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**PROCESS MODEL OF GOAL COMMUNICATION IN E-
LEADING: CASE PROTOMO**



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Tavoitteiden viestintä on muuttumassa etätyöskentelyn myötä haasteelliseksi. Perinteinen toimintaympäristö on mahdollistanut tavoitteiden viestintään johtajille niin muodollisia kuin vapaamuotoisiakin viestintätapoja. Näiden vapaamuotoisten tilanteiden vähäisyys etätyöskentelystä aiheuttaa tarpeen kiinnittää huomiota tavoitteiden viestinnän prosessiin.

Tässä pro gradu -tutkielmassa tarkastellaan etätyöskentelyn ominaisuuksia johtajan näkökulmasta, pyrkien identifioimaan mahdollisia ongelmia tavoitteiden johtamisessa. Käsiteanalyysissä tarkastellaan etätyöskentelyn teoreettista viitekehystä, josta saatavaa ymmärrystä hyödynnetään case-tutkimuksessa. Case-tutkimuksessa mallinnetaan yrityshautomo Protomon tavoiteviestintäprosessi ja identifioidaan mahdollisia kehityskohteita. Käsiteanalyysissä käsitellään myös tavoiteviestintää käsitteenä, sekä yrityshautomotoimintaan liittyvää kirjallisuutta.

Käsiteanalyysin keskeisenä löydöksenä on, että tavoitteiden viestintään liittyvistä haasteista voidaan luoda viitekehys tavoiteviestintäprosessin arviontiin. Kirjallisuuden perusteella tutkielman case-tutkimuksen menetelmäksi valittiin prosessin mallinnus UML-menetelmällä. Tuloksia käsiteltiin arviointia varten rakennetulla viitekehyksellä.

Tutkimuksen tuloksena havaittiin, että mallinnettu prosessi on suurimalta osalta toimiva ja terve. Kuitenkin kriittisiä heikkouksia löydettiin. Nämä olivat viestintäteknologian valinnan puutteellisuus, seurantamekanismin puute ja standardoitujen menettelytapojen puute tavoiteviestinnässä.

Asiasanat: tavoiteviestintä, prosessi, etäjohtaminen

ABSTRACT

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The communication of goals is becoming problematic through the increased virtuality of teamwork. The traditional, collocated working environment enables leaders to use informal means of goal communication. The lack of these informal situations incurs a need for a closer study of the goal communication process.

This Master's Thesis looks at the properties of virtual teamwork from the perspective of the leader. The aim is to identify problems in managing goals in a virtual context. In the concept analysis, a theoretical understanding of virtual teams is established. This understanding is used in the case study, where the goal communication process of the case company Protomo is modelled and evaluated for possible points of development. The concept analysis also provides theoretical background for business incubators and discusses the concept of goal communication.

The main findings of the concept analysis are that there are various issues in goal communication from which an evaluation framework could be constructed. The evaluation framework is used as a basis for evaluating the process in the case study. The communication process is modelled using a methodology utilizing UML, based on earlier literature.

The main result of evaluating the modelled process is that the process is mostly healthy, with some notable exceptions. The main issues in the process are that efficient technology choices have not been made for goal communication, feedback procedures have not been implemented and standard procedures for communication have not been established.

Keywords: goal communication, process, e-leading

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1 INTRODUCTION

The economic situation is forcing the world of business into a more virtual workplace. With the advent of increasingly globalized operations the need for communication across vast distances has increased. With the dwindling energy resources, pressure to cut down on excessive travelling has also increased. Happily, communication technology and information networks have kept up with the changing environment, connecting people across the globe. This gives rise to an interesting problem: how can goal related information be communicated efficiently without the ease and synchronicity of face-to-face interaction?

This Master's thesis takes the approach of modelling a communication process in an environment heavily reliant on electronic communication. The goal of the research is to find if the process modelling approach is an effective method in addressing the problems of goal communication. The success of this approach will be mainly determined by whether the evaluation of the process will yield any weak points, which can be formulated as suggestions for further development of the process. The research question is the following:

"Is a process modelling approach an effective method in addressing the problems of goal communication?"

Goal communication has been taken for granted in the traditional workplace, but the restrictions imposed by a shift towards a virtual working environment elevate it to a higher importance. In this thesis, goal communication as a term is understood to mean communication of goal-related information between two parties, in which the other has defined the goal, and the other is required to achieve it.

This Master's thesis builds on the findings of the author's Bachelor's thesis, where problems of technology-mediated teamwork in a start-up context were investigated. In the Bachelor's thesis, titled *Free E-Collaboration Tools as a Support for Leading Virtual Teams*, the main finding was that the communication of goals in a virtual team is difficult and of extreme importance. The thesis attempted to find technologies to ease communication, but found that the problems were of a nature more likely to be solved by studying the process rather than the mediating technology.

1.1 Research method

This thesis will describe the basic concepts in the field of electronic communication from the perspective of the team leader. This is done as a concept analysis based on earlier research. While examining these concepts, problems are identified in order to facilitate the defining of possible breakpoints in the process modelled in the case study. A simple framework is proposed for evaluating the process for weaknesses.

The nature of this research is highly qualitative, and findings are dependent on the information received from the case study company. The information will be extracted via a series of interviews, where specific areas of the company's de facto modes of operation in the goal communication process are discussed and modelled. Existing documentation relating to the process will also be examined. The case study company is in itself a small business if measured by the number of its employees, however it is responsible for incubating multiple small businesses in their early stages. The internal communication of the case study company is excluded from this thesis; instead the communication of goals by the case study company with its incubated businesses is studied.

The research explores process modelling as a method in evaluating goal communication in a case study of a single organization, and the generalization of the results is limited. However, the method is designed for ease of repeatability for further research. The research is also limited by the choice of process modelling methodology, which if varied could produce diverse results.

1.2 Structure of the thesis

The second chapter of this thesis discusses the main concepts of the research in the form of a review of literature. First, a definition of the concept of goal communication is attempted. Then the concepts of virtuality, leading a virtual team, information and feedback, and culture are discussed. Finally, theory on business incubators is discussed. As well as describing the concepts, the literature review aims to extract problems and possible solutions linked to the concepts, to help with evaluating the modelled process.

Towards the end of the second chapter, an evaluation framework is proposed for the scoring of a goal communication process. The framework is an aggregation of issues found in the review of the literature, each to be marked for their observed appearance in the process: as having been considered and executed, just planned, or not present at all.

In the third chapter, the methodology used in modelling the case study process is discussed. The aim of the discussion is to establish grounds for using the chosen techniques for modelling, and to ensure repeatability of the study. The chosen technique is an approach utilizing UML, which is briefly compared to another popular technique, BPMN.

The fourth chapter introduces the context in which the study is conducted, and presents the process model results. The business model of the case study company, Protomo is briefly discussed to provide some background for the research context. Also the motivation for developing the process is established, i.e. the need for proactive development to provide results in exchange for the funding of the company.

The rest of the chapter concentrates on presenting the results, i.e. the modelled process. The different views of the process are studied and described. At the end of the chapter, the modelled process is evaluated according to the proposed framework. This also serves to test if the framework is suitable for evaluating a goal communication process. Proposals are made for further development of the process.

Chapter five presents the conclusions reached in this thesis. An evaluation of the process modelling approach and suggestions for further research are given.

2 CONCEPT ANALYSIS

In the concept analysis, relevant terms are defined through a short literature review of main concepts, such as goal communication, virtuality, leading a virtual team, information and feedback, and culture, with the aim of better defining the usefulness of results reached in this research. As the case study in this thesis deals with a company that strongly utilizes virtual means in its communication concerning goals, it is important to have knowledge of the nature of communicating in a virtual team. The concepts discussed are the virtuality of a team, leading a virtual team, information and feedback in a virtual team, and the implications of culture in virtual teams.

The concept analysis provides a basis for evaluating the modelled process. After the discussion of concepts, a framework is constructed from the problems discovered in the concept analysis. This framework is presented and proposed as the tool used for evaluating a goal communication process.

2.1 Goal communication

Goal communication is a concept, which exists at the intersection of two sets of theory: goal related theory, and communication theory. This chapter aims to provide a discussion of these theories in order to clarify the concept of goal communication. For the needs of this study, the goals and communication considered are limited to those that are involved in productivity. Therefore the theory concerning goals is mainly limited to goal setting research.

Why are goals needed? It is a logical possibility that without setting goals productivity events could still be efficient and successful. The literature concerning goals seems to regard setting goals as a motivational technique (Locke et al., 1980). However, a lot of other literature related to goals concentrates on metrics, so the possibility of measurement seems to be central to the concept. As well as the motivational aspect, it can be seen that without explicitly set goals there can be no metrics as to whether they have been reached. Another reason

for goal setting is provided by Locke et al. (1981), having found that clear, specific, difficult performance goals coupled with feedback increase productivity.

According to Austin (1996): goals are internal representations of desired states. Locke (1976) states that productivity goal setting is the establishment of individual performance goals. This definition could apply to goal setting in general. In essence, goals are visions of future performance, to which metrics can be applied.

According to Locke (1976), goals have two characteristics: difficulty and specificity. Difficulty refers to the challenge presented by the goal relative to the resources available and effort needed for the completion of the given tasks. Specificity refers to how the goal is defined.

As summarized by Shalley (1991), previous research has found that goal setting causes attention and action to be selective so that aspects of a job for which no goals are set will tend to be ignored (e.g, Locke & Bryan, 1969 and Rothkopf & Billington, 1979). This forms the basis of the second part of the definition, which states that an explicit goal affects the direction of the resulting action.

Explicit goal affects the motivation of the resulting action, which Locke (1976) found to be the basic motivational assumption of goal-setting: attention and effort are increased by providing clear targets toward which individuals can direct their energies (Locke, 1976). In Shalley's (1991) study on the effects of productivity goals and creativity goals on individual creativity, it was found that participants assigned a difficult productivity goal performed noticeably better than participants with do-your-best goals or no productivity goal at all. The results of that study further add to the research indicating that goal setting is useful for clarifying performance requirements and that goals do effect the allocation of effort to different aspects of the task (Shalley, 1991).

In the research on goal setting the focus is on goals as a motivational technique (Seijts et al. 2004), applied to individuals to increase productivity. This approach could be contested by arguing that goal setting is ubiquitous wherever any coordinated action takes place. A goal needs to be set if it is to be communicated to others. Plenty of research is to be found on the strategic goals for businesses, and also for setting personal life-goals. There is a shortness of research for the middle ground.

On the basis of research on goal setting, my attempt at a definition of the concept of a goal is this:

"A goal is an explicit definition of a desired outcome, affecting the direction and motivation of resulting actions.

Logically, a goal needs to be explicitly defined in order to be communicated. If a goal is set by a someone other than the person doing the associated tasks, the goal needs to be communicated. It is worth noting, that the difficulty and specificity need to be tailored to the recipient of the goal information.

Communication in this thesis is taken to mean the way goals are conveyed from person to person within the information system of a team. There are various methods of communication, mostly through electronic means as will be dis-

cussed later. Communication events are discussed mainly from the perspective of delivering goals to the involved parties.

The sender-message-channel-receiver model proposed by Berlo (1960) serves as a basis for the definition of communication for this thesis. In-depth communication theory is outside the scope of this thesis, so just this simple form of the model is considered. Communication as a process of conveying information in this study comprises of a sender, which can be either a team leader or a team member, a goal-related message, a channel, which is taken to mean either the electronic means or face-to-face interaction, and the receiver, which again is either the team leader or a team member. The sender and the receiver are limited to mean humans instead of technology.

For the purposes of this thesis, goal communication is defined as

“the process of communication involved in attempting to achieve an explicitly defined desired outcome.”

2.2 Virtual teams

To understand the concept of a virtual team, it is important to understand what a team is. In the literature a commonly accepted premise is that a team is essentially a group. Lipnack and Stamps (2000) define a small group as "individuals interacting interdependently". They then go on to explain, that it is in fact the task-oriented nature of teams that actually distinguish them from mere groups. Hence, teams are conceptually a subset of groups.

What, then, are virtual teams? It is an instance of social organization (Mowshowitz, 1997, p.34). Cascio and Surygailo (2003) state, that "virtual teams are often formed to overcome geographical or temporal separations. By definition they are composed of members who rarely, if ever, meet physically" (Cascio & Shurygailo, 2003, p.362). Virtuality is needed to free teams from the restrictions imposed by the interconnected time zone and location. It is commonly accepted in literature that overcoming the geographical discontinuity is the main defining factor of virtual teams. For example Sivunen and Valo (2006, p.57) state in their study of technology choice for virtual teams that

"A VIRTUAL TEAM is usually defined as a group of people who work closely together even though they are geographically separated, sometimes residing even in different time zones around the world."

Virtual could also be interpreted as "being such practically or in effect, although not in actual fact or name" (Webster's New World Dictionary). That is not the definition of virtual used in this thesis. Sivunen and Valo's (2006) is seen to be the closest interpretation, in the spirit of Lurey and Raisinghani (2001, p.524):

"[Technology] has led to the formation of virtual teams in which workers no longer need to work face-to-face, or even be co-located in the same place, in order to work together."

One of the earliest studies on the distance where virtuality becomes a necessity is described by Lipnack and Stamps (2000, p. 20). It is a study by the MIT professor Tom Allen in 1977 who found that people are not likely to collaborate if they are more than 50ft apart. This means that if the team members are not closer than 50ft to each other, they are likely to be forced to use virtual means of collaboration for the tasks on hand. This is illustrated by figure 1.

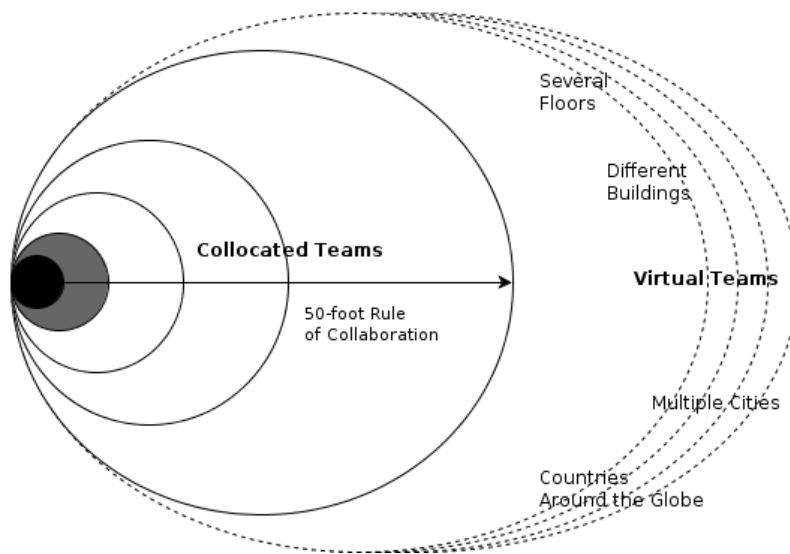


FIGURE 1 Collocated to virtual distance (Lipnack & Stamps, 2000, p. 21)

As well as face-to-face communication, measuring the extent of using electronic means helps in defining the virtuality of a team. Niederman and Beise (1999) created a framework to measure the state of a team based on this. As well as the co-location vs. geographical dispersion angle, they added the concept of mixing face-to-face with virtuality. Their framework (shown in figure 2) stipulates that, compared to traditional teams, the electronic mediation is key in defining a team as virtual. However, according to them, the richest case is where a high level of face-to-face to provide organizational values is used in conjunction with an electronic environment. This thesis concentrates on highly electronically mediated teams with a low level of face-to-face.

		Face-to-face	
		Low	High
Electronic Mediated	Low	Inactive	Traditional
	High	Highly-Virtual	Fully-Supported

FIGURE 2 Categories of virtual group, team and meeting (Niederman & Beise, 1999, p. 16)

However there is more to virtual teams than geographical considerations. Chudoba et al. (2005) say in their study that although "conflicting definitions of virtuality make it hard to measure such things as how much virtual teaming occurs and how virtual teaming affects performance", (Chudoba et al., 2005, p.279) it is possible to measure virtuality through the discontinuities of "geography, time zone, culture, work practices, organization, and technology"(Chudoba et al., 2005, p.282). The more of these are experienced in a team, the more virtual it is.

There are also other ways of defining virtuality in the literature. According to Zigurs (2003), there is no single cut-off point at which a team "becomes" a virtual team. Instead, what managers must do is assess the context of the team and the degree to which virtuality is present on a variety of dimensions. (Zigurs, 2003, p.340) Zigurs' dimensions are presented in figure 3.

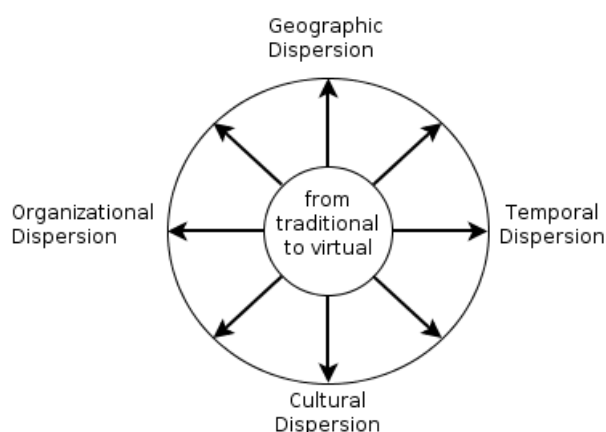


FIGURE 3 Zigurs' dimensions of virtual teams (Zigurs, 2003, p. 340)

Zigurs' model is very similar to the one used by Chudoba et al. (2005) to assess virtuality. As it can be safely assumed that the time zone is in effect tem-

poral dispersion, and work practices are tied to the cultural and organizational dispersion, the only major difference between the two models is the lack of consideration of technology in Zigurs' dimensions. The concepts used in these two models are widely accepted in the literature in defining the virtuality of a team.

It might be argued that "going virtual" is a hindrance to the team, because of the lack of face-to-face communication. However, studies like the one conducted by Akkirman and Harris (2005, p.404) show that "the virtual workplace does not have a categorically negative impact on organizational communication." In fact, in many of the studies on virtual teams it is found that the lack of face-to-face time is sometimes a very good thing, reducing friction caused by personal issues between the team members. Also, when the highly synchronous face-to-face interaction is compared to the less synchronous technology-mediated interaction, it seems that the team members tend to make more informed decisions when interacting through technology. This seems to be because of the additional thinking time allowed by the slower synchronicity. Akkirman and Harris (2005, p. 397) in their empirical study of an organization even found that virtual office workers were more satisfied with organization communication than traditional office workers. They state in their conclusions (p. 403) that "if results-by-management reduces the influence of office politics, then being physically removed from the social context of work might increase satisfaction because it allows the worker to focus on what will provide rewards."

Virtual teaming is deemed to be effective by the studies in general, and in fact quite essential by some. Lipnack and Stamps (2000, p.28) even go as far as to say virtual teaming is a twenty-first-century survival skill. What do these apparently effective teams do? According to Zigurs (2003), the work of teams comes down to two basic processes:

- Conveyance, which is the exchange of information and an attempt to understand its meaning
- Convergence, which is the development of shared understanding on the meaning of the information exchanged.

Teams work on specific tasks, conveying information back and forth, and then developing it only to be conveyed again. This virtuous loop is assisted, or in the case of virtual teams, enabled, by technological media.

2.3 Leading a virtual team

For the purposes of this thesis, only general problems of virtual teams are included. Any problems relating to specific types of teams are omitted. E-leading is taken to mean the set of activities performed by an e-leader.

The term used to describe the leader of a virtual team in this thesis is "e-leader". It is used in the literature, e.g. by Cascio and Shurygailo (2003, p.362), and seems a fitting description to differentiate from a traditional leader. In this

thesis, the leader of a virtual team will also sometimes be referred to as the "team leader" or simply "leader".

The role of an e-leader requires a versatile skill set. The responsibilities are numerous and range from building the team, setting goals and tasks, motivating the team to do the tasks, helping with the work, keeping tabs on the progress, ensuring deadlines are met and generally keeping the team happy and active. According to Sivunen and Valo (2006), it is the leader who often has to choose the media through which the team members communicate. The team leader is responsible for managing the team efficiently, and the technology choices have effects on the cohesion and effectiveness of the team. (Sivunen & Valo, 2006, p.57)

Zigurs (2003) laid out that "leadership in virtual teams is expressed through technology; therefore leaders and team members have to make sense of technology in order to make the most capable use of it"(p.347), adding another source of pressure. The e-leader must be able to effectively handle the technology, and not show weakness. They must be able to train the team members if necessary. There is little tolerance for ineffective leadership in projects carried out by virtual teams (Cascio & Shurygailo, 2003).

Hertel et al. (2005) identified four phases of implementing virtual teams. The first phase is "Preparations", and consists of decisions that are essential to creating the team, for example the mission statement and personnel selection. The second phase is "Launch", where the tasks required to begin successful teamwork are carried out. These are, for example, conducting a kick-off workshop. The "Launch" phase is likely to take more time than in traditional teamwork, because of the degree of high virtuality (p.72). The third phase, "Performance management" includes issues of leadership and the maintenance of motivation and communication within virtual teams. The fourth phase, "Team development" entails evaluation activities of team processes together with team training and assimilation of new members.

The four phases of Hertel et al. (2005) weigh squarely on the team leader's shoulders, except in part for the first one. Performance management and team development are the phases the concepts discussed in this thesis have the most impact in. In this thesis, the e-leader is seen as a coach of an expert team, as well as an instructor for specific tasks. They are to give subtle factual, practical and emotional support, coercing the team members to success (Sivunen, 2007).

Kayworth and Leidner (2002) discovered that the highly effective virtual team leaders act in a mentoring role, showing a high degree of understanding toward the team members. Still, when the occasion calls, they are able to assert their authority without causing bad blood in the team. A good virtual team leader also excels in regular, detailed and prompt communication.

Trust is important in an environment of little non-verbal communication. In a virtual team, trust is established by repeatedly setting expectations and then delivering results that meet or exceed those expectations (Cascio & Shurygailo, 2003). As the facilitator of successful results, the responsibility lies heavy on the leader of a virtual team. Despite all the pressure, Zigurs (2003, p.349) expresses that there is hope yet: "leadership can and should be expressed in virtu-

al teams. The new technological environments that are emerging provide an unprecedented opportunity for a new way of thinking about leadership."

According to Sivunen (2007), the main problems with goals in teams are that the goals are not discussed, they are not concrete enough, they are too generic, or there is not enough information on strategy. Goal setting is important, so that the team members are empowered to make decisions on their own work.

The problem with goals not being discussed seems quite trivial at first, but when there are many team members and the work is hectic, it is quite understandable that setting individual goals can be forgotten. This needs to be addressed so that it is easy for the team leader to find out if the goals have been set and discussed. Sivunen (2007, p.106) states that it is especially important to make sure the goals are discussed at the beginning of a new team's work.

Even if the goals have been discussed, Sivunen (2007) found that they remain quite ineffective if they are not concrete and clear enough. This is because they are hard to remember and work towards, especially if the team members feel the goals don't relate to their work. This problem needs to be addressed so that it is made sure that the team members have understood their goals.

Sivunen's third problem of goal setting is that the goals are too abstract and not team specific. This might happen if the team leader works higher up in the organization, and cannot fully understand the context of the team. As an example of this, if the team leader gets paid for global results and the team members for local results, then it might be difficult for the team leader to understand why the members tend to focus on the local tasks.

The problem involving strategic goals arises from the rapidly changing organizations. When the organization changes, it is important that the employees can keep track of where they are, and what they are working towards. It is the responsibility of the team leader to make sure the team members understand their strategic significance.

2.4 Information and feedback

Not only do the goals need to be set, also feedback metrics and information flow need to be established. It is quite self-evident that without feedback, there is no way of knowing the goals have been understood and that they are being reached. The key points on feedback and information management rising from the literature are the newcomers' problems (e.g. Sivunen 2007, Ahuja & Galvin 2003), keeping track of task-completion (Sivunen, 2007), giving feedback to the team members (Sivunen, 2007), maintaining documentation and establishing "standard procedures" (Cascio & Shurygailo, 2003).

The newcomers' problems in the studies are mainly where to get the information needed, and who to contact with a specific problem. Sivunen (2007) found in her study that the threshold for asking for help could be quite high. This issue is likely to be solved with procedure, similarly to discussing goals early on when joining the team. On the issue of contacting the right people,

Ahuja and Galvin (2003, p.176) suggest a coordination role for the team in their research:

"Our research suggests that virtual groups ... would seem to benefit by having an internal coordination and external liaison role. The amount of information exchange activity in this group indicates the importance of having a person focused on managing the flow of information through the group. For example, many newcomers don't know who the correct contact is for obtaining a particular type of information so they contact the coordinator for help."

As well as receiving feedback, the team leader needs to give information to the team members on their progress. After all, the team leader is compiling the results towards a common goal, and has the best understanding of overall progress. Without this feedback, the team members have no way of knowing if they are performing up to par or not, and how they should improve their work. This issue needs to be solved with procedure, setting up feedback meetings or otherwise notifying the team members of their progress and performance.

The last issues concerning information are maintaining the documentation and setting standard procedures. These can help in the issues discussed earlier. For example, the documentation on goals, specific and generic, needs to be up to date and comprehensive. Also, without standard procedures it is not possible for the team members to know how to use the communication channels uniformly, and what are the appropriate ways to communicate in a given situation. Bell and Kozlowski (2002) found that it is important to "develop appropriate habitual routines early on in the team's lifecycle". Maintaining documentation and facilitating progress reporting is essential for the case company in this thesis, as their funding depends on it.

2.5 Culture

According to Barczak et al. (2006, p.28), the four key challenges facing global team leaders are: team members who speak different native languages, who come from different cultural backgrounds, who live and work in multiple countries, and who come from different companies. The fact that these are all more or less cultural issues emphasizes the importance of culture. Cascio and Shurygailo (2003) agree that culture is the most important challenge, while also shedding light on its meaning in this context: "culture refers to shared norms about expected behavior" (Cascio & Shurygailo, 2003, p.374). They go on to state "E- leaders must be sensitive to cultural norms, especially where virtual teams span multiple regions of the world"(Cascio & Shurygailo, 2003, p.375). The case company of this thesis deals with multiple nationalities, so this could be an issue in the process.

While concentrating on problems that are likely to be solved by examining the communication process, culture seems such an important issue that it cannot be lightly omitted. The attributes of virtual teamwork, distributed spatial distance and lack of face-to-face communication are seen by Bell and Kozlowski

as impeding the two primary leadership functions, performance management and team development (Bell & Kozlowski, 2002, p.25). As culture is always present in fulfilling these leadership functions, it must be considered by the leader when carrying out decisions. This is especially important when facing the challenge identified by Cascio and Shurygailo: "promoting close cooperation among teams and team members in order to integrate deliverables" (Cascio & Shurygailo, 2003, p.375). Because culture affects the primary leadership functions, it is important for ensuring the proper convergence of the information that a healthy environment exists within the team culturally.

2.6 Evaluation framework

For the purposes of evaluating the process modelling method, an evaluation framework is proposed. The proposed framework consists of a listing of the important issues found in the literature. The results produced by the research will be evaluated according to this framework.

The value of this framework is two-fold. It will provide direction on how effectively the process modelling approach can uncover potential problems in goal communication, thus helping in answering the research question. Another, less academic benefit of the framework is that it helps in formulating suggestions for further development of the process. The proposed framework is shown in figure 4.

The aspects to be evaluated are shown on the left, and are to be analysed for their presence in the process. Three levels of presence were chosen for the framework, with emphasis on the perspective of planning. The column "not considered, not executed" represents the total absence of the aspect from the process. The "considered, not executed"-column shows the aspects where the aspect has been identified and planned, but is not present in the process. A column representing "not considered, executed" is excluded from the framework, because the framework attempts to examine goal communication from a perspective of intentional planning. Any unintentional execution of aspects is to be noted in the research for further development of the goal communication process, but are excluded from the framework to promote consistency with the planning perspective. The "considered and executed"-column represents the full inclusion of the aspect in goal communication.

It is possible to attempt to quantify the results, for example giving two marks for every tick in the column "considered and executed", one mark for every tick in the "considered, not executed" column, and no marks for ticks in the last column. This marking system is used for the examples in the following discussion of the different aspects listed in the framework. Examples are not given for every way of marking, instead in many cases it is left to the discretion of the analyst to evaluate at which level the aspect is present in the process.

Efficient technology choices have been made (Zigurs, 2003)			
Goals are discussed (Sivunen, 2007)			
Goals are concrete enough (Sivunen, 2007)			
Goals are not too generic (Sivunen, 2007)			
Goals contain enough strategic information (Sivunen, 2007)			
Feedback procedures are in place (Sivunen, 2007)			
A coordinator role is allocated (Ahuja & Galvin, 2003)			
Information on progress is communicated (Sivunen, 2007)			
Standard procedures are in place (Cascio & Shurygailo, 2003)			
Habitual routines are established (Bell & Kozlowski, 2002)			
Documentation is maintained (Cascio & Shurygailo, 2003)			
Cultural considerations are taken into account (Barczak et al., 2006)			
	Considered and executed	Considered, not executed	Not considered, not executed

FIGURE 4 Evaluation framework for goal communication

Sivunen & Valo (2006) and Zigurs (2003) emphasize the importance of the use of the right technology to mediate communication. An example of a full two marks for this aspect would be a situation where technology has been planned for use in suitable activities of the process, and upon inspection it is also used as planned in practice.

The aspect of the goals having been discussed primarily stems from the original development of the process, where one way or another a routine for communicating the goals is established. If the process has been allowed to form to be susceptible in practice to forgotten goal communication, it might mean that the leader has not established a practice for feedback of whether the goals have been presented to the team. Full marks for goals having been discussed would be given in a situation where the process in practice demonstrably performs this task. One mark is likely to be awarded in most situations, as it is likely that it is the intention of the leader to discuss all goals with the team. No marks will be given, if there is a goal that is required of the team, but has been intentionally hidden.

A little more challenging to evaluate, the goals also need to be concrete enough. This can be hard to discover from evaluating the process as a set of diagrams, and more likely relies more on the information gained in the interviews. An approach to this would be to analyse the planned feedback mechanisms of the process, which would serve to gauge if the team members have understood the goals. In any case, full marks can be awarded if the interviewed team members feel that they have been instructed with concrete goals, i.e. have been given examples of what the concrete end results require.

Whether the goals are too generic is another aspect that might present difficulties in evaluation. Problems in this area can stem from the fact that the leader doesn't understand the context of the team (Sivunen 2007), and hence communicates the goals in a form too abstract for the team to understand. If any goal in the process is found to be abstract enough for it to be impossible to

communicate as an explicit end result, no marks can be given. If the goals are not abstract in the process as planned, but interview data reveals that they are nevertheless communicated at an abstract level, one mark is to be awarded.

The aspect of goals containing enough strategic information can be found in the process as planned communication of what a specific goal means to the overall strategy. For example if the team members have been given information of why each goal is to be achieved and what implications this has on overall progress, full marks can be awarded.

Feedback procedures should be in place to avoid especially the issues directly involved with goals, as described by Sivunen (2007). Feedback is important for finding out if the goals have been understood. Feedback procedures are also needed to keep track of task completion (Sivunen 2007). If gathering feedback is planned as an integral part of the process, and it also presents in practice, full marks can be awarded.

Ahuja and Galvin (2003) propose that allocating a coordinator role could be beneficial for work executed in a virtual environment. In a simple goal communication process, the coordinator's responsibilities are likely to be taken on by the leader, but a more complex process could require more resources. The coordinator is "a person focused on managing the flow of information through the group" (Ahuja & Galvin, 2003), providing information or the correct contacts for obtaining needed information. Full marks for this aspect are given, if the leader in charge of the goal communication has planned the coordinator role, and successfully delegated or taken on the role.

As well as gathering information on task completion, feedback must be given to the team on their work in order to guide their progress towards the goals (Sivunen, 2007). If the process includes a planned way to inform the team of their progress and to also provide criticism, and this also happens in practice, full marks can be awarded.

Standard procedures in the process are expected to be in place concerning the goal communication activities. In order to establish routines, the team needs to be able anticipate new information, for example through the standardization of the tools or procedures used for communicating new goals or feedback. Standard procedures regarding communication channels can reduce the amount of misplaced information. Full marks will be given, if recurring communication activities have been planned with respect to standardization and the standard procedures are followed in practice.

Habitual routines need to be established early on in a team (Bell and Kozlowski, 2002). This aspect pertains to routines in communicating important information through the process, for example reporting and feedback discussions. If the need for the establishment of routines is recognized and planned in the parts of the process where it is beneficial, one mark can be awarded. For two marks, these routines need to be found to exist in the implementation of the process.

Documentation on the goals and progress needs to be maintained to provide accountability. If a location for documentation is allocated for the process and available to the stakeholders, a mark can be awarded for this aspect. An-

other mark is given, if the documentation is actively updated during the process.

Barczak et al. (2006) identify the four key challenges for global team leaders to be team members whose native languages are different, who come from different cultural backgrounds, who live and work in multiple countries, and who come from different companies. These cultural differences need to be addressed in the goal communication process. If cultural factors have been taken into account in forming the process, one mark can be awarded. If the process accommodates these factors in practice, for example by allowing for language differences, another mark can be given.

2.7 Business incubators

In the case study, this thesis will deal with a business incubator. It is important therefore, that the concept of business incubation is clear. In this chapter, a theoretical background will be given to business incubation. First, the historical development of business incubation will be discussed. Then some examples of the services a business incubator can provide for businesses are given. Then the variations of incubators are discussed. Finally, the potential benefits of business incubation are discussed.

In the current economic system, where not just traditional companies are competing for resources, but also states and whole economic areas, entrepreneurship is important as a means of finding new ways of producing value. To support entrepreneurship, business incubators have arisen.

Hackett and Dilts (2004) state that a business incubator is a shared office space facility that seeks to provide its incubatees with a strategic, value-adding intervention system of monitoring and business assistance. Hackett and Dilts also go on to add that an incubator is also a network of individuals and organizations (p. 57). According to Lalkaka (2001), this definition can be divided into historical parts. The first incubators in the 1980's concentrated purely on providing shared facilities and office space to carefully selected entrepreneurial groups. The second-generation incubators in the 1990's began to provide networking opportunities, skills enhancement and links to professional support and seed capital outside the incubator environment. The third generation of incubators, according to Lalkaka, has emerged alongside the second. It concentrates on technology ventures, attempting to capitalize on the high growth potential of IT-based ideas.

From the stages of business incubator history, it can be seen that the institution has gradually spread its wings to provide a more comprehensive offering. What services do business incubators provide? According to Knopp (2007), these:

- Help with business basics
- Networking activities
- Marketing assistance

- High-speed Internet access
- Help with accounting/financial management
- Access to bank loans, loan funds and guarantee programs
- Help with presentation skills
- Links to higher education resources
- Links to strategic partners
- Access to angel investors or venture capital
- Comprehensive business training programs
- Advisory boards and mentors
- Management team identification
- Help with business etiquette
- Technology commercialization assistance
- Help with regulatory compliance
- Intellectual property management

From this list, it can be seen that business incubators are a sort of stepping stone for first-time entrepreneurs, providing many resources a seasoned entrepreneur would not need assistance with. For example business etiquette, business basics, presentation skills and a working knowledge of accounting are properties, which need to be acquired only once. Hence it could be argued that the set of offerings commonly provided by business incubators is likely to be of most service to novice entrepreneurs.

A concept map of business incubation by Hackett & Dilts (2004, p. 57), shown in figure X, describes the business incubation process at a high-level. As mentioned by Lalkaka (2001), only carefully selected incubatees make it to the incubation process. The incubatee teams then go through the incubation process, and then either stop their activities or graduate from the incubator as businesses.

Possible variation in business incubator processes could be explained by what Lalkaka (2001) asserts: each incubator is different from another. Differences in incubators can result from a number of reasons. In a taxonomy proposed by Hackett & Dilts (2004), these can be the incubator's primary financial sponsorship (Kuratko & LaFollette, 1987, Smilor, 1987 and Temali & Campbell, 1984), whether incubatees are spin-offs or start-ups (Plosila & Allen, 1985), the business focus of the incubatees (Plosila & Allen, 1985 and Sherman, 1999), and the business focus of the incubator. Factors affecting the incubation process also include their sponsors (state, economic development group, university, business, venture capital), objectives (from empowerment to technology commercialization), location (urban, suburban, rural, and international), sectoral focus (technology and mixed) and business model (not-for-profit or for-profit) (Lalkaka, 2001).

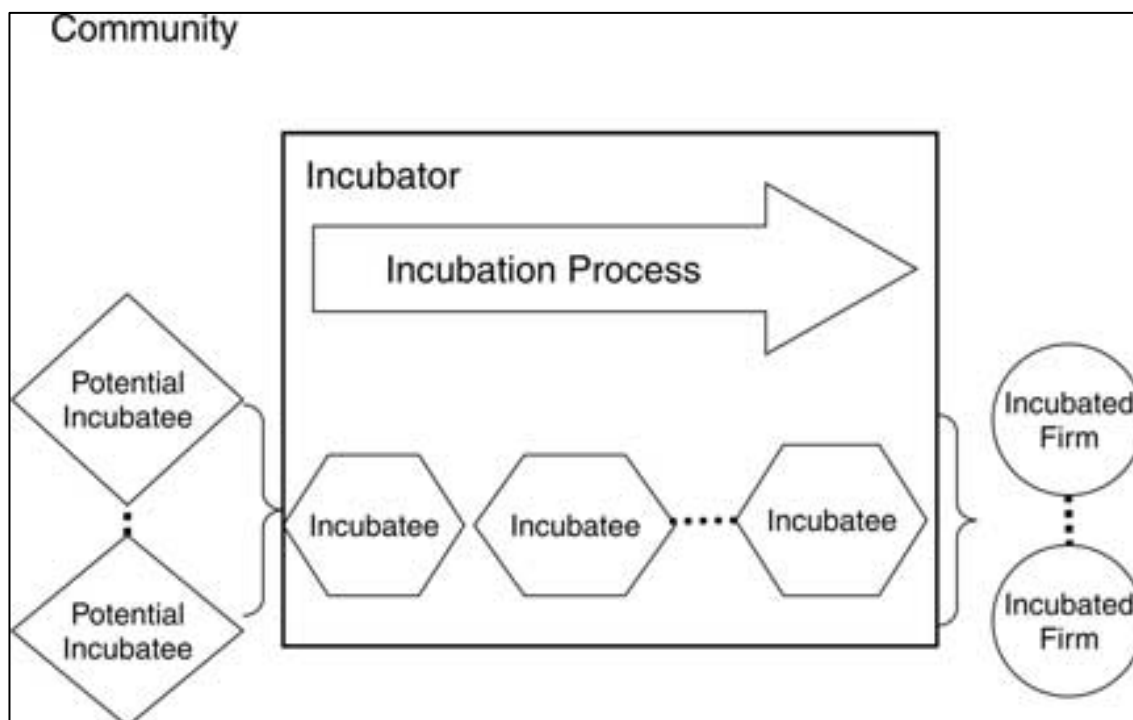


FIGURE 5 Concept map of business incubation (Hackett & Dilts, 2004)

The effects of business incubators are various. In their research on the impact studies of business incubation, Hackett & Dilts (2004) found that at the community level incubators and incubatees are not very good job creators (Campbell & Allen, 1987). However, Hackett & Dilts (2004) found that studies by Markley & McNamara (1995), Sherman (1998, 1999) and Sherman & Chappell (1998) show that business incubators are more cost effective economic development tools than programs, which try to attract firms to a specific region. It is possible that with the advent of the third stage of incubators and very fast technology development these data could be out of date.

In terms of benefits, while it might be the case that job creation by business incubators is low, Lalkaka (2001) asserts that in a well-managed incubator it is likely that the incubatees, as well as receiving training and networking opportunities, also gain credibility and have an increased chance at success. For research institutes, Lalkaka predicts better promotion for research commercialization and opportunities for faculty and graduate students to utilize their skillset. For existing businesses, the benefits could be acquirable innovations. Lalkaka also suggests that business incubators can accommodate spinoffs from businesses.

3 Process modelling method

The modelling method used in this thesis is derived from the Finnish government guide for process modelling (JUHTA 2008) and the method described in Holt (2009). This chapter outlines the method. First, some background is given for the choice of the technique used. Then the two guiding sources are described, and in conclusion the final modelling method is outlined.

3.1 Modelling

Before discussing modelling methodology, it is important to first clearly understand what a model is. According to Curtis et al. (1992, p. 76),

a model is an abstract representation of reality that excludes much of the world's infinite detail. The purpose of a model is to reduce the complexity of understanding or interacting with a phenomenon by eliminating the detail that does not influence its relevant behavior.

Hence modelling is very much affected by the choices made by the creator of the model in choosing the relevant details to be modelled. This needs to be understood as a possible weak point when considering process modelling as a methodology in evaluating goal communication. The resulting process model must not be accepted as an exhaustive account of reality, and therefore cannot be relied on as such in process re-engineering.

3.2 Modelling technique

In order to increase repeatability, the technique used in the case study is described here. Figure 6 shows the hierarchical decomposition of the elements of modelling, as composed by Giaglis (2001). This description of method concentrates mainly on the techniques of modelling, i.e. diagrammatic or other nota-

tions for studying and analysing modelled systems (Giaglis, 2001). The methodology chosen for this study is an object-oriented approach, where the process is seen as being composed of a number of interacting objects. The process of modelling the relevant objects is described later. The specific tools used for modelling are not relevant to repeatability, so will not be discussed in this thesis.

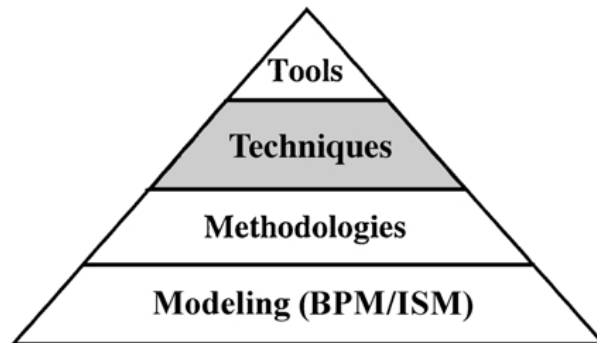


FIGURE 6 Hierarchical decomposition of modelling elements (Giaglis, 2001)

When choosing a modeling technique, Curtis et al. (1992) asserts that it should be capable of representing one or more of the following process perspectives (abstracted by Giaglis, 2001):

1. The *functional perspective* represents *what* process elements (activities) are being performed.
2. The *behavioral perspective* represents *when* activities are performed (for example, sequencing) as well as aspects of *how* they are performed through feedback loops, iteration, decision-making conditions, entry and exit criteria, and so on.
3. The *organizational perspective* represents *where* and *by whom* activities are performed, the physical communication mechanisms used to transfer entities, and the physical media and locations used to store entities.
4. The *informational perspective* represents the informational entities (data) produced or manipulated by a process and their interrelationships.

Incorporating the process perspectives described by Curtis et al., Giaglis created an evaluation framework for business process modelling techniques, which is shown in figure 7. In studying goal communication, the perspectives of interest are the organizational perspective and the behavioural perspective, in other words *who* communicates, and *how*. Here the choice of technique for this case study runs into conflict with Giaglis' (2001) recommendations, which states that the Unified Modelling Language (UML) has limited potential for modelling the behavioural and organizational perspectives (p. 224). The methodology described a little further on in this chapter shows that UML is a suitable technique for modelling these perspectives. Hence the technique chosen for this case study is UML. The slight discrepancy here could be as a result of the rapid development of UML in the years following Giaglis' paper. For an overview of other techniques, see the taxonomy created by Giaglis (2001). To support the

decision to use UML, it is later compared to BPMN (Business Process Modelling Notation) in the context of the methodology used in this research.

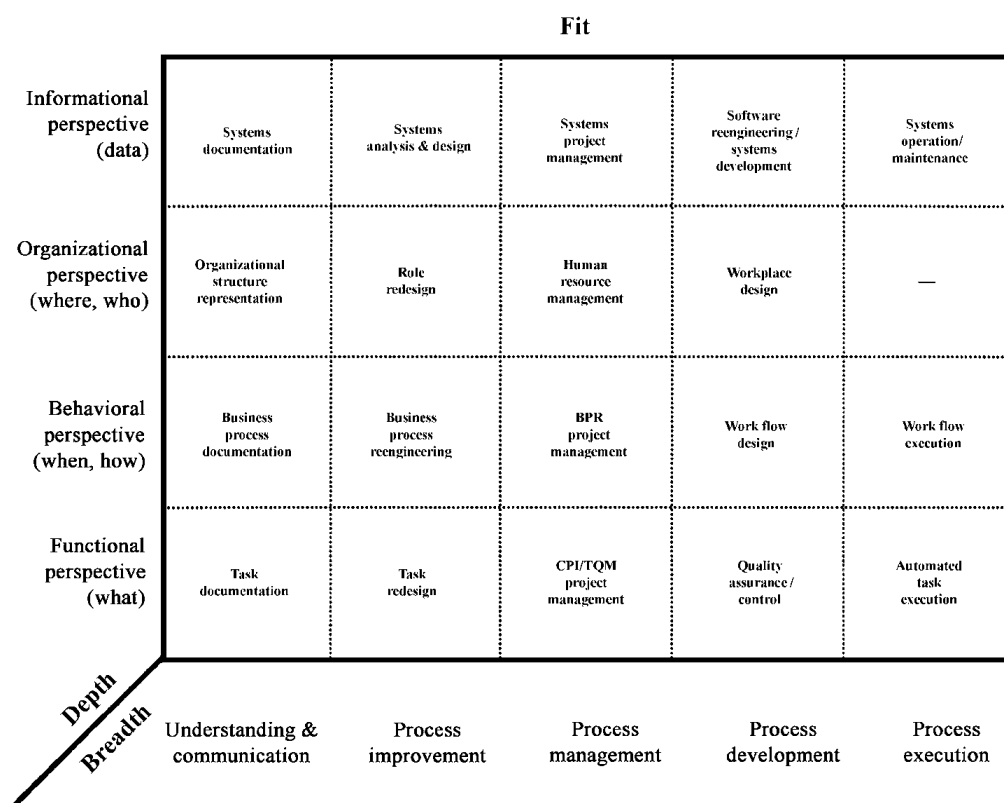


FIGURE 7 Giaglis' (2001) evaluation framework for BPM techniques

This thesis will not describe UML in detail; instead the reader is urged to read Holt (2009), which gives an excellent account of the UML diagrams when used as a technique in business process modelling. Instead, in this chapter it is described how UML is used to abstract various views of the process. Holt (2009) describes a methodology where a business process should be modelled through seven views (the recommendations for UML diagrams is in parenthesis):

- The requirements view (use case diagram)
- Process structure view (class diagram)
- Process content view (class diagram)
- Process behaviour view (activity diagram)
- Stakeholder view (class diagram)
- Information view (class diagram)
- Process instance view (sequence diagram)

The requirements view is included in the model in order to make validation of the process possible. In the view, the requirements for *who* does *what* is modelled, so as to describe the required end result as tied to the stakeholders.

This view concentrates on the process from the organizational perspective as described by Curtis et al. (1992).

The process structure view attempts to create a high-level representation of the basic structure of the process. As well as setting out the structure, this view documents the terminology used in the process model to describe parts of the process.

The process content view describes the content of the sub-processes that the process model consists of. It endeavours to list the activities in each process, as well as the artefacts either used or produced by the process.

The process behaviour view shows the behaviour of the individual sub-processes described in the process content view. It shows how the stakeholders interact in the process through the activities defined for the process. This view satisfies the needs of the behavioural perspective of Curtis et al. (1992).

The stakeholder view classifies the stakeholders involved in the process, and shows their inter-relationships. The stakeholders are described in the context of roles instead of individually defined entities, for example named employees. Basically an organization diagram, the stakeholder view satisfies the *who* -part of the process model.

The information view describes the key information used and produced in the process. The view provides the possibility for quality checks in the process, and also makes possible process automation easier.

The process instance view comprises of a number of diagrams showing possible scenarios to comply with the requirements described in the requirements view. It gives a high-level look into the order of execution of the parts of the process for a given scenario.

These views will be modelled in the following order, as proposed by Holt (2009, p. 84) for abstracting tacit process knowledge for an existing system: process structure view, process content view, information view, stakeholder view, process instance view, requirements view, and finally the process behaviour view. As well as using this views approach as the methodology in the case study, the workflow described in the Finnish government guide for process modelling JUHTA (2008) is adopted. It is used in this thesis because of the amount of government involvement in the case company, in order to increase compatibility with existing conventions. A summary of the chosen method is shown in figure 8.

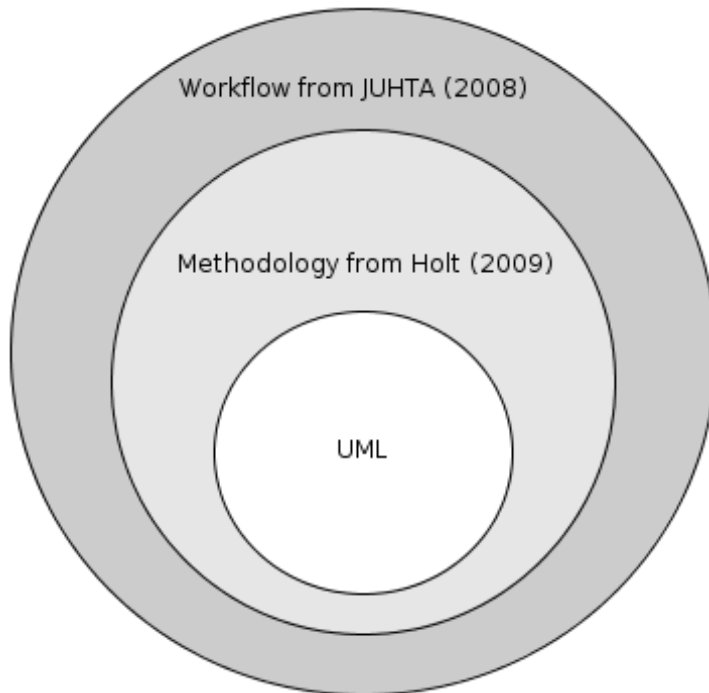


FIGURE 8 Summary of the chosen methodology

The JUHTA (2008) workflow consists of six steps:

1. Identify the processes and process owners
2. Choose the process to be modelled
3. Decide on the usage and abstraction level of the model
4. Choose the modelling technique and tools
5. Create the process model
6. Tie the process model into its context

The levels of abstraction suggested by JUHTA (2008) are the process map, process hierarchy, process flow and work flow. The requirements of these levels are satisfied by the modelling approach adapted from Holt (2009) to the extent required by the case study. Now to further support the decision of UML for the modelling technique, UML is compared with BPMN in table 1, as regards their potential to model the seven views described earlier. The comparison is based on the analysis by Holt (2009) of applying BPMN to modelling the seven views of a process model. The problem with using BPMN is that to be able to model all the seven views, supplementary techniques would need to be used for the structural descriptions of the process. This would lead to using multiple techniques for the modelling, thus increasing the complexity of the modelling process and hindering the repeatability of the study. UML was hence chosen to provide a comprehensible and unified technique for repeating the study.

TABLE 1 Comparison of UML and BPMN as techniques for modelling process views

View	UML	BPMN
Process content	Yes	No
Process structure	Yes	No
Requirements	Yes	No
Information	Yes	No
Stakeholder	Yes	No
Instance	Yes	Yes
Process behaviour	Yes	Yes

The data for this study will be gathered mainly by qualitative interviewing. The interviews will be iterative, with the process model used as a basis for questions. The initial interview will consist of a basic set of questions, aimed at constructing a simple flow representation of the process. After the initial interview, the seven views of the model will be concentrated on individually as a basis for forming further questions. The interviews will be recorded with an audio recorder to serve as reference in building the model. The interview events will be set up in an environment suitable for a conversational interview, and will be kept to a maximum time of one hour each. The time limit is imposed to keep the interview on topic.

As well as interviews, there is another source of data for this research. The author of this thesis has been closely working with the case company as a consultant and also as part of a pre-incubation team. The knowledge gained during this work will assist in being able to formulate useful questions during the interviews. This is important, because the nature of a case study requires the researcher to be able to formulate questions “on the fly” and successfully interpret the responses. Therefore the researcher must master the case subject extremely well (Järvinen & Järvinen, 2004, p. 80). To make sure that the process model is complete, after each interview the process model will be updated. The interview iterations will continue, until the interviewees are satisfied that the model describes the process accurately.

4 Case study results

In this chapter, the context and results of the case study are presented. First, the case company is described, and business model of Protomo is briefly discussed to provide some background for the research context. Then the steps provided by JUHTA (2008) are followed to deliver the modelled process. Each process view is described, and discussed with regard to its usefulness in evaluating the process.

Towards the end of this chapter, the results of modelling the process are presented within the evaluation framework. The framework is used to provide an analysis of the process, whence proposals for further development can be made.

4.1 Case Protomo

This sub-chapter gives an introduction to the case company, Protomo. First, its business model is described briefly, and the case problem that this thesis addresses is discussed. Then, the specific application of the chosen research method is discussed in detail.

Protomo is technically a pre-incubator for teams working towards founding a company. Teams graduate and move on to other incubators or other means of growing their business when a new company is founded. It operates in multiple locations in Finland. In this thesis, the name "Protomo" is used exclusively to mean Protomo Jyväskylä. Protomo played a vital role in the re-employment of ex-Nokia employees, when Nokia began its downshifting in Finland. Protomo's goal is to generate employment opportunities for professionals through new business ideas and models.

Protomo provides a working environment for would-be entrepreneurs, where they can network and acquire the required skillset for developing and running a new business. As well as an office environment, Protomo provides funding for customer acquisition activities, business seminars and various train-

ing events. In exchange for these services, Protomo requires the entrepreneurs to produce documentation of their activities.

Protomo is in essence a coaching organization, leading the new teams through early stage start-up development. The implicit goal is to instil a basic set of skills and a healthy working culture in the new businesses. One of the main problems is the uncertain nature of start-ups, which brings with it instability of time-management for the founders. Protomo's challenge is to inspire the founders to be active in their business, without neglecting their reporting duties to the incubator.

The hectic nature of working with start-up teams could benefit from the explicit evaluation of the communication process. A large portion of the communication at Protomo happens through electronic means, again due to the nature of early stage business. Protomo publishes a newsletter every week through email, and basic information on their website. This thesis addresses the communication process with the goal of identifying potential development needs.

If the main goals Protomo sets for the businesses are reached, i.e. learning, development and revenue, there still remains the question of Protomo's accountability to its funders. Protomo needs to be able to report its progress in order to acquire funding. The model produced in this thesis is designed to support the basis of receiving funding.

In terms of virtuality, Protomo's operation can be evaluated according to Zigurs' (2003) dimensions. Geographically the team is close to Protomo due to the fact that Protomo provides the main office space, so in theory a lot of face-to-face communication could be expected to happen. In practice, however, in creating their product prototype and carrying out market research, not many teams spend much time at the premises.

In the temporal dimension, there is no time zone difference between the participants of the process. However this could also be misleading, as the working hours of an entrepreneur are largely dictated by necessity. Therefore there is no certainty that the different participants will be "at work" at the same time.

The organizational dimension doesn't suggest a high level of virtuality, because flat hierarchy and simple structure of the organization. This doesn't give much information on the lack of virtuality either, so it is hard to draw any conclusions from this dimension.

Culturally, Protomo is quite a heterogeneous operation. There have been team members from as far as India, various parts of Africa, and China, as well as nationalities closer to Finland. This places a lot of pressure on Protomo to make the communication as efficient as possible.

The information required to create an accurate process model was gathered through interviewing three separate parties within Protomo. The first interviewee was Protomo's facilitator, who provided details on both how the process is planned to work, and also could give an estimate of how it has worked in practice so far. To corroborate the knowledge gained in interviewing the facilitator, representatives of two separate incubatee teams were interviewed, in order to make sure important details were not left out, and to find out if some parts of the process were not present in their cases.

4.2 Process and process owner identification, selection of process

The operation of Protomo comprises three main processes, planning and reporting, communication and incubation. Of these three, the communication process was chosen as the process to be studied. In short, it includes the communication between the incubatee and Protomo, facilitating the creation of deliverables for planning and reporting purposes. The process owner is the facilitator, who is the main representative of Protomo in the process.

The communication process, as shown in context in figure 9, produces various data from the incubation process. This research limits the examination of the process to the core deliverables defined as the artefacts required from the incubatees in exchange for Protomo resources. All other areas of the process are disregarded for the purposes of this study.

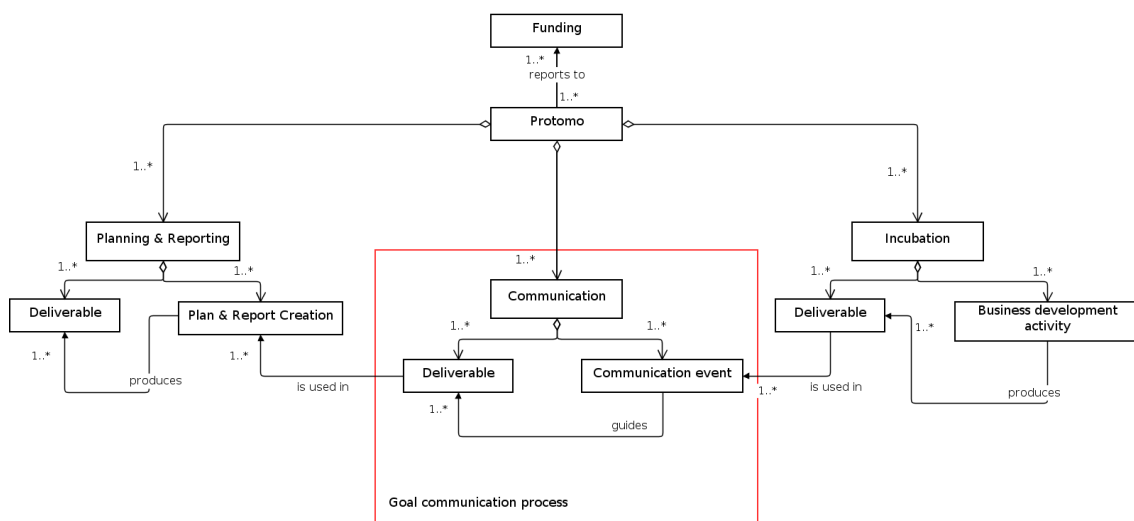


FIGURE 9 Goal communication process in context

4.3 Usage and abstraction level of the model

The model is primarily to be used in evaluating possible weaknesses in the process. These weaknesses could present as possible breakpoints, or the process might be missing important parts. Considering that the process will be mainly for the use of management, the abstraction level is fairly high.

Some parts of the process could be identified as possible functions that can be automated, however this process model will be used only for identifying those functions. No low-level detail will be modelled. The abstraction level required covers identification and evaluation.

4.4 Modelling technique and tools

As discussed in chapter 3, the chosen modelling technique used is UML. UML will be used to create a process model comprised of seven views, based on interviews with Protomo's facilitator and representatives from two separate incubate teams.

The abstraction level of the process model was defined to be high, removing the need for generating code from the model. Hence a simple diagramming tool is needed, without any code generation features. For this process model, diagramming software Umlet and web-based diagram.ly are used, but there is no reason why the same end results couldn't be achieved with any diagramming tool, including a pen and paper method.

4.5 Process model

The process model views are set out in this sub-chapter in the order proposed by Holt (2009, p. 84) for abstracting process knowledge for an existing system. While the modelling process loosely followed this order, in practice most of the views complemented each other and were populated in an iterative fashion, whenever new knowledge was acquired.

4.5.1 Process structure view

The process structure view gives the basic terminology and structure for the process. It is a meta-level description, and shows that each sub-process consists of activities performed by roles, which create or deliver a deliverable; deliverable being the chosen term to mean a document or other artefact. The terminology was already in use at Protomo, so building this view was quite straightforward.

The benefits of this view presented themselves mostly in the form of giving an overview of what the sub-processes consist of. No opportunities for improving the process were discovered through this view. In the interviews, the process structure view acted as an introduction to how the rest of the model works.

As for usefulness in evaluating goal communication, the process structure view seems to offer very little. The view is shown in full in figure 10.

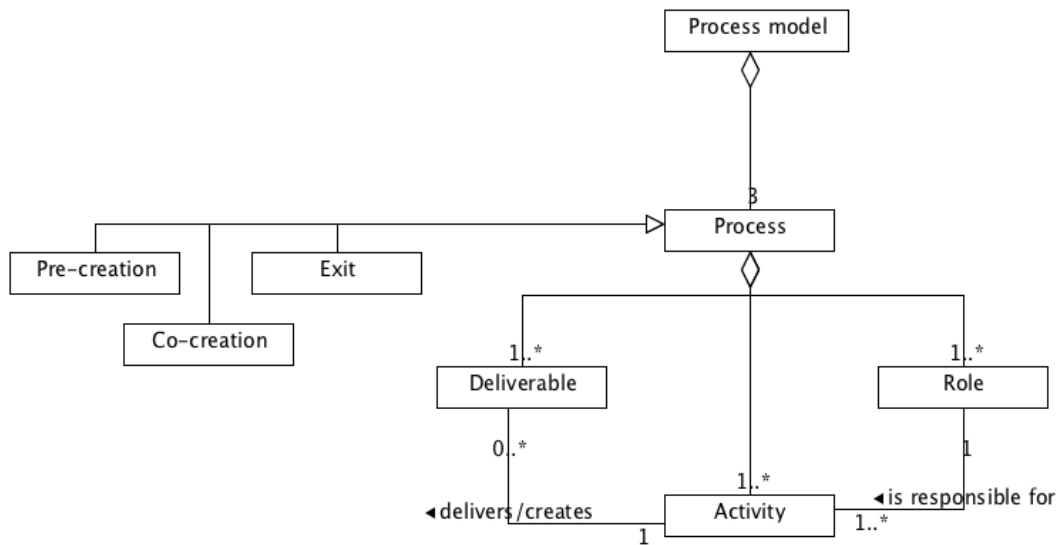


FIGURE 10 Process structure view

4.5.2 Process content view

The process content view gathers the deliverables and the activities of the sub-processes into class diagrams. If there were more complexity in the process, it would show more information on the relationships between the sub-processes. In this process, however, the sufficient relationship information is given in the process structure view and the process instance view. Hence the process hierarchy is flat, and providing more detail than a simple class diagram for the sub-processes would only serve to complicate the process content view. An example of the diagrams in the process content view is shown in figure 11, and the entire view is shown in appendix 5.

The process content view shows that the sub-processes have dependencies. The co-creation process depends on the completion of the pre-creation process, and the exit process depends on the completion of the co-creation process. This is echoed in the process instance view, where it is shown that only one scenario is possible for the goal communication process.

The process content view can be tested for the ratio of activities to attributes (Holt 2009). Holt proposes that the amount of the one should not exceed the amount of the other excessively. In this respect, the process content view is a little out of balance, slightly favouring the amount of activities. Also, according to Holt the amount of either should not far exceed nine items, in which case it could be an indication that the sub-process should be divided into separate processes. In this case, the only sub-process exceeding nine items is pre-creation, which consists of eleven items of activities. This is not deemed by the author as sufficient reason to complicate the process model further.

For goal communication development, in this case the process content view mostly has an indirect effect. It serves as a tool in the modelling process, providing the possibility to check that every sub-process has at least activities

and attributes, and that they are not too numerous to handle. While being of assistance when modelling the process, the process content view was not very useful in the interviews or in evaluation of the process.

Co-creation
Project plan instructions
Project plan template
Project plan
Project plan update
deliver_instructions_project_plan()
deliver_template_project_plan()
write_project_plan()
deliver_project_plan()
evaluate_project_plan()
develop_project()
deliver_update_project_plan()
evaluate_project_plan_update()

FIGURE 11 Example diagram of the process content view

4.5.3 Information view

The information view provides a description of the content of the goal communication and also the deliverables of the process. The abstraction level in the information view is high-level, notably affecting the depth of information recorded. For the deliverables this is because in-depth examination of the documents is not within the scope of this process model, and for the instructions because the guidance given tended to be extempore in nature and therefore impossible to document thoroughly. The latter is an issue, which would ideally be resolved by creating standard procedures for the instructions, which would also form a basis for maintainable documentation on the goals.

The instructions given had in common the objectives of the deliverable, and also a brief description of what the content should be. In the interviews it was found that the instructions for each deliverable had given the founders a reasonable idea what the deliverables were to be used for, so they were not limited by the templates given and could use their creativity. An example diagram is shown in figure 12, which shows how the instructions affected the deliverables. The complete information view is included in appendix 4.

The documentation provided by Protomo was helpful in compiling the information view. Combined with interviews with the facilitator and members of two separate teams an understanding of each deliverable was reasonably effortless to compile. What stood out from the documentation, especially the templates for deliverables, was that they facilitated making the goals very concrete and understandable. The goals concerning creating the deliverables seemed quite straightforward and mechanical to reach.

Interviews concerning the information view revealed that some of the goals had not been discussed. Especially the case study required in the exit sub-

process had received insufficient attention. This seems to have been due to a lack of following an explicit plan for goal communication. Due to this, an overall understanding of the set of deliverables had not been communicated to the interviewed founders, and therefore the process was found insufficient in providing the required overall strategic information. The goals that had been discussed had been discussed at a personalized level; hence the interviewees did not find them too generic.

A sizable issue that was uncovered during the interviews regarding the information view was the lack of dedicated technology for both communicating the goals and conveying the deliverables. This resulted in confusion about the channels of communication, in the end reverting to haphazard sporadic face-to-face and email communication. The lack of choosing the proper technology in a largely virtual environment can be seen as a critical flaw in the process.

Partly due to the technology choices, perhaps partly as a result of not following an explicit plan no specific location for documentation for the goals had been allocated. Having reference documentation for the goals could help the founders to acquire a full understanding of what is required from them, and also reduce the facilitator's workload. Also the documentation on the progress of each team was not readily available.

The interviews showed that the process had the potential to accommodate for cultural diversity, partly because the facilitator could deliver instructions in multiple languages, and in part because the process allows for flexibility in execution. If the process is to be developed in a stricter direction, care should be taken to preserve cultural flexibility.

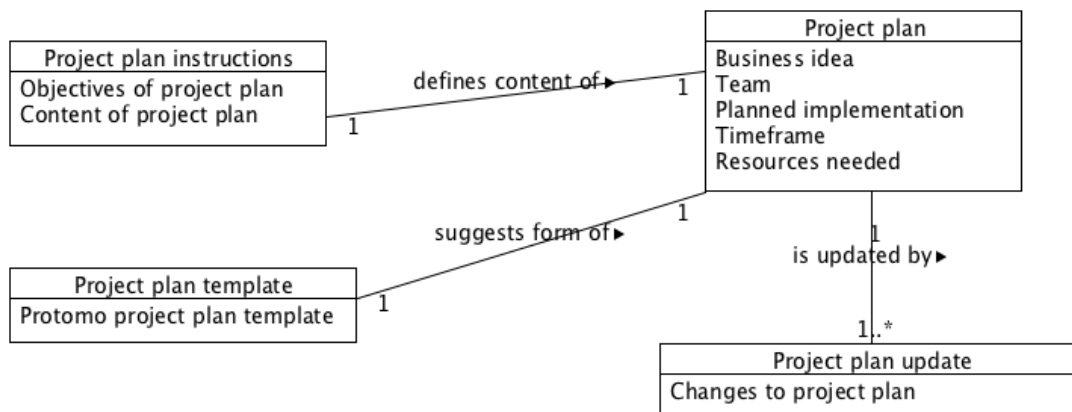


FIGURE 12 Example diagram of the information view

4.5.4 Stakeholder view

The stakeholder view shows the relationship between the stakeholders, and links all the activities to their respective roles. The stakeholder view of this process includes roles taken on by people, however a stakeholder view could also represent other entities such as other systems. As it is, the view is a description of the parties involved in goal communication, and hence very simple and flat, as shown in figure 13.

The stakeholder view shows the properties required of each stakeholder, which helps in defining job descriptions and system requirements (Holt, 2009). In this case study, the stakeholder view clarified the roles involved in the process. It serves as a reference to provide a clear understanding as to what the responsibilities are for each person involved in the goal communication process. The stakeholder view provides the terminology for the roles: the Protomo representative is called a “facilitator”, and the team members are called “founders”.

In the interviews it was found that the founders didn’t have a clear understanding of their responsibilities to Protomo, possibly due to the lack of enforcement of these responsibilities on the part of Protomo. The stakeholder view served as a useful tool in finding this out in the interviews.

The stakeholder view shows that the facilitator role is in essence a coordinator. For the evaluation framework, this satisfies the requirement for a coordinator role as proposed by Ahuja & Galvin (2003).

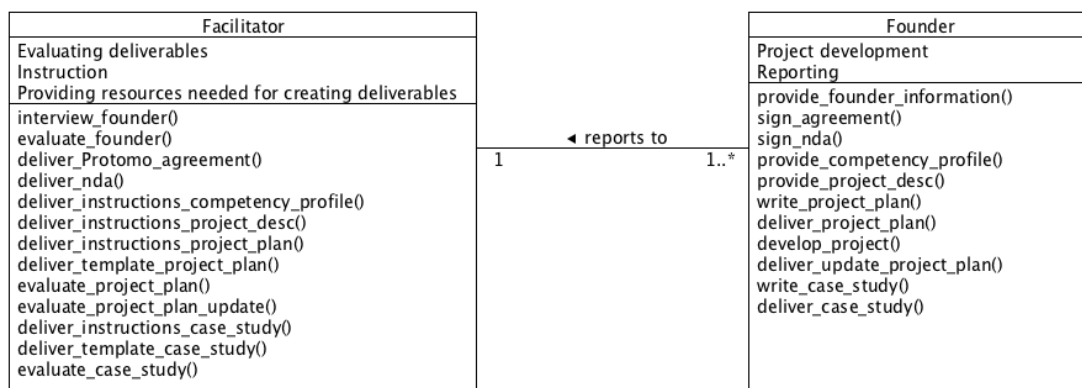


FIGURE 13 Stakeholder view

4.5.5 Process instance view

The process instance view is utilized for validating the process, in the sense that the process must meet the requirements set out in the requirements view. The process instance view is used for describing scenarios, which will fulfil a specific requirement. For example, in Holt (2009) a diagram in the process instance view is created for every use case in the requirements view. However in the case process the sub-processes were dependent on their completion in a specific

order, and therefore multiple diagrams were not required. The process instance view of this process model has only one scenario, which provides for all the requirements in the requirements view.

This simple process instance view, shown in figure 14, defines the order in which the sub-processes are executed. As can be seen from single the diagram of the view, the processes follow each other consecutively, without iteration. Modelling the process instance view was a starting point to modelling the process, providing the understanding that when modelled at this level of abstraction, the process consists of a straightforward set of three sub-processes. Due to its simplicity, it was fairly effortless to model and might seem superfluous to the model, but it played an important role in the early stages of modelling the process.

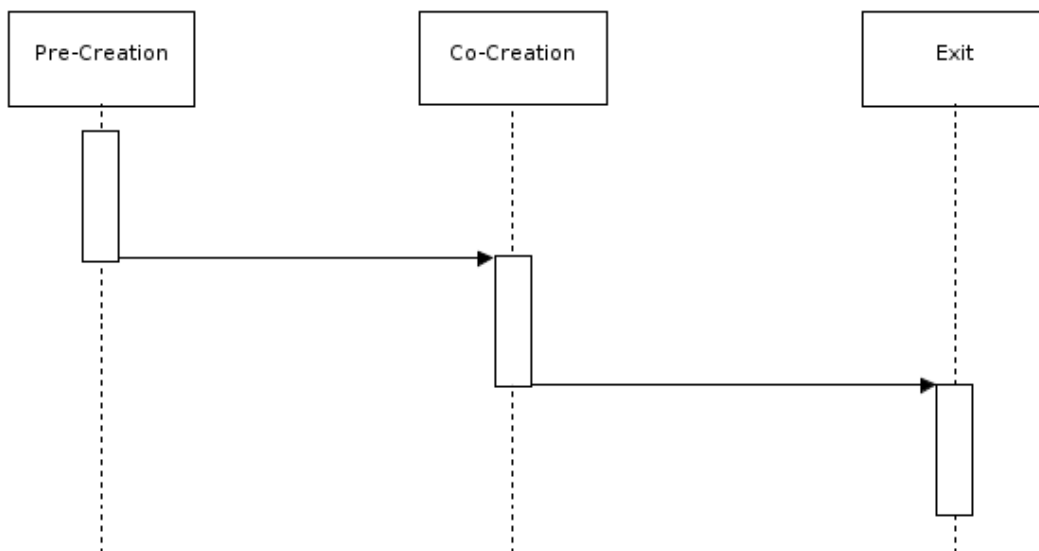


FIGURE 14 Process instance view

4.5.6 Requirements view

The requirements view is a collection of use cases, representing the different needs of the process. The level of abstraction chosen for the model effected that the requirements view is simple, defining only the vital use cases. The requirements view consists of a single diagram, shown in figure 15, which was drawn from the requirements discovered in the interviews. Only four use cases were required of the process. An initial interview with the founder(s) had to be conducted, where the founder was given information on goals, and the deliverables for each sub-process had to be produced.

The requirements view gives an overview of what the goal communication process seeks to accomplish, and might help in the case that the whole process is redesigned in the future. It helped the modelling process by giving a reference point for validating the rest of the model. This led to successfully dis-

carding parts of the model that were outside the scope of the goal communication process.

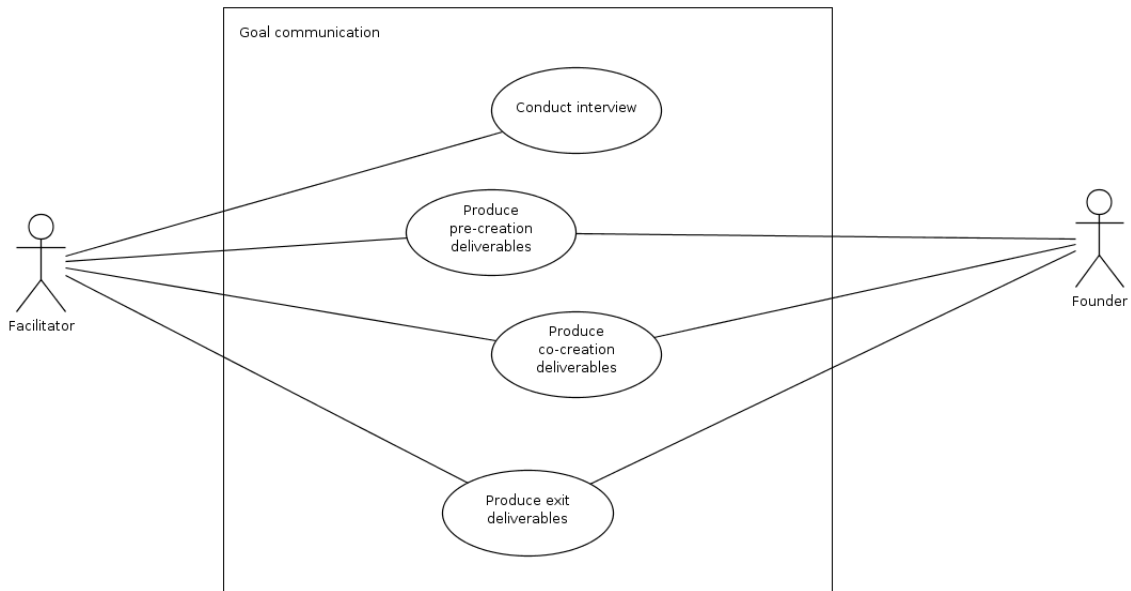


FIGURE 15 Requirements view

4.5.7 Process behaviour view

The process behaviour view models the specific workflow of the sub-processes. The diagrams are not very complex, mainly due to small amount of roles. This resulted in the diagrams only having two swimlanes, illustrating the back-and-forth nature of goal communication in the case process.

The process behaviour view was the most useful view during the interviews, because it provided a basis for walking through the process. The walkthroughs formed an important part of interviewing, as the interviewees could readily point out corrections to the workflow. This helped in creating an accurate description of the process.

The diagrams in the process behaviour view show the workflow of the sub-processes. The workflow consists of activities attributed to one of the roles, and sometimes the activities produce or create a deliverable. An example of this is shown in figure 16.

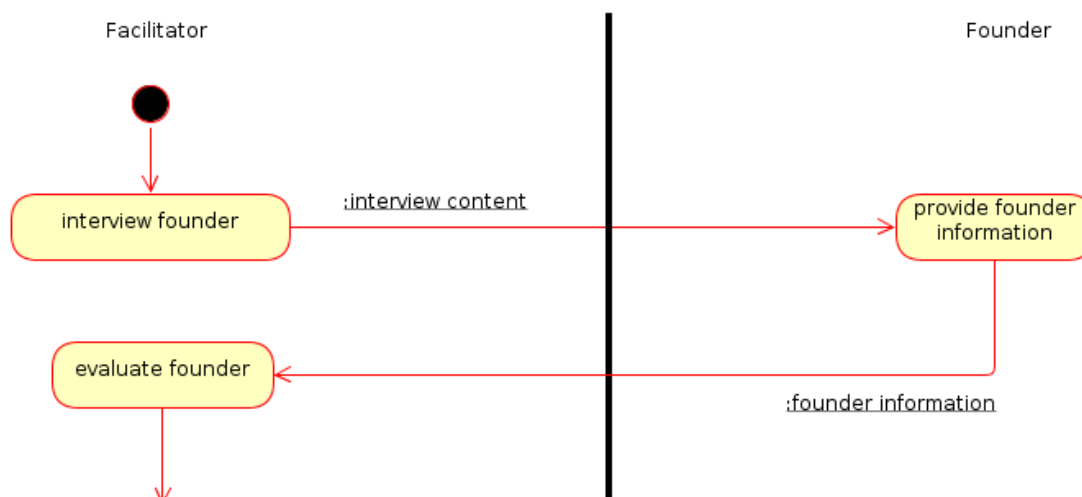


FIGURE 16 Process behaviour view: example of basic activities

There are two special cases of note in the process behaviour view. One is when the facilitator gives instructions on how to accomplish the goal, sometimes followed by delivering a template to assist in the work. An example of this is shown in figure 17. The other special case is when the facilitator receives something that needs to be evaluated. This is shown in figure 18. In this case, the facilitator gives feedback on the work, and determines whether it is at a stage where the process can continue. This gives us an example of how the team is given information on their progress.

The process behaviour view shows that explicit procedures for gathering feedback from the founders are not planned into the process. The founders are given information on their progress, but there is a shortage of planned milestones, which would trigger feedback. The interviews revealed that the feedback depended on conversations at seemingly random intervals, mostly triggered when the founders were in need of a resource. No explicit requirements for progress were set. For example in the process behaviour view diagram for pre-creation, as shown in appendix 1, there are no checks for whether the competency profile or the project description have been delivered. In the diagrams for co-creation and exit, appendices 2 and 3 respectively, the deliverables are evaluated and feedback is given. However, again there are no checks in place for whether the deliverables have reached the facilitator.

Standard procedures are also shown to be lacking in the process. The activities in the process behaviour view have not been assigned standard channels of communication; instead they rely largely on the discretion of the stakeholders. A notable exception to this is the initial interview, which has occurred as a face-to-face meeting without exception. The shortage of standard procedures could be linked to the lack of defined communication channels, which presents itself as insufficient technology choices for the process.

Due to the lack of standard procedures, habitual routines have not been established. This is not shown directly in the process behaviour view, however the subject was discussed at length during the interviews based on the process

behaviour view diagrams. The main problem found during these discussions was the current informal nature of the execution of the process, and hence a lot of leeway in practice.

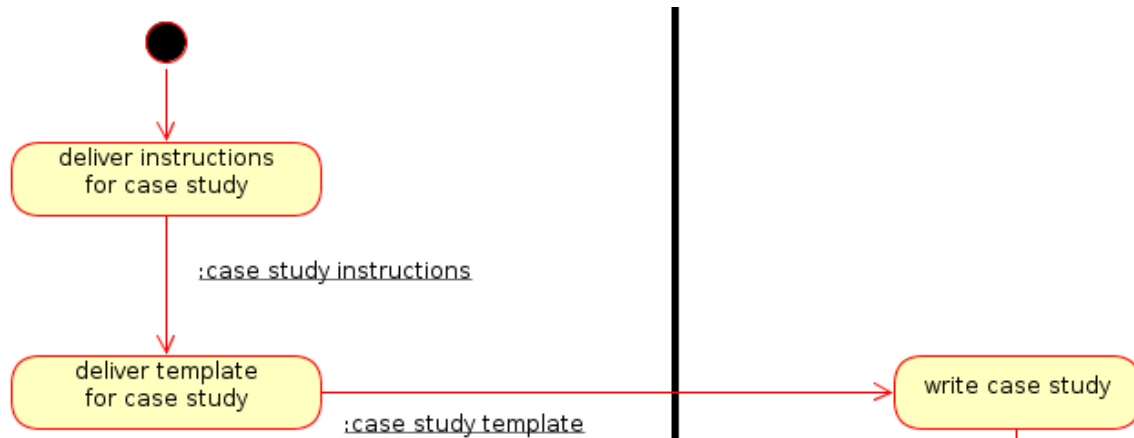


FIGURE 17 Process behaviour view: example of instructions

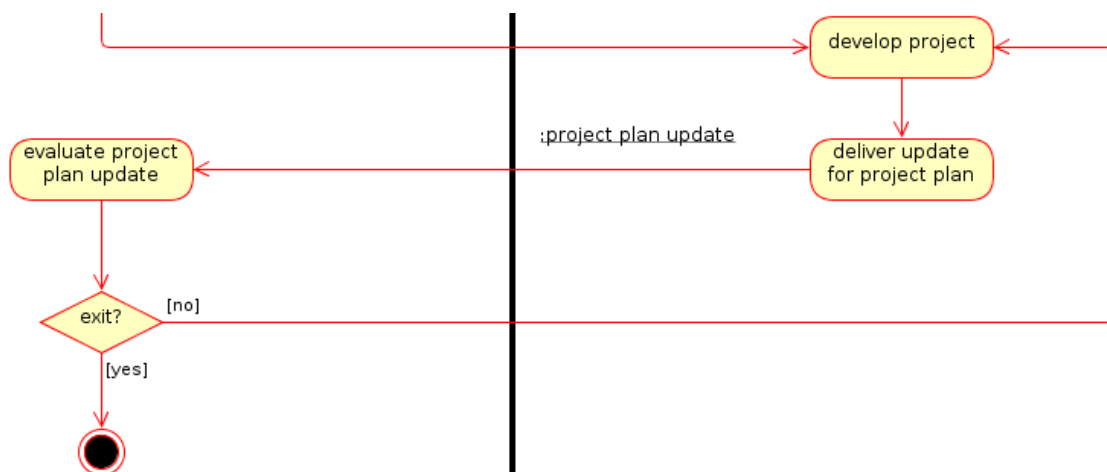


FIGURE 18 Process behaviour view: example of evaluation

4.6 Tying the process model into its context

The process model covers a narrow but important area of the Protomo process. The part that was modelled produces the vital deliverables required for Protomo to function. The modelled process is a part of the communication process of Protomo, which also includes communication that aims to develop the incubatee business.

The modelled process is designed to be used as a reference in situations involving goal communication, and can be appended to the existing Protomo process documentation. An example of existing documentation that was modified due to this research is the Protomo project model, part of which is shown in figure 19. The project model document is a diagram that provides an overview

of a typical Protomo project. As can be seen from the document, deliverables exist in the process that have not been included in the case study: these are deliverables that Protomo does not set as goals, but recommends that the teams produce them for their own use.

Protomo Project Model (modified from original document: interview with Facilitator 15.5.2012)

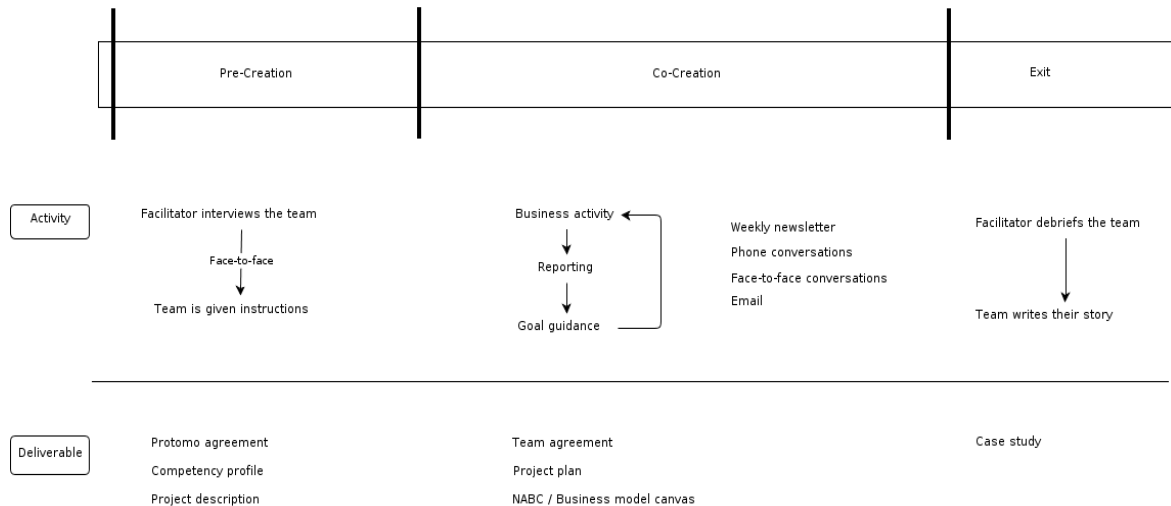


FIGURE 19 Protomo project model

4.7 Analysis of the results

This sub-chapter discusses the strengths and weaknesses found during modelling the process. Some of them can be identified from the process model, however some were found out during the interviews from which the process model was constructed. The evaluation framework proposed in chapter 2 is used to analyse the results. The framework is shown in figure 20.

Modelling the process yielded knowledge of various problems within the process. Three main shortcomings were discovered via the process model: no technology choices were made or enforced for the communication events, no feedback on progress was gathered, and no standard procedures were in place for communication. These seem to indicate a lack of procedural planning.

In practice, the goals were perceived as being concrete enough and not too generic by the interviewees. However, not all goals had been discussed with the interviewees, and as some of the goals had not been made clear full marks cannot be given for strategic information. On the goals that had been discussed, the interviewees were happy to report that they had contained enough background and strategic information.

A coordinator role had been allocated to the process as a responsibility of the facilitator, and was an integral part of the facilitator's job. A positive fact was, that the process could cater to the differing needs of various cultures. Although it eluded the formal process model, this was to be found in the multi-language documentation and in the potential for flexibility in practice.

Possibly due to the lack of standard procedures, no habitual routines for producing deliverables had been established. The process was supposed to work on the basis that the incubatees voluntarily produce the deliverables as they develop, however in practice this had been given a lower priority than expected.

Documentation of the goals was not successfully maintained. However, when it was discussed during the interviews, various documents were immediately updated. Also a plan for documenting progress and goals was initiated. This can be seen as a positive impact by the modelling process, which drew attention to the weaknesses of the process. Modelling the case process proved to be beneficial, even had the model not been finished and evaluated.

Efficient technology choices have been made			✓
Goals are discussed		✓	
Goals are concrete enough	✓		
Goals are not too generic	✓		
Goals contain enough strategic information		✓	
Feedback procedures are in place			✓
A coordinator role is allocated	✓		
Information on progress is communicated	✓		
Standard procedures are in place			✓
Habitual routines are established		✓	
Documentation is maintained		✓	
Cultural considerations are taken into account	✓		
	Considered and executed	Considered, not executed	Not considered, not executed

FIGURE 20 Evaluation results

Some proposals for further development of the process can be made. Firstly, the collecting feedback should be planned. The feedback mechanism should be designed so that the feedback activities will become part of a habitual routine. Supporting the first proposal, secondly it is recommended that standard procedures for communication be put in place. For example it should be specified how the updates for the project plan are delivered, and what the deadlines for each deliverable are. The third proposal involves the technology used. As the process relies on virtual means of communication, it is proposed that the technology used for each communication event involving deliverables is chosen and enforced, in order to create a clear working environment.

5 Conclusions

This thesis set out to find if process modelling was an effective method for discovering weaknesses in goal communication. First, concepts in the area of goal communication within a virtual team were discussed, and issues relating to these were set out. From these issues, a framework and scoring system were constructed for evaluating a goal communication process. The modelling method and technique were then described. It involved following a workflow set out by JUHTA (2008), and a methodology proposed by Holt (2009). The modelling technique chosen was UML. Before presenting the results of the case study, the case organization, Protomo, was discussed. The discussion showed that Protomo is an organization reliant on electronically mediated communication. The process model was then produced in iterations through interviewing members of the case organization and examining the existing documentation relating to the process. An evaluation of the process was made according to the framework set out for the purpose.

The benefits of choosing a process modelling approach in addressing the problems of goal communication were found to be two-fold. Firstly, the procedural issues could be identified directly in the process model. Secondly, many other issues were identified during the interviews. In these interviews, the still incomplete process model also proved conducive to clarifying the rest of the process.

Some views in the seven-view methodology yielded little direct value to the evaluation. The most direct value was produced by the process behaviour view and the information view. The information view gave insight into the content of the instructions given to the team, and also reminded the case organization that the deliverables need to be clearly defined in order for the goal communication to be unambiguous. The process behaviour view showed the process at the workflow level, which made the analysis of procedural issues possible.

The other views were invaluable in the modelling process. The requirements view and the process instance view gave a higher-level understanding of the process, which helped in the correct division into sub-processes. Their anticipated worth in validating the process can not be perceived in this process

model, due to the simplicity of the process and the inter-dependency of the sub-processes. The process content view made possible the internal analysis of the size of sub-processes, loosely confirming that the division into sub-processes was correct. The process structure view presented the terminology of the process, and worked as a visualization tool for the abstract level process during the interviews.

The stakeholder view did not bring much value to either the evaluation of the process or to the construction of the model, however in the interviews it was found to be useful to give attention to the attributes and responsibilities of each stakeholder. This served to clarify the relationship between the facilitator and the founder in practice.

The research question was:

“Is a process modelling approach an effective method in addressing the problems of goal communication?”

From the results, it can be concluded that the process modelling approach could be effective in evaluating and addressing the problems of goal communication. This is based on the fact that after modelling the case study process, enough information had been accumulated for it to be possible to evaluate the process according to the proposed framework. From this evaluation, several development suggestions arose, and the case company began to actively improve the process.

However, the research only comprised of one case process, and more research is needed to confirm the method. Also, all of the knowledge used in evaluating the process could not be found in the process model as such, but was accumulated during the modelling of the process. This can be seen as a weakness of either the chosen modelling process and/or level of abstraction, or process modelling as a method. Further research involving different modelling processes and levels of abstraction is needed for confirmation.

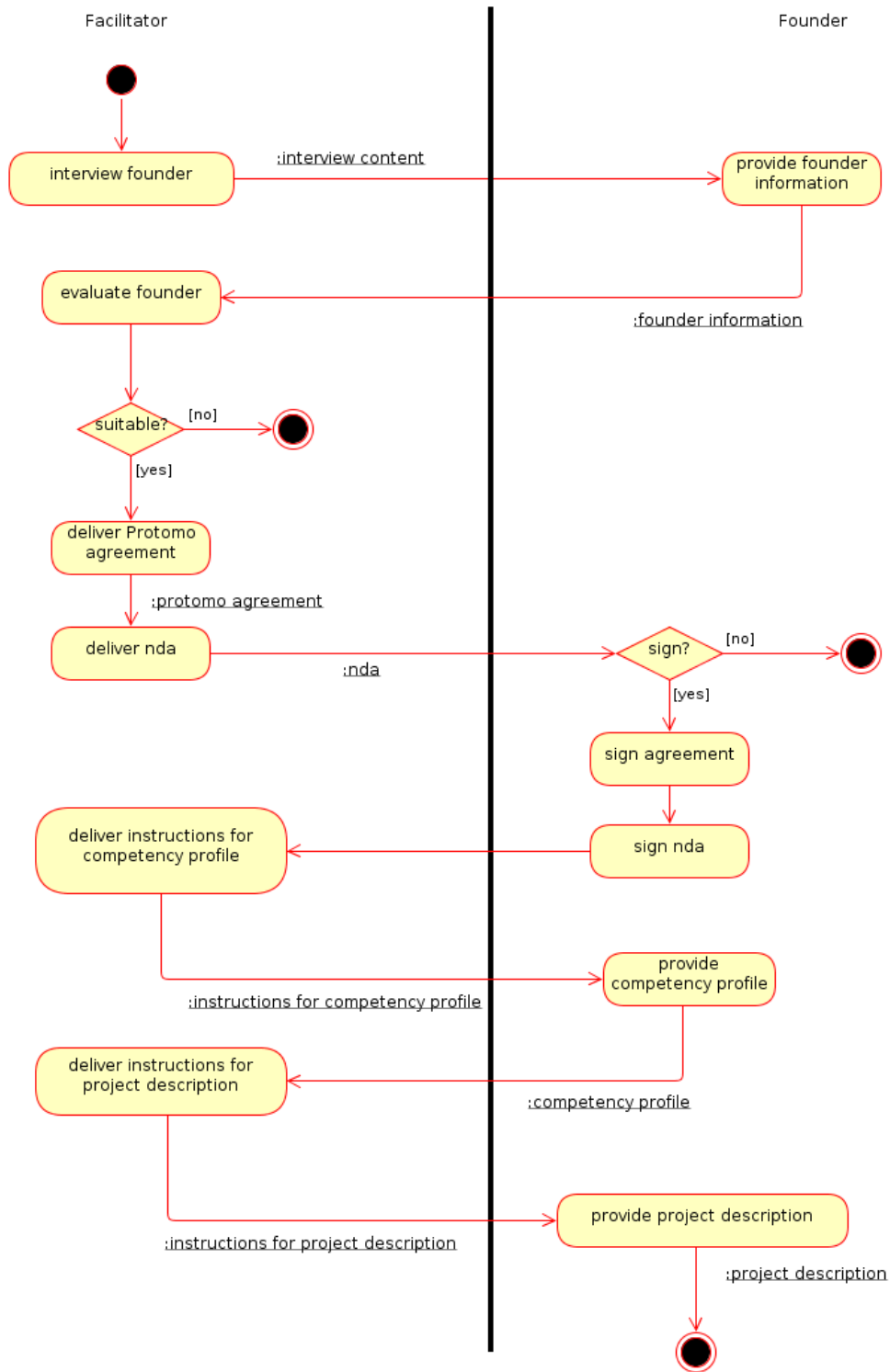
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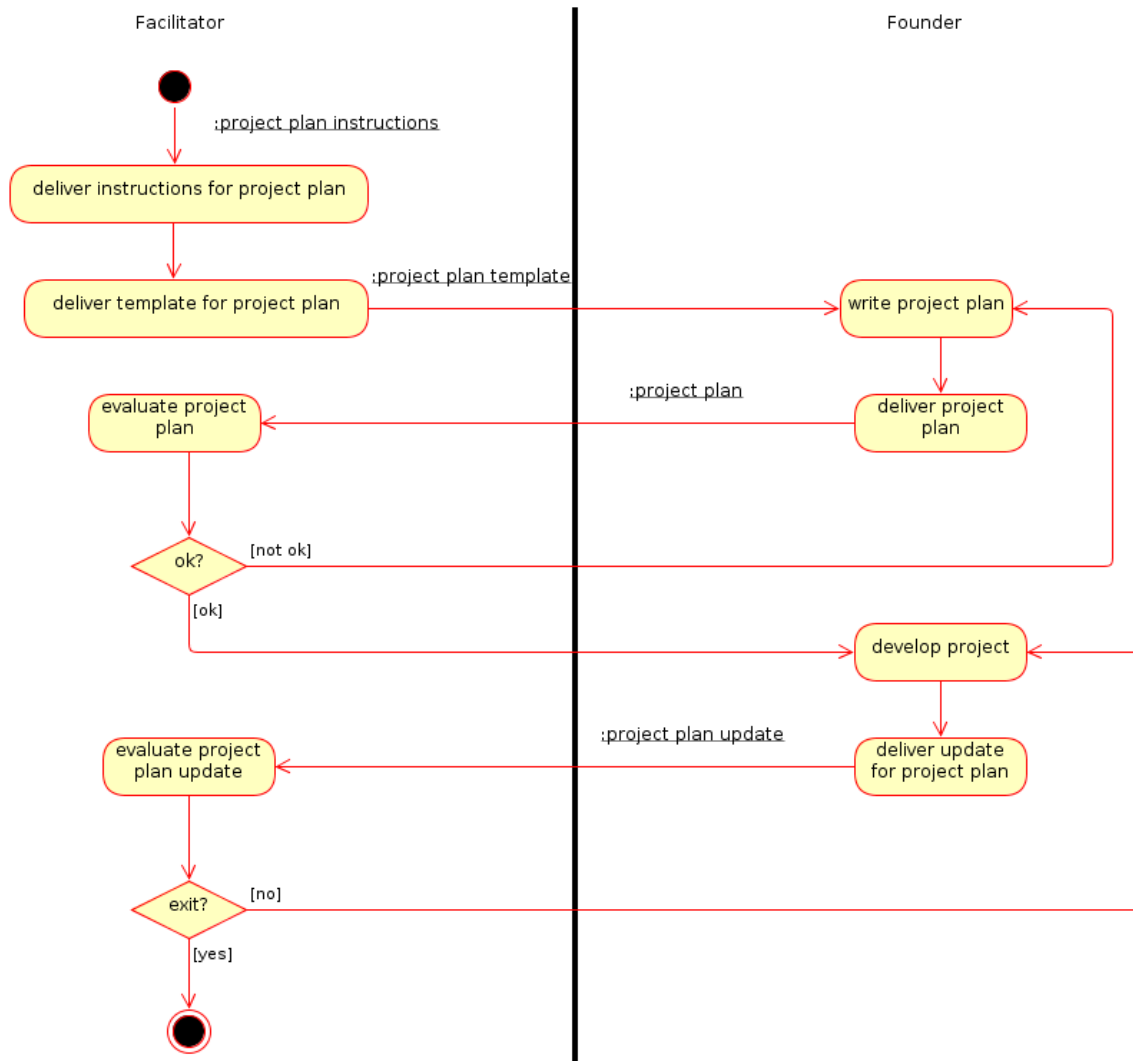
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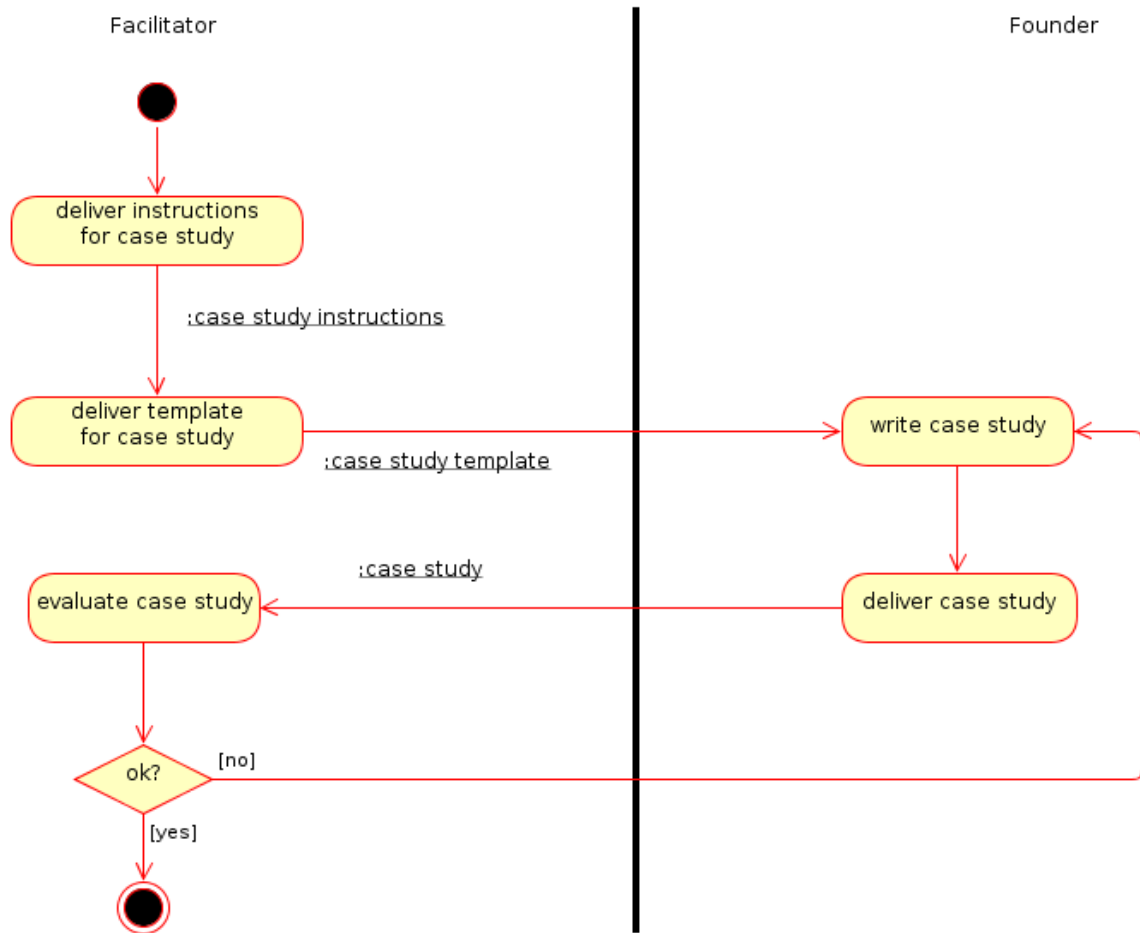
APPENDIX 1 ACTIVITY DIAGRAM: PRE-CREATION



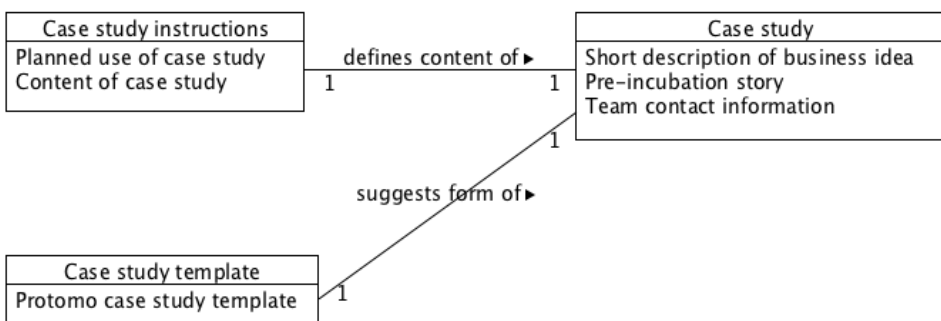
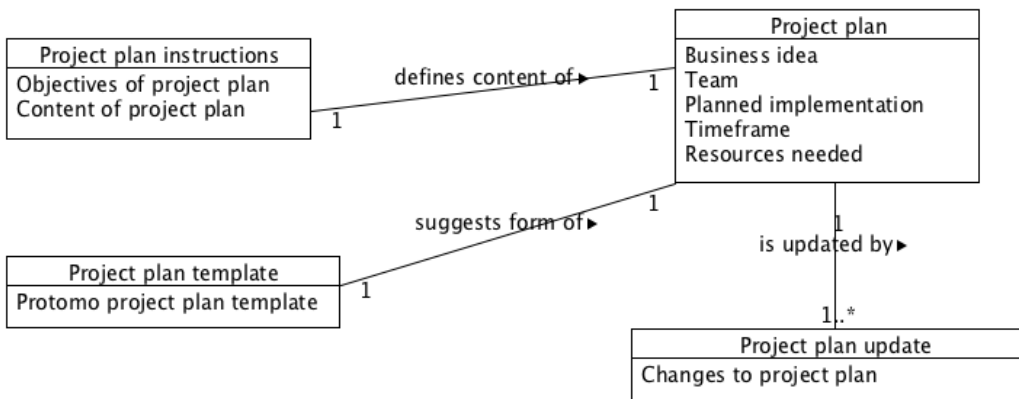
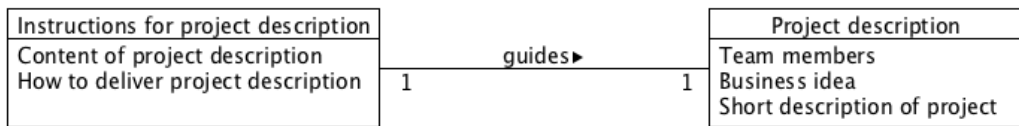
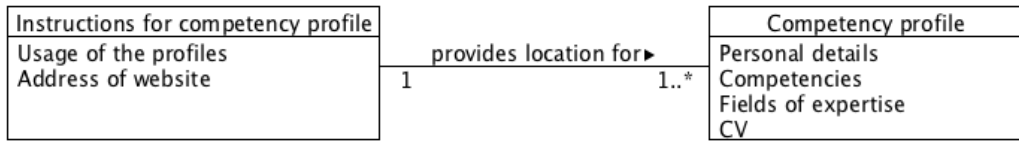
APPENDIX 2 ACTIVITY DIAGRAM: CO-CREATION



APPENDIX 3 ACTIVITY DIAGRAM: EXIT



APPENDIX 4 INFORMATION VIEW CLASS DIAGRAMS



APPENDIX 5 PROCESS CONTENT VIEW

