of the framework (area delimited by the dotted line), because there is where the business and IT alignment in CNOs takes place.

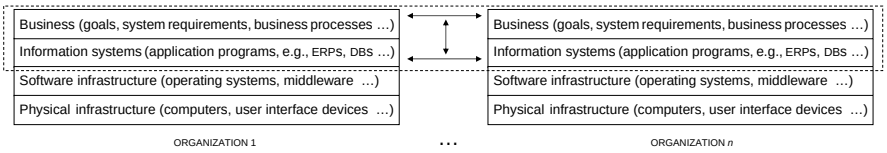


Figure 2.1: Business-IT alignment framework.

## 2.2 Collaborative Networked Organizations

We define a CNO to be any *"mix-and-match" network of profit-and-loss responsible organizational units, or of independent organizations, connected by IT, that work together to jointly accomplish tasks, reach common goals and serve customers over a period of time* [14]. Virtual enterprises [15], value constellations [16], extended enterprises and collaborative highly integrated supply chains [17] are some forms of CNOs. Our interest is in IT-enabled CNOs, i.e., collaborations that are made possible by IT where the participants interoperate with each other by means of information systems. We believe that IT makes global competition and collaboration possible, forcing organizations to focus on what they can do well and facilitating collaboration between organizations with complementary competencies.

CNOs continue spreading since hypercompetitive environments [18] exist. This kind of environments forces organizations to re-think the way they are doing business by connecting and aligning the business and IT operations among them to meet goals. Participants in a CNO can be seen as distinct loosely coupled stakeholders with commonly conflicting interests and goals [19]. However, if they want to collaborate, they need to formulate a clear-enough common goal(s) toward which they strive together. Having well-defined goal(s) and collaborative work structures as basis [20], participants need to react promptly to customer needs. They will collaborate while an interesting 'business' opportunity exists. When this opportunity is over, the CNO dissolves while, perhaps, the organizations are active in other CNOs or look for new complementarities that allow them to participate in new 'business' opportunities.

# Chapter 3

# Research Approach

The case study research design involved multiple sources of data collected in a structured way. This situation suggests that construct validity must be addressed, and that we can generalize results to valid statements [21]. Case study research was used because of the need to analyze complex phenomena in depth and the significant nature of the data that had to be collected [21, 22]. Limiting the study to one CNO in one sector (i.e., the public one) facilitates the analysis of multiple sources of evidence. However, the case site used was not systematically sampled. Therefore it is not possible to generalize findings to a wider population of organizations. Nevertheless, as we can generalize to theory (see Sect. 3.3), part of the results can be drawn on by others who work in an environment where B-ITa plays a valuable role.

It can be argued that our results can not be brought up in the private sector since our case study was conducted in the public sector. Research (e.g., [23, 24, 25, 26, 27]) analyzing the differences between public and private organizations will support such an argument. However, that research has also found similarities between the two sectors. Likewise we have also found evidence, in the case studies we have conducted to design the ICoNOs MM [8, 9, 10], that confirms some similarities. We believe that CNOs in both sectors begin a B-ITa project with a solid mission statement that drives the strategic planning process to meet the common goal(s). This mission reminds the participating organizations of their work principles and respective roles in the network. We have studied entrepreneur-led and governmental CNOs where (i) participants pool costs, skills, and core competences to provide world-class solutions (products or services) that could not be provided by any of them individually; (ii) information systems are able in each of the participants to respond dynamically to meet the ever-changing customer needs and to communicate and share information among them; (iii) participants have a clear understanding of the common goal(s) and the functions of each of the participating organizations in order to know what is expected from each of them. Such characteristics are reflected in our definition of CNO (see Chapter 2). So, both sectors are similar. Only their purpose could vary. And, this difference in intention creates the environment in

which they operate and how they do it.

The objective of the case study presented in this report was to identify whether the process areas included in the ICoNOs MM are present in the investigated CNO. We claim that the B-ITa process areas of the ICoNOs MM are the required processes to implement for making improvements in the B-ITa domains. If the process areas prove important in the results of our case, then we have an empirical ground for their inclusion in the MM. The research question addressed with this case was:

> *Is there evidence to support the inclusion of the process areas presented in Fig. 1.1 in the B-ITa domains, within a specific level, of the ICoNOs MM?*

This question can be translated to the next hypothesis:

If a CNO strives to improve B-ITa, then it would be possible to find, in such CNO, the four B-ITa domains and the process areas included in the ICoNOs MM. Furthermore, it would be possible to identify:

- on level 2, process areas that are planned and executed in accordance with policy; employ skilled people who have adequate resources to produce controlled outputs; are monitored, controlled, and reviewed, but not from the entire CNO perspective.
- on level 3, process areas that directed to make improvements in the standardization and management of B-ITa domains. Processes that are performed from a CNO perspective, and that are well characterized and understood, and are described in standards.
- on level 4, process areas that use statistical and other quantitative techniques, where quantitative objectives for quality and process performance are established and used as criteria in managing the process itself.

## 3.1 Case Study Site

People who want to build, re-build, or re-use a house, factory, or barn, in the Netherlands, can often need to apply for licenses and permits regarding residency, spatial planning, and the environment. Each of these licenses and permits has their own set of criteria, procedures, administrative desks, waiting periods, fees, and staff. For both citizens and companies, this is a complex and time consuming process that costs both applicants and the government a great deal of money. The Ministry for Housing, Spatial Planning and Environmental Management (VROM – initials in Dutch) wants to gather the different licenses together within the 'omgevingsvergunning' – the environmental permit. All aspects can then be requested from a single point and follow a single paid procedure to obtain a decision even if such decision needs the collaboration of different organizations.

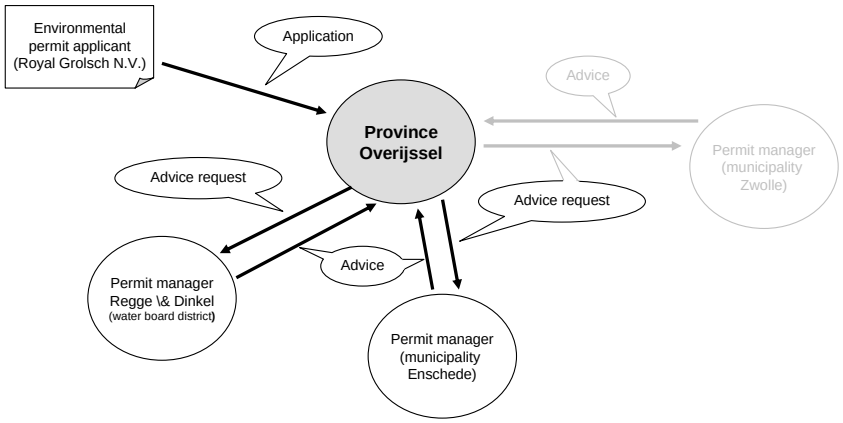


Figure 3.1: Functional to-be status of the case study site.

The environmental permit project is part of a packet of measures that the cabinet has initiated to substantially reduce administrative charges for citizens and businesses. According to the Enviromental Licensing (General Provisions) Bill –WABO for its initials in Dutch, from January 1st 2009, municipalities, provinces and water board districts should be able to use the new process. The environmental permit is part of the modernization plan for VROM legislation, in which the ministry is reducing and improving its rules and regulations. The project includes a development of an implementation plan with pilot projects and advice. The CNO we studied is one of this pilot projects. It is a networked organization among the province Overijssel, the municipalities Zwolle and Enschede, the water board district Regge & Dinkel and Royal Grolsch N.V. (hereinafter referred to as Overijssel CNO), working in the WABO-ICT project. The aim of this project is testing the practical feasibility of the national online all-in-one service for environmental permits (LVO – initials in Dutch), leaning the project on the services offered by IT to support the business processes.

The WABO force the different public entities to cooperate with each other in a different way. This cooperation is possible only if it is supported by a correct provision of information. The WABO-ICT project investigates if both the process of cooperation and the support of an information system are feasable in practice. In the future situation of the Overijssel CNO, Royal Grolsch N.V. plays the role of the 'client' asking for an environmental permit to the province Overijssel which is the competent authority that ask advice to the municipality Enschede, and the water board district Regge & Dinkel as well (see Fig. 3.1). We make the note that for this particular case where Royal Grolsch N.V is physically located within the municipality Enschede, the province Overijssel asks advice to this specific municipality only. The municipality Zwolle will provide such advice just in the cases where the permit applicant is physically located within its borders.

## 3.2 Data Collection and Analysis Techniques

A variety of data sources were used: (i) professionals from the case study, (ii) meetings, (iii) documents related to WABO, LVO, the WABO-ICT project, and past projects, and (iv) illustrative materials (e.g. newsletters and videos). This combination of sources permitted triangulation of the data to increase the strength of the findings. The data collection techniques used with the professionals and the meetings were semi-structured interviews[1] and observation, respectively. The interviews were conducted with 8 persons on a one-to-one basis. It can be argued that interview data is often biased by impression management [28] and retrospective sensemaking [29]. However, we mitigate such a bias by interviewing different and highly knowledgeable professionals who view the Overijssel CNO from diverse perspectives. The professionals included people from the different collaborating organizations and diverse functional areas. Table 3.1 classifies the interviewees based on their expertise (B-ITa domain) and the organization where they affiliate.

Table 3.1: Distribution of interviewees' expertise

| **Field of expertise/B-ITa domain** | **A** | **B** | **C** | **Total** |
|---|---|---|---|---|
| Partnering structure and coordination | 1 | | | 1 |
| IS architecture | 2 | | 2 | 4 |
| Process architecture | 2 | 1 | | 3 |
| Total | 5 | 1 | 2 | 8 |

**Legend**
A = Province Overijssel
B = Municipality Enschede
C = Municipality Zwolle

The duration of each interview was approximately 1 hour. The interviews were taped. This was done with the consent of each interviewee. The data analysis was conducted using interpretation [30]. Having done such analysis by ourselves may reflect some bias in how we interpreted the data. However, we bear out this decision by the following statements: first, documentation was an important data source in this case study. Documents are not simply containers of meanings. They are collectively produced, exchanged, and consumed. They summarize many decisions made by more than one person for a specific purpose. Documents represent specific circumstances including different insights. Therefore, the analysis of documents requires interpretation [31]. Second, where people are data sources, interpretation also is a suitable analysis technique. Generally, people develop and use their own understanding and observations. Therefore, it was expected that the interviewees attached their own meanings to their answers in the interviews. People interpret their world and we, as observing researchers, interpreted their interpretations. Third, we believe that the

[1] The questionnaire used as basis in the interviews can be found in Appendix A (in Dutch).

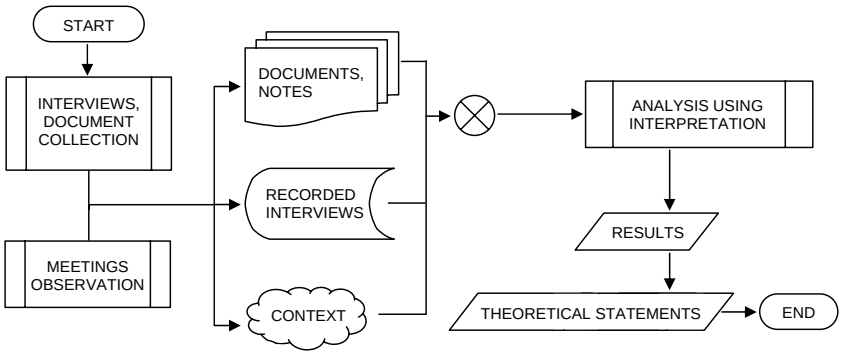


Figure 3.2: The data analysis process.

interpretation technique can provide insight to identify the external forces and processes that constitute the means through CNO events unfold [32].

## 3.3 Analysis Process

Fig. 3.2 illustrates the analysis process we followed. As we had multiple data sources, we used hermeneutics in the interpretation process. Hermeneutics claims that we can understand a complex whole from preconceptions about the meanings of its parts and their interrelationships [30]. In our particular case, hermeneutics helps to obtain results from analyzing the taped interviews, the documentation, the illustrative materials, the meeting observations, and the CNO altogether.

As this case is a single interpretative study – since we are studying one (constantly changing) organization, it can be argued that we cannot generalize results. We consider two kinds of validity threats: (i) single case studies cannot be used to generalize, and (ii) interpretative research cannot generalize. We took some steps to counter them. First, according to Yin [21], to be able to generalize to valid statements from a case study, we need to use multiple sources of data. This can help to ensure the quality of the final conclusions. Hence, we responded to the first validity threat by using professionals, meetings, documents and illustrative materials as sources of evidence.

To confront the second validity concern, we based our analysis process on theories, frameworks, and principles developed by case study research methodologists (e.g., [21, 30, 33, 34]). In summary, they claim that the generalization from empirical descriptions to theoretical statements is possible and valid. So, in our case the empirical descriptions specify the description of the ICoNOs MM and its B-ITa process areas, and the details of the case study site. The resulting theoretical statements could comprise a theory explaining the Overijssel CNO's environment, structure and/or specific characteristics that would account for the performance of the B-ITa process found in the case study site itself.

# Chapter 4

# Study Findings

The collected data was analyzed by one of the researchers who are involved in the development of the ICoNOs MM. Having done such analysis by ourselves may reflect some bias in how we interpreted the data. Fig. 4.1 presents an overview of the process areas found in the Overijssel CNO. We summarize our findings as follows.

## 4.1 Partnering Structure

The partnering structure process areas of the studied CNO were identified through the responses to answers in the interviews and from the meeting observations. It was clear that the definition of a blueprint of the CNO (BMD process area) was the first activity they did to begin to collaborate. The Overijssel CNO described the relation of the different participating organizations in order to know what was expected from each of them and to present how they fitted together.

The alignment of business and IT was also facilitated by the organizational structure that complements its goals. The need to link goals and structure was well-embedded in the organizational structure of the Overijssel CNO (OSD process area). The interviewee pointed that "*increasing emphasis was being given to the balance of responsibilities*". The major responsibilities in the WABO-ICT project were in the development of the technological architecture, the oversight of the information system, and the description of the collaborative processes and interfaces. The match between organizational structure and responsibilities was also illustrated in (i) the functional level of the information system, as we could see in some documents (e.g., see Appendix B), and (ii) the way they organized and related future activities taking in consideration resources and roles (GSC process area). For example, in one of the meetings we observed that for planning the first text pilot of the information system in the physic location of each participant, they listed the required resources (human and technological) in order to come up with an efficient plan. Since the project began, "*there was a clear indication of who was responsible for achieving specific goals, and what*

| B-ITa DOMAIN | PA | PERFORMED | NOT PERFORMED |
|---|---|---|---|
| Partnering structure | MRE | | ✓ |
| | GSC | ✓ | |
| | RRS | ✓ | |
| | IoPD | | ✓ |
| | BMD | ✓ | |
| | SLA | | ✓ |
| | OSD | ✓ | |
| IS architecture | RAM | | ✓ |
| | QPM | | ✓ |
| | ATF | ✓ | |
| | IsCD | | ✓ |
| | AVV | | ✓ |
| | IsPM | | ✓ |
| | BAD | ✓ | |
| | SPD | ✓ | |
| | IsRM | | ✓ |

| B-ITa DOMAIN | PA | PERFORMED | NOT PERFORMED |
|---|---|---|---|
| Process architecture | IoPO | | ✓ |
| | CAR | | ✓ |
| | OPP | | ✓ |
| | EFC | | ✓ |
| | PFP | ✓ | |
| | PAF | ✓ | |
| | PAD | | ✓ |
| | PPM | ✓ | |
| | BPM | ✓ | |
| Coordination | QRA | | ✓ |
| | STD | ✓ | |
| | COC | ✓ | |
| | InCA | ✓ | |
| | DTS | ✓ | |

Legend: PA = Process area

Figure 4.1: B-ITa process areas performed in the Overijssel CNO.

*the role of each participating organization was*" (RRS process area).

The interviews also revealed that the commitment and mutual benefits perception at each participant was high. However, the inter-organizational policies definition (IoPD process area) has not influence on this situation. Their high commitment came from a specific individual goal of each participant: to be present and to contribute in a project (i.e., the WABO-ICT) that will have national impact in the future.

Service level agreements (SLA process area) were still not define in the Overijssel CNO. Experience in the definition of SLAs was not a problem. They know exactly what to do, how to do it, and what they need to get success in the description of agreements on the deliverables, quality, and fitness-for-purpose of services. Although the project is already testing the information system, they are in the very initial stage to define SLAs. It seems that the way of work and the formal commitment of the participating organizations reduced the necessity of agreements description in the beginning of the project.

In general, the Overijssel CNO, as a networked organization in the public sector, has a well-defined hierarchy of authority with powers and responsibilities understood by all, a clear-cut division of work among the participants and people, and an explicit set of procedures for making decisions.

## 4.2 IS Architecture

In this study, the 4 professionals that we interviewed in the IS architecture domain indicated they believe that the CNO is highly dependent on information

systems. We had access to different documents presenting the principles and norms (SPD process area) they use for the development of the IS architecture (e.g., NORA [35], SOA [36], ISO 17799:2005 [37]). The Dutch Government Reference Architecture (NORA – initials in Dutch) is a set of models and principles showing how e-government works. They present the way in which it is possible to collaborate, to link processes smoothly to one another and to exchange data. One of the interviewees explained us the deontic nature of such models and norms stating that "*NORA does not say anything about the content of the government service provision. For example, you can make an analogy with the road traffic infrastructure. Everyone expects that this infrastructure enables effective and efficient transport. An implicit assumption in this situation is that there is a road system of national, regional and local roads and there are traffic rules (for example we all drive on one side of the road). This is a typical assumption that would be included in NORA as a principle. Where exactly the roads are and in which side of the road we drive are decisions that the governments have made among themselves. If we apply this to NORA, we can see that NORA contains guidelines for (i) the exchange of data on a national scale and (ii) the definitions of data reports. However, NORA does not contain any elaboration of the infrastructure or the contents of the reports that public organizations exchange*". In the Overijssel CNO, each of the three participating public organizations (i.e., the province Overijssel and the municipalities Zwolle and Enschede) also has their own set of principles based on NORA. Such principles, together with the NORA, are the basis for the definition of specific principles and explicit requirements in the WABO-ICT project.

When the project started, they created a snapshot of the existing ISs in order to have a clear view of the current situation of the CNO concerning information systems they had (BAD process area). The Overijssel CNO followed the same process to define its IS to-be state (ATF process area). However, although they were aware of the required ISs, they did not conducted a formal identification of the IS requirements (IsRM process area), and a gap analysis to know the suitability of the ISs already in place (AVV process area).

An identification of the CNO ability to achieve new forms of competitive advantage by ISs (IsCD process area) was not present. We believe that this occurs since the B-ITa driver of the Overijssel CNO is to improve quality and to increase effectiveness instead of innovation and risk management. Such situation also affects to manage the IS portfolio effectively (IsPM process area). The Overijssel CNO has not strategic innovation planning and it does not use risk management techniques. As a result, the selection of ISs in accordance with resources, needs and changing situations is inadequate to minimize risks. One interviewee pointed that IS portfolio management within their particular organization was partially performed. "*Our organization tries to make fact-based, data-driven decisions using a consistent and disciplined approach to analyze information in a way that helps to optimally allocate scarce resources to ISs projects*". However, although one participating organization take actions related to IS portfolio management, it does not mean that the CNO does the same.

## 4.3 Process Architecture

As in the IS architecture domain, a blueprint of the current and to-be status of the collaborative processes was easily found in some of the studied documents (BPD and PAF process areas). They spent considerable time and effort in working sessions to design the choreography of all (individual and collaborative) processes needed to reach the goals of the CNO. We were present in some of the sessions, and it was clear how they took project portfolio management practices into account during the process design process (PPM process area). For example, the allocation of human and technological resources was implicit in the process architecture design process. The results of the working sessions included (i) a workflow process that encompasses project approvals, checkpoint reviews, and periodic status reporting at project and statewide levels, (ii) a plan to ensure that the work is done acceptably and that the project is in position to complete its phases successfully, and (iii) documents that follow recognized best practices for project management (e.g., PMI practices as message/document-driven controls, scope statement definition and work breakdown structure). A session always took in consideration the results of previous sessions. Therefore, they could plan and implement improvements based on an understanding of the pros and contras from past work (PFP process area). "*The discussions on process improvement and optimization always begins by describing what goes into the process model and what we learn from previous sessions*".

An interesting insight was to find again evidence to support a result from the IS architecture domain: best practices applied in one of the participating organizations are not automatically applied in the entire CNO. For example, a control mentality pervades it from top to bottom in the province Overijssel. This 'obsession' with control attempts to eliminate uncertainty so that the organization performs its tasks smoothly and without problems. In the province Overijssel, quality assurance is an important control-related domain considered for its B-ITa efforts. Quality assurance in this participating organization implies (i) to maintain a repository of the processes and assets in order to check their compliance with national laws, quality standards (e.g., ISO 9001:2000), and the requirements (PAD process area); and (ii) to use logs of the process planning IS to identify flaws in process execution in order to take corrective and preventive measures (EFC process area). However, such processes are still not implemented for the collaborative processes of the entire Overijssel CNO.

## 4.4 Coordination

The Overijssel CNO tries to have high rationalized activities resulting in simple and repetitive tasks. This situation leads to have a sharp division of work and to depend primarily on standardization of its processes and skills for coordination (STD process area). Although standardization helps to coordinate the interdependencies among the participating organizations, differences in meanings remain creating ambiguities which leads to have some conflicts. These cannot

easily be handled by informal communication since this kind of communication is sometimes held back by the standardization itself. Thus, they restrict the raise of conflicts by direct supervision (DTS process area). The Overijssel CNO has persons who take the responsibility for the processes and provide instructions to others to monitor their work.

One interviewee stressed how political issues affect the informal communication among the participating organizations. "*Sometimes, each organization becomes jealous of its own work and exclusive privileges to do something. Therefore, it finds ways to protect itself against the pressure of the network or oversteps. This restricts a proper communication among the organizations and its members, and it drives a kind of competition*". However, "*the coordination team tries to minimize this undesirable situation by organizing social events based on informal settings to encourage the synergy and the raising of new ideas for working*". They have created an organization more concerned in the service to be provided than in the political games that could arise (InCA process area).

Coordination is usually achieved with some kind of communication or information exchange. We identified through one interview and some meeting observations that in the Overijssel CNO, agreements on communication take place (COC process area). These agreements are on either horizontal (or crosswise) communication with the help of informal communication adjustment, or on vertical communication in the form of standardization or direct supervision. Bringing members of the participating organizations to the required level of understanding to get their job done, and using what each of them learns in interaction with the citizens who apply for the environmental permit both to respond to immediate needs and to determine future citizens requirements, are two practices we identified within the WABO-ICT project. For example, "*each participating organization has its own knowledge in-house, i.e., each organization has different professionals that are experts in each of the permits (i.e., residency, spatial planning, environment, etc.) gathered within the environmental permit. They need to communicate with each other in order to share knowledge and to learn from each other*" to produce, for instance, a complete process architecture of the to-be status.

# Chapter 5

# Discussion

Results from the case indicate the importance of performing processes related to partnering structure, IS architecture, process architecture, and coordination when achieving B-ITa in CNOs. The study findings reveal that a process area considered to achieve B-ITa in one participating organization within a networked organization is not automatically taken into account to achieve B-ITa at CNO level. For example, in the CNO studied, we identified that the province Overijssel does perform the SLA process area of partnering structure, the PAD and EFC process areas of process architecture, and the IsPM process area of IS architecture. However, these process areas are not performed in the networked organization.

Based on the case study results we also know that if a B-ITa process area is not implemented in the CNO, the presence of the results of performing such a process area might be enough to consider the process area is carried out. That is, although the B-ITa process areas are required processes to implement for making improvements in the B-ITa domains, it is permitted to implement alternative practices in substitution for the practices that will be included in each of the process areas of the ICoNOs MM. The only condition is that the goals of each process area must be satisfied to reach a specific maturity level. In the Overijssel CNO, (i) performing a formal process to identify the software application requirements (IsRM process area) was not the rational for the awareness of the required ISs and (ii) the inter-organizational policies definition (IoPD process area) has not influence in the high commitment and mutual benefits perception they have. For example, the Overijssel CNO is regulated by the plans and laws dictated by VROM, and uses external advices and customer satisfaction research results to identify its ISs requirements.

Furthermore, we can conclude that there is a relationship between status enhancement and coordination mechanisms, and the level of commitment of the operational stakeholders towards the B-ITa project success. In a CNO where each participating organization is a self-governing entity that cooperate with others to provide world-class solutions, the most transparent way of cooperation is an explicit commitment via coordination. In the Overijssel CNO, the commitment came primarily through the shared goal of being present in a project with

a future national impact (in order to increase status). The definition of plans, shared risk and rewards policies has not influence on this commitment. However, the commitment of the participants also raised from informal communication adjustment and communication-oriented coordination, i.e., they negotiate over joint plans, task distribution, governance or resources allocation in formal and informal settings considering shared knowledge and shared learning as specific coordination mechanisms.

## 5.1 Recommendations

The findings and the discussion in this report support the following recommendations to the Overijssel CNO:

1. Province Overijssel should wield power and take the role of decision-maker partner to influence the other participating organizations to perform the the PAD and EFC process areas of process architecture, and the IsPM process area of IS architecture at CNO level in order to improve the chances of B-ITa success. A definition of these process areas is presented in turn.

   **PAD** *Process architecture definition.* To establish and maintain a repository of CNO processes, assets and work environment standards.

   **EFC** *Event logs formal consistency.* To use event logs for checking traceability of execution processes during collaboration, and for controlling whether profitability estimates are realized.

   **IsPM** *IS portfolio management.* To create the right mix of information systems investments to properly use limited resources while providing the maximum business benefit.

   If recommendation 1 is addressed, it is advised:

   2. to establish and maintain a quantitative understanding of the performance of the standard processes set in support of quality and process-performance objectives (OPP process area), to reach level 4 in process architecture.
   3. to perform periodically gap analysis to make sure changing IS requirements are managed in consistent fashion with IS architecture targets (AVV process area), and to define the ability of the CNO to achieve new forms of competitive advantage by ISs to achieve congruence with the business environment where it works (IsCD process area), to reach level 3 in IS architecture.

4. SLA and IoPD should be the next process areas to be addressed by the Overijssel CNO within partnering structure in order to reach level 3 in this B-ITa domain. A definition of these process areas is presented in turn.

**SLA** *Service level agreements definition.* To describe the agreements on the deliverables, quality, and fitness-for-purpose of services that have an impact on the work of each participating organization.

**IoPD** *Inter-organizational policies definition.* To define the plans of action, intended to influence and determine decisions, including shared risk and rewards policies to increase mutual benefits perception and shared commitment.

5. To reach level 4 in partnering structure, IS architecture and coordination, statistical and quantitative techniques should be used in each of these domains. For example, (i) within the partnering structure domain is recommended to use relational exchange techniques, organizational communication's mechanistic and system-interaction methods to study organizational communication, structure and roles in the CNO; (ii) within the IS architecture domain is advised to use quantitative techniques to analyze, assess, and control IS portfolio assets, managing such a portfolio from a quantitative perspective; and (iii) within the coordination domain is recommended to use techniques (e.g., causal model analysis) to link the interrelationships to the local scheduling constraints of the participating organizations.

# Chapter 6

# Conclusion

In this paper, we investigated a networked organization among the province Overijssel, the municipalities Zwolle and Enschede, the water board district Regge & Dinkel and Royal Grolsch N.V. in The Netherlands. After conducting this case study, we have real-life evidence to support the inclusion of the business-IT alignment (B-ITa) process areas presented in Fig. 1.1 in the B-ITa domains, within a specific level, of the ICoNOs MM.

We make the note that this study could not be enough to overcome external validity concerns that a case study is exposed to. For example, the case site investigated was not systematically sampled. Therefore it is not possible to generalize findings to a wider population of organizations. However, we can generalize the case study findings to theory and, thus, part of the results can be drawn on by others who work in an environment where B-ITa plays a valuable role.

The results gained through this study let us increase our knowledge of the process areas included in the ICoNOs MM. Future work includes to conduct a new case study following a replication logic. That is, after conducting the case study presented in this report, we uncover significant findings that led us to conduct a new study with replication as immediate research goal. Only with replication of findings, such findings could be robust for generalization. This validation study therefore served to establish the soundness of the ICoNOs MM and, specifically, of the B-ITa process areas that the model includes.

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# Bibliography


[1] Applegate, L., McFarlan, F., McKenney, J.: Corporate Information Systems Management: Test and Cases. Fifth edn. Irwin McGraw-Hill (1999)

[2] Sabherwal, R., Chan, Y.:Alignment between business and IS strategies: A study of prospectors, analyzers and defenders. IS Research **12** (2001) 11–33

[3] Duffy, J.: Maturity models: Blueprints for e-volution. Strategic and Leadership **29**(6) (2001) 19–26

[4] de Koning, D., van der Marck, P.: IT Zonder Hoofdpijn: Een Leidraad voor het Verbeteren van de Bedrijfsprestaties. Prentice Hall (2002) In Dutch.

[5] Luftman, J.: Assessing IT-business alignment. Information Systems Management **20** (2003) 9–15

[6] van der Raadt, B., Hoorn, J.F., van Vliet, H.: Alignment and maturity are siblings in architecture assessment. In: CAISE '05: Proceedings of the 17th International Conference on Advanced Information Systems Engineering. Volume 3520/2005 of LNCS., Porto, Portugal, Springer (2005) 357–371

[7] Santana Tapia, R.: A value-based maturity model for IT alignment in networked businesses. In: CAISE'06: Proc. of Workshops and Doctoral Consortium of the 18th Int. Conf. on Advanced Inf. Systems Engineering, Luxembourg, Presses Universitaires de Namur (June 2006) 1201–1208

[8] Santana Tapia, R., Daneva, M., van Eck, P.: Business-IT alignment domains and principles for networked organizations: A qualitative multiple case study. 3rd International Workshop on Enterprise Integration, Interoperability and Networking. EI2N'08. Submitted and under review.

[9] Santana Tapia, R., Daneva, M., van Eck, P.: Validating adequacy and suitability of business-IT alignment criteria in an inter-enterprise maturity model. In: Proceedings of the Eleventh IEEE International EDOC Enterprise Computing Conference, Annapolis, MD, USA, Los Alamitos, IEEE Computer Society Press (2007) 202–213

[10] Santana Tapia, R., van Eck, P., Daneva, M.: Inter-organizational business-IT alignment maturity: Validating the domains of an alignment assessment

instrument. Int. Conference on Information Systems, ICIS'08. Submitted and under review.

[11] Santana Tapia, R., Daneva, M., van Eck, P., Wieringa, R.: Towards a business-IT alignment maturity model for collaborative networked organizations. 1st Int. Workshop on Enterprise Interoperability. IWEI'08. Submitted and under review.

[12] Chan, Y., Huff, S., Barclay, D., Copeland, D.: Business strategic orientation, information systems strategic orientation, & strategic alignment. Information Systems Research **8** (1997) 125–150

[13] Reich, B., Benbasat, I.: Development of measures to investigate the linkage between business and information technology objectives. MIS Quarterly **20** (1996) 55–81

[14] Santana Tapia, R.: What is a networked business? Technical Report TR-CTIT-06-23a, University of Twente, Enschede, The Netherlands (2006)

[15] Barbini, F., D'Atri, A.: How innovative are virtual enterprises? In: ECIS. (2005)

[16] Tapscott, D., Ticoll, D., Lowy, A.: Digital Capital - Harnessing the Power of Business Webs. Nicholas Brealy Publishing (2000)

[17] Davis, E.W., Spekman, R.E.: The extended enterprise: Gaining competitive advantage through collaborative supply chains. Financial Times Prentice Hall (2003)

[18] Bogner, W., Barr, P.: Making sense in hypercompetitive environments: A cognitive explanation for the persistence of high velocity competition. Organization Science **11**(2) (2000) 212–226

[19] Damian, D.: Stakeholders in global requirements engineering: Lessons learned from practice. IEEE Software **24**(2) (2007) 21–27

[20] R. Santana Tapia and N. Zarvić: Value-based partnering structure design for networked businesses: A multi-method approach. In: Proceedings of 21st Bled Conference "eCollaboration", Bled, Slovenia (2008) 263–276

[21] Yin, R.K.: Case study research: Design and methods. Third edn. Applied Social Research Methods Series; vol. 5. Sage Publications (2003)

[22] Benbasat, I., Goldstein, D., Mead, M.: The case study research strategy in studies in information systems. MIS Quarterly **11** (1987) 369–388

[23] Birdi, K.S., Patterson, M.G., Wood, S.J.: Learning to perform? A comparison of learning practices and organizational performance in profit- and non-profit-making sectors in the UK. Int. Journal of Training and Development **11**(4) (2007) 265–281

[24] Buelens, M., van den Broeck, H.: An analysis of differences in work motivation between public and private sector organizations. Public Administration Review **67**(1) (2007) 65–74

[25] Boyne, G.A.: Public and private management: Whats the difference? Journal of Management Studies **39**(1) (2002) 97–122

[26] Rainey, H.G., Bozeman, B.: Comparing public and private organizations: Empirical research and the power of the a priori. Journal of Public Administration Research Theory **10**(2) (2000) 447–470

[27] Snyder, M.M., Osland, J., Hunter, L.: Public and private organizations in latin america: a comparison of reward preferences. International Journal of Public Sector Management **9**(2) (1996) 15–27

[28] Giacalone, R.A., Rosenfeld, P.: Impression Management in the Organization. Lawrence Erlbaum Associates (1989)

[29] Weick, K.E.: Sensemaking in organizations. Sage Publications (1995)

[30] Klein, H., Myers, M.: A set of principles for conducting and evaluating interpretive field studies in information systems. MIS Quarterly **23**(1) (1999) 67–93

[31] Finnegan, R.: Using documents. In Sapsford, R., Jupp, V., eds.: Data Collection and Analysis. Thousand Oaks, CA: Sage (1996) 138–151

[32] Paré, G., Elam, J.: Using case study research to build theories of it implementation. In Lee, A., Liebunau, J., DeGross, J., eds.: Information Systems and Qualitative Research. Chapman and Hall, London, U.K. (1997) 70–100

[33] Walsham, G.: Interpretative case studies in is research: Nature and method. European Journal of Information Systems **4**(2) (1995) 74–81

[34] Lee, A., Baskerville, R.: Generalizing generalizability in information systems research. Information Systems Research **14**(3) (2003) 221–243

[35] Kenniscentrum: NORA 2.0: Samenhang en samenwerking binnen de elektronische overheid. (2006) In Dutch.

[36] Schijvenaars, T., Keijers, M.: SOA is wondermiddel voor gemeenten. Computable (February 2008) In Dutch.

[37] International Organization for Standardization: ISO/IEC 17799:2005 (2005)

[38] VROM Advies- en Expertdienst (ICT): Startarchitecture landelijke voorziening omgevingsvergunning (2007) In Dutch.

[39] Provincie Overijssel: Met het oog op morgen! (March 2008) Wabobijeenkomt provincie Overijssel. In Dutch.

[40] Horward, J.: LVO Inrichting v 1.1 (2008) In Dutch.

# Appendix A

# Case study questionnaire.

1. Positie van uw organisatie in de omgevingsvergunning netwerkorganisatie.
   In de centrale doelstelling van deze vragen is te zien hoe de deelnemende organisaties zijn eigen positie binnen de netwerkorganisatie bepaalt.
   - Wat zijn de strategische doelstellingen om deel van de omgevingsvergunning netwerkorganisatie uit te maken (d.w.z., uitbreiding van marktbereik, ontwikkeling van de gevorderde diensten, zich vertrouwd maken met een nieuwe technologie, deelneming aan een experiment, etc.)?
   - Wat zijn de competenties, specifieke activa, en middelen van uw organisatie die voor het werken binnen de omgevingsvergunning netwerk essentieel zijn?
   - Hoe belangrijk is de omgevingsvergunning voor uw organisatie?

2. Perceptie van de omgevingsvergunning netwerk door uw organisatie.
   Deze vragen en onderwerpen bespreken de perceptie van de omgevingsvergunning netwerkorganisatie vanuit het perspectief van de genterviewde.

| | | |
|---|---|---|
| **PARTNERING STRUCTUUR** | Kenmerken van de omgevingsvergunning netwerkorganisatie. | |
| | 1 | Worden de gemeenschappelijke doelstelling(en) gespecificeerd? |
| | 2 | Kent iedereen de omgevingsvergunning netwerkorganisatie (actoren, kleine of grote spelers, bevoegd gezag, etc.).? |
| | 3 | Is er een ontwerp van de omgevingsvergunning netwerkorganisatie om die als volledig systeem (d.w.z., actoren, relaties, input, output, etc.) te beschrijven? |
| | Rollen en verantwoordelijkheden. | |
| | 4 | Zijn er beschreven service level agreements over de deliverables, de kwaliteit en het werk van elke deelnemende organisatie? |
| | 5 | Was de definitie van een samenwerking structuur noodzakelijk om efficiënt samen te kunnen werken? |
| | 6 | Welke rollen en actoren zijn noodzakelijk? Wie neemt zorg voor wat? |
| | 7 | Hoe worden de organisatorische middelen (mensen, materialen, en informatie) verdeeld binnen de omgevingsvergunning netwerkorganisatie? |
| | 8 | Is er aandeelrisico- en beloningen beleid dat wordt gevestigd om wederzijdse voordelen en verplichting te verhogen? |

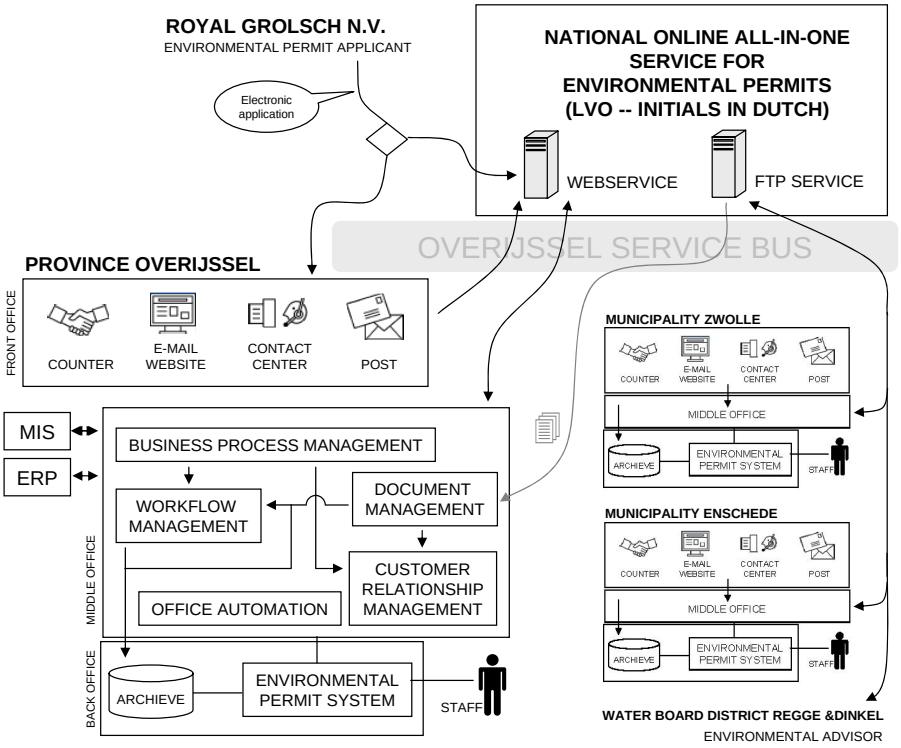
| | | |
|---|---|---|
| **COÖRDINATIE** | Kenmerken van de omgevingsvergunning netwerkorganisatie. | |
| | 1 | Wat is de graad van standaardisatie van output en handhaving tussen de deelnemende organisaties? |
| | 2 | Wordt het werk gecontroleerd door specifieke personen die de verantwoordelijkheid voor de processen nemen, instructies geven, en activiteiten controleren? |
| | Interfaces tussen organisaties. | |
| | 3 | Hoe zijn de communicatie processen (d.w.z., persoonlijke, samenwerking in werkgroepen, workflow-systemen, communities)? |
| | 4 | Zijn de formele/informele communicatiekanalen belangrijk om efficiënt samen te kunnen werken? Zo ja, kan je een voorbeeld geven? Zo nee, waarom niet? |

| | | |
|---|---|---|
| **PROCESARCHITECTUUR** | 1 | Is er de huidige situatie van de processen beschreven? Zo ja, hoe is die ontwikkeld? |
| | 2 | Wat zijn de informatiestromen, en processen, die nodig zijn om de omgevingsvergunning te leveren? Kent iedereen met een rol in het Wabo proces die informatiestromen en processen? Zo nee, hoe gaat dit georganiseerd worden? |
| | 3 | Hoe worden de processen tussen de organisaties in kaart gebracht? |
| | 4 | Is er een evaluatie/ selectie/ ontwerp of processen die nodig zijn om de gewenste situatie te steunen? Zo ja, hoe wordt dat gedaan? Is er een standaard proces/methode? |
| | 5 | Hoe gaan jullie als samenwerkende organisaties ervoor zorgen dat de procesbeschrijvingen actueel blijven? |
| | 6 | Vindt er een beheer van procesportfolio plaats? Zo nee, zal dat gebeuren? en hoe? |

| | | |
|---|---|---|
| **IS ARCHITECTUUR** | 1 | Is er een beschrijving van de huidige situatie van de systemen? Zo ja, hoe is die ontwikkeld? |
| | 2 | Wat zijn de noodzakelijke technologienormen en principes in het IS gebied? |
| | 3 | Hoe wordt bepaald of de systemen alle essentiële informatieverwerkingsbehoeften steunen? (gap analyse) |
| | 4 | Hoe worden de interfaces tussen IS bij voorkeur gerealiseerd? |
| | 5 | Steunen de bestaande IS het realiseren van interfaces? Zo nee, hoe wordt het dan opgelost? |
| | 6 | Vindt er een beheer van IS en de interfaces plaats? Zo nee, zal dat gebeuren? en hoe? |

# Appendix B

# The Overijssel CNO: Future situation.




Adapted from [38, 39, 40]