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GOAL HETEROGENITY IN AN INTER-ORGANISATIONAL PROJECT

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Combining the social and technological sides of innovation

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Abstract

This paper analyses the role of goals for resource development in an inter-organisational project. The theoretical framework is centred on resources and actors of the Activity-Resource-Actor (ARA) framework of the Industrial Network Approach and in particular the Resource-Actor intersection. The point of departure is taken in the project management literature arguing that one single project goal should be formulated in the beginning and kept all the way through projects. By using an in-depth case study of an inter-organisational research project, an opposite picture with regard to goals is shown. This particular case shows a multiplicity of goals. This project has two different, but connected and parallel, goals and the members relate differently to the two project goals. In addition the members have their individual goals with participating in the project, which at times become developed during the project. With basis in the resource heterogeneity assumption, the paper ends with suggesting goal heterogeneity of actors as a facilitator of resource development in inter-organisational research collaborations. It is for future studies to explore goal heterogeneity further.

Key words: Resource combining, goals, inter-organisational projects, heterogeneity.

INTRODUCTION

In recent decades, a number of studies have shown that collaboration is central to innovation (Håkansson and Waluszewski, 2007; Håkansson and Ford, 2002; Powell et al., 1996; DeBresson and Amesse, 1991). From a firm perspective, the significance of working with customers or users (Gruner and Hornburg, 2000; Von Hippel, 1988) as well as suppliers (Wynstra and Pierrick, 2000) has been pointed at. In addition, there are many examples of fruitful collaborations among firms and academic partners (Adler et al., 2009; D'Este and Patel, 2007; Jacob et al., 2000).

These collaborations need to be organized somehow and one way to organize innovative activity is in projects, and especially projects involving several actors, so called inter-organisational projects. Projects are by definition task or goal oriented (Engwall, 2002; Lundin and Söderholm, 1995). Undoubtedly the goals play a critical role by stimulating the outcomes from a project. When the goals are set high, the results of the project members' achievements may, according to Christensen and Kreiner (1997), become greater than if the goals were set at a more moderate level. Similarly, Sundström and Zika-Viktorsson (2009) concluded that innovation in a product development project seemed to benefit from high goals, including time pressure and external requirements, but in such projects it needs to be a tolerance for mistakes.

From a project management perspective, it is typically argued that one single project goal should be formulated in the beginning and kept all way through in order for the project to be regarded a successful project (e.g. Mantel et al., 2001). However, goals in an inter-organisational setting are a much more complex issue than that. The different actors involved in a project may have their own goals with joining a project and in addition each actor may have different goals (Cantú et al., 2012; Corsaro and Snehota, 2011). To fulfil the goals of a project, resources are needed. Each actor may access and contribute with resources to be used to achieve the goals of a project. To make the most out of them, interaction among the participating actors and their resources is crucial, and in this process resources become developed (Håkansson et al., 2009). Hence, resources are needed for achieving goals but it could also be the other way around, knowing what resources are available can form the starting point for formulating goals (Boddy, 2009). Hence, goals and resources are related and this relatedness forms the starting point for the aim of the paper:

The aim of the paper is to analyse the different goals of an inter-organisational project and its participating actors, and discuss the role of goals for resource development.

The paper uses a case study to capture various aspects of goals in an inter-organisational project. The project is a research project from the plant biotechnology field and it involved four actors

having their own goals in the project besides the project goals. The case study covers in-depth aspects of the process of resource development to the various goals.

The structure of the paper is as follows. The first part contains a theoretical framework on actors and resource combining in business networks. This is followed by a description of the method used. The next section contains the case and an analysis of the goals of the project and participating actors. The paper ends with a concluding discussion on goal and resource heterogeneity.

THEORETICAL FRAMEWORK

Technological innovation has been thoroughly analysed as resource development based on the Industrial Network Approach (Baraldi et al., 2012; Chou and Zolkiewski, 2012; Gadde et al., 2012; Baraldi et al., 2011). The resource dimension of the Activity-Resource-Actor framework (Håkansson, 1987) has its basis in an assumption on resource heterogeneity. The resource heterogeneity assumption goes back to Penrose (1959) pointing out that the value of resources are not once a given but has to do with the services that they can render. Viewing resources in this way is also related to the theory of teams (Alchian and Demsetz, 1972) pointing at that the value of team is more than the sum of its parts. Accordingly, resources are entities, which become resources, only as long as they have a known use value to somebody (Holmen, 2001; Håkansson and Snehota, 1995). Hence, to be regarded as resources, entities need to have meaning to an actor and the value of a resource depends on how it is combined with other resources (Håkansson and Waluszewski, 2002). In relation to an inter-organisational project, Lind et al. (2012) pinpoint how the resource base of which resources are to be combined becomes greater by opening up the project for boundary-crossing resource combinations.

As pointed out above, resources only have meaning in relation to actors. Consequently, resources and actors are strongly interrelated:

“The resource dimension is inextricably interwoven with the actor dimension and at the intersection of the actor and resource dimension is the concept of a solution, defined as a combination of resources that has a meaning for an actor in the sense that the actor perceives it to serve some purposes.” (Cantú et al., 2012, p. 140)

From this quote follow important remarks about the actor-resource connection. In particular the concept solution that is defined as a combination of resources that is perceived to serve some purposes. Before coming back to resource combinations for a particular goal, let us look into

actors and their goals in more detail. With the basis in the IMP research tradition, an actor is inbuilt in interaction processes. In a traditional view of actors, an actor is defined as an individual or collective entity that acts purposefully. In explaining an actor in an interactive perspective, Håkansson et al. (2009) brings two common features of actors in interaction. First, actors' existence and characteristics depend on their counterparts of the network. There is thus an extreme variety of actors. Second, all actors have partial but deep knowledge as a basis for their interactions. Hence, an actor becomes an actor "when its conduct impacts the counterparts and induces actions and reactions" (Snehota, 2011, p. 6). With the basis in the assumption of bounded knowledge, also Snehota (1990, p. 85) pinpoints how actors interact with others and in this process both the ends and means of actors can change: "Future ends and means can be unknown and unknowable. The desirable goals can be difficult to articulate or even to identify, the means known can become irrelevant and new means can be conceived."

There may be many different reasons for why actors develop relationships with other actors. Independent of reasons, both parties need to believe and expect that they can develop together in the relationship (Håkansson et al., 2009). It means that when interacting with others, each actor has some kind of idea with the goal with that specific interaction. In a specific relationship, the actors' goals with interaction may be both similar and different, regarded as alignment and misalignment with regard to problems and solutions (Corsaro and Snehota, 2011). By taking a focus on firm strategy, Baraldi (2008) framed the potential differences with regard to goals and resources in a relationship as a matching process. The goals of firms collaborating need to match at least on a general level. Achieving some form of total congruence of goals is not to strive for from a business network perspective since managing *the* network is undesirable (Håkansson and Ford, 2002).

The goal matching could take different forms depending on how goals are nested. Individual actors can have different goals internally, while collaborating actors may have similar and different goals that are nested in various ways. One straight-forward pattern of goal nestedness is when one goal is regarded as a sub-goal or a means to another goal. The complexity of goal nestedness increases when there are more than two actors involved in a cross-relational setting (Ritter et al., 2004) such as an inter-organisational research projects e.g. taking user needs into account (Barlow et al., 2006).

To sum up, the actors of an inter-organisational project most likely have similar and different goals that at least on a general level need to match. The view of goals and resources may change over time and the complexity increases based on the number of actors collaborating to combine resources to be regarded as solutions to their particular goals as well as common project goals.

RESEARCH METHOD

Focusing on a project as study object for goals has many reasons. First of all, a project is by definition goal-oriented, according to Engwall (2002, p. 275): “The project goal provides direction. It focuses on a preferred state in the future. It redirects attention from other issues to problems and solutions related to the project”. Therefore, the goal may be possible to understand by studying a project and its process. By setting the focus on an inter-organisational project, where the members belong to different organisations i.e. parent organisations, additional aspects of goals can be captured. The individual project members typically have goals in accordance with their parent organisations even though there may be a discrepancy between the parent organisation and individual projects (Artto et al., 2008). Some of the resources needed may be built up jointly, while the different members and their parent organisations contribute some.

The empirical basis of the paper is a case of an inter-organisational research project. The project in focus is the so-called winter oats project, which had members from four organisational units: two university departments, a company and a co-operative and were involved during 2001-2006. The illustrations of resource development to the different project goals are selected to demonstrate the collaborative research process towards the joint project goals and the individual goals of the project members. The members of the winter oats project are made anonymous since the joint research process and the role of the goals are possible to follow without knowing the exact actors. The national context of the project is explicit because it is essential for understanding the very purpose of having the inter-organisational research project in focus.

To be able to capture the various aspects of the goals of an inter-organisational research project, a case study has been used as an overall research design. Case study research is well suited for studies that require an in-depth and multi-dimensional view of the phenomena concerned (cf. Easton, 2010; Yin, 2003; Eisenhardt, 1989) and is thus suitable for analysis of the role of the goals in an inter-organisational project. The study can be described as conducted with an abductive approach (Alvesson and Sköldbberg, 1994), in particular building on “systematic combining” (Dubois and Gadde, 2002). Systematic combining takes the non-linear elements of conducting case study research into account and acknowledges the iterative elements of going back and forth between the theoretical concepts and empirical reality. The specific interest in goals emerged as the theme of interest during the study, in interplay with the analytical framework mainly focusing on resource combinations and the case study.

The case study relies on a combination of several sources of data, mainly personal interviews, specialist literature, books, and articles in business press, newspapers and information from the Internet, although interviews can be regarded as the principal source. In total, the study builds on 16 “semi-structured” interviews (Bryman and Bell, 2007) with researchers involved in or collaborating with the winter oats project. The interviews lasted between one and two hours and

were performed at the informants' offices. All the interviews were prepared by formulating a number of themes (Kvale, 1997) that provided guidance during each interview.

To ensure the trustworthiness of the study, three criteria have been used. First, member checks (Lincoln and Guba, 1985) have been performed. The empirical material has been reviewed with the respondents to investigate whether the data have been correctly understood and interpreted; the ones best qualified to tell are the people who have been interviewed. Second, triangulation of data sources (Yin, 2003) and informant triangulation (Kvale, 1997) were pursued to ensure the content of the data. Third, draft papers and results have continually been presented to other researchers, allowing review and elucidation of the study, method and results. In conclusion, the study underlying the paper can be considered trustworthy on the basis of member checks, triangulation and elucidation.

THE CASE OF AN INTER-ORGANISATIONAL PROJECT

This project involved around eight persons, varying to some extent over its different phases. It had members from four organisations: two university departments, a company and a co-operative, and they are described below, followed by a description of goal formulation and how resources were developed to the different goals of the project in addition to the project members' individual goals.

The project members and funding

Of the four organisations taking part in the project, one was *the Farmers Supply and Crop Marketing Association*, a co-operative where the majority of the members are farmers. The co-operative's development division had an interest in improving certain characteristics of oats, in this case frost tolerance. The second member of the project was a plant-breeding firm, which is international and specialises in plant breeding and developing new varieties and producing seed for customers in cold climate areas. The rationale for this firm to be involved in the project was that it has not been able to breed oats that survive the winters, in spite of several attempts. The cold-resistance characteristics of oats were also expected to be of great interest for farmers, due to the higher yields that would be the result of sowing in the fall instead of the spring and having oat plants surviving sudden weather changes. This is apparently the reason why both the above-mentioned actors initiated, and were involved in, the project.

In addition to these two organisations, two research groups were involved, representing two university departments. One was *the Department of Cell and Molecular Biology*, specialised in molecular biology and conducting research on, for example, organism and plant structure and

function. The other was *the Department of Computer Science*, at another university, specialised in computer science and especially on developing methods and algorithms for structuring and handling huge amounts of biological data. The reason for this involvement from the molecular biologists' perspective was related to their interest in an increased understanding of the functions of the oat genome, while the computer scientists' interest was related to the methods required for handling the massive data set to be generated in gene-sequence information.

The project was financed by three main sources. The first one was a national funding body connected with farming and crops. The second source was the development division of the co-operative, which invested in the cost for sequencing. The third source of funding was a National Research School in Bioinformatics and Genomics, hosted by one of the universities being a project member. This research school funded two PhD students involved in the project and there was one PhD student at each of the participating university departments.

Goal formulation in the project

A traditional way of improving certain characteristics of plants is breeding (also referred to as hybridisation), practised by farmers and plant breeders for centuries. This process normally takes ten to twelve years from initial interbreeding to a new variety. Until today, it has not been possible to develop winter oats with plant breeding for the Swedish climate. There are, for instance, English winter oats, developed with traditional hybridisation methods, but the English winters are milder. However, in contrast to winter crops developed through hybridisation, which requires the cold adaptation to be a monogenetic characteristic, the cold resistance of oats is assumed to be dependent on the interplay among several genes. This made it necessary to combine several different competences in an inter-organisational research project focusing on understanding the cold-adaptation process of oats. Hence, the winter oats project combined the traditional plant-breeding methods with a research process relying on molecular biology and computer science.

Three of the four members of the winter oats project, the Department of Cell and Molecular Biology, the plant-breeding firm and the farmers' co-operative had worked together in prior projects and these three parties were essential to the goal formulation of the winter oats project. The plant-breeding firm knew from experience which characteristics the farmers would appreciate and, of equal importance, what could be done with plant breeding only. The farmers' co-operative contributed experiences from the farmers' needs, which are critical since the farmers are not only the members but also the owners of the co-operative. If the members receive good oat varieties, these might in the end increase their sales. The molecular biologists had in an earlier joint project developed a certain technique that the molecular biologists, as well as the

funding body, were interested in applying further. These three perspectives formed an important background to the goal formulation.

Based on discussion among these three parties, the overall goal of the project became to develop oats that survive the Swedish winters, i.e. to develop Swedish winter oats. This was regarded as an ‘impossible’ goal, since there had never been any oats surviving the Swedish winters. Nonetheless, it was considered a challenge and something all the three parties had an interest in, although in different ways. In detail, the goal meant that there were some special characteristics of oats which were to be understood genetically. The new knowledge could then enrich the breeding process required to develop a new oat variety. The characteristic in focus was the ability of oats to stand cold weather – both cold temperature and frozen land with no access to water. The overall goal was translated into the specific goal of genetically understanding the cold-adaptation process of oats and thereby potentially identifying the genes involved in that process.

To be able to fulfil the goals of the project, working with gene-sequence information became an obvious choice. The three project members realised that in order to draw conclusions from the gene-sequence data, appropriate methods would be needed, and this was the background for establishing contact with the Department of Computer Science and eventually involving it in the project. Before contacting the computer scientists, the farmers’ co-operative knew that this university had started specialising in the new discipline of bioinformatics. The computer scientists expressed an interest in joining the project, their motive being to get access to real biological data – which is a promising condition for development of new algorithms and databases, and was thus in their interest. See Figure 1 for illustration of the project.

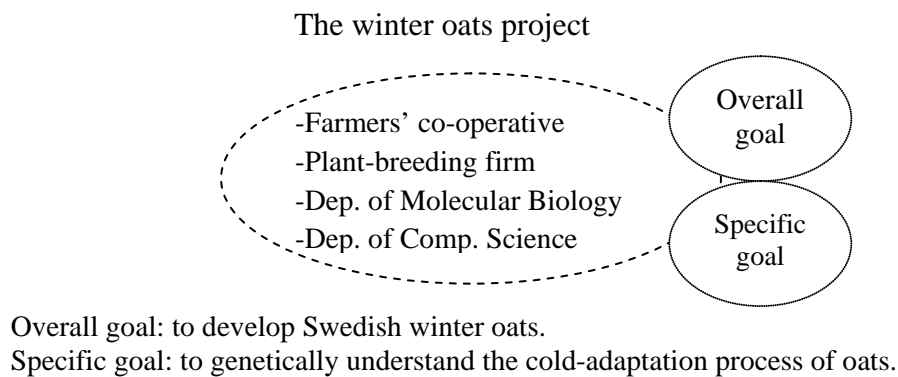


Figure 1: The goals of the winter oats project.

Almost all the research activities in the project were directed to the specific goal of the project, and only a few were directly related to the overall goal of the project. The use and development

of key resource to fulfil the project's overall and specific goals, respectively, are described below.

Resource development to the project goals

The overall goal of the winter oats project was clearly formulated – to develop winter oats for the Swedish climate. Already from the project's start, its members addressed this goal in one way or another. An initial attempt was to test whether any of the oat varieties that survive winters in other cold climate parts of the world would survive the cold climate of the Swedish winters. These tests were done with traditional breeding methods. Winter-oat varieties from the US and Russia (R_1) were accessed via the Internet and oat varieties from the plant-breeding firm (R_2) were used in these tests. The long-term plan of the combination was thus to pursue the overall goal of the project.

The tests actually resulted in oat plants that survived the field studies (R_3). The plant-breeding firm had never tried these particular oat varieties before with the intention to develop winter oats. However, the firm continuously tests oat varieties for the purpose of developing new ones, and investigates in this work which varieties survive and which have certain characteristics. Thus, the oat plants surviving the field studies may be considered as a resource developed to the overall project goal. Of equal importance, this resource (R_3) became useful in resource development towards the specific project goal.

The overall goal was translated into a more specific goal – to understand the cold-adaptation process of oats and therein identify the genes that regulate that process. Many of the research activities of the project were made to fulfil this goal. In order to reach this specific goal, a critical step was to generate gene-sequence data. To do so, the results from the field tests (R_3) were used as a point of departure, and test tubes were prepared for sequencing (R_4). Hence, the same resources as discussed above were used for another purpose within the project.

With the prepared test tubes, gene-sequence data¹ were generated. However, what resources to use in order to develop the data were not known in advance. None of the project members had any previous experience in working with sequencing data. Consequently, it was an obvious step to use facilities external to the project and, after searching for alternatives and evaluating them, a German sequencing firm was selected as a supplier. The delivered gene-sequencing data (R_6) produced at the sequencing firm were very important for the specific project goal. To get a grip on the produced data, which presented some difficulties, additional information from the

¹ Gene-sequence data contains the information of the nucleotide bases of a genome under certain circumstances but cut in small pieces. The challenging task is to assemble them into genes and come to conclusions regarding their functions.

sequencing firm was needed and manuals from the Internet were used. It was mainly the molecular biologists and the computer scientists that were involved in the work on the gene-sequence data.

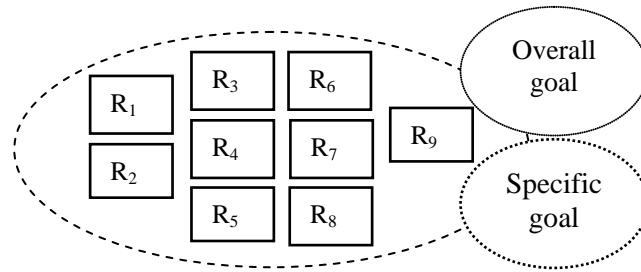
In the initial analysis of the gene-sequence data, the computer scientists' methods of handling data and building databases (R_7) were central, and while analysing the data a particular database (R_8) was built simultaneously to structure them. This database may be regarded as a resource developed as a tool for understanding the gene-sequence data. On the other hand, the database does not have any value without the data, so the data are a tool for developing the database.

Hence, the data and the database are strongly interrelated since they build on and are understood in terms of each other, and they have an intrinsic value for both the molecular biologists and the computer scientists. From the molecular biologists' perspective, the database is indeed a tool developed in order to better comprehend the data. This resource view of the database is interesting, since the opposite view of the database as a result is held by the computer scientists – they see the data as a resource in order to develop the database. Hence, both resources were respectively an end and a means for the two kinds of project members.

To be able to analyse the data further, the researchers compared them with publicly available research results in databases on the Internet. They also managed to compare another ongoing research project, the *Arabidopsis* project (R_8), which was a parallel project of the molecular biologists. Comparing the gene-sequence data of oats with data regarding the genome of other plants and specifically the model plant *Arabidopsis* formed the basis for pursuing the specific goal of the project. During the data analysis, the researchers identified some potential cold-associative genes (R_9), and these were the result coming closest to the fulfilment of the specific project goal, see Figure 2 for the key resources of the project.

In addition, the researchers identified other oat genes, some of which were concluded to be non-cold-related and some to have a positive impact on health, referred to as health-related genes. Hence, the project gained an understanding of the genome of oats and identified some potential cold-adaptation genes of oats, which formed the basis for fulfilment of the specific project goal.

The winter oats project



Key resources:

R₁ – Winter-oat varieties from US and Russia.
 R₂ – Oat varieties from the plant-breeding firm.
 R₃ – Oat plants that survived the field tests.
 R₄ – Prepared test tubes.
 R₅ – Facilities of German sequencing firm.

R₆ – The gene-sequencing data.
 R₇ – Methods of data handling.
 R₈ – Results from other research projects.
 R₉ – Potential cold-associative genes of oats.

Figure 2: Key resources used in the project.

The knowledge of the oats genome in general and of the cold-adaptation process in particular has formed the basis for publications in scientific journals. The overall goal is still some steps away, but the ongoing field tests in combination with the increased knowledge regarding oats was seen as good starting points for future Swedish winter oats.

Resource development to the individual goals of the project members

Some of the project members used resources developed in the project in relation to their individual goals. This further use lied outside the scope of the project, but did not conflict with the project – rather the opposite, since there was a potential for contribution back to the project. Below, three illustrations of resource development to individual goals involving the four project members in different constellations are discussed.

As described above, not only were some potentially cold-associative genes found, but there were also other genes identified as *non-cold-related*. The computer scientists managed to use one of these non-cold-related genes in developing a ‘gene-family tree’. A gene-family tree is helpful to investigate which other plants the oat most likely is related to and, as a consequence, most similar to. The interaction between the computer scientists and the molecular biologists was central in the formulation of this task as a basis for identification of the non-cold-related genes as well as for formulation of the task of developing a gene-family tree, in terms of what plants it is of value to compare oats with, and which genes to compare. This task of developing a gene-family tree may on the one hand be seen as corresponding well to the computer scientists’

individual goal of building methods for comparing large data sets. On the other hand, the gene-family tree has demanded a botanical understanding of plants, which was totally new to them, and can thus be seen as a partially new goal to them.

Another example of how a resource developed in the winter oats project became useful in relation to the individual goals of the project members is the health-related genes. Those genes, regulating e.g. cholesterol levels, were not possible to relate to the goals of the winter oats project, but two of the project members considered them to be interesting and usable in another setting. The farmers' co-operative and the molecular biologists used this gained knowledge as a starting point in a new collaborative research effort with another university department specialised in food science. In this effort the focus is on healthy food, and oats are among several groceries in focus. This new collaboration was in line with the individual goals of both these actors – the farmers' co-operative in terms of learning more about oats as a healthy crop that potentially will benefit their growing oats, and the molecular biologists in terms of gaining additional understanding of the genome of oats.

A third example shows how the plant-breeding firm managed to use results from the winter oats project towards its individual goals of developing proper breeding markers for oats. It was a particular characteristic of the gene-sequence data, their repetitiveness, found during the data analysis that may qualify as the starting point for breeding markers. The repetitiveness characteristic did not particularly relate to the specific project goals, but it became useful in an English plant-breeding programme in which the plant-breeding firm took part.

Summing up, the winter oats project has shown how the project members have different goals with participating in the project and how they relate in different ways to the project goals. The case has also shown how resources are developed both to the overall and specific project goals as well as how some results of the project have been further pursued to fulfil the existing and emerging individual goals of the project members.

ANALYSIS OF GOALS

In the winter oats project, the project goals referred to as the overall and the specific goals are nested in different ways. The specific goal can be seen as a means or a step in connection with the overall goal. Also in the time perspective they are connected; pursuing the specific project goal can be seen as a stage towards fulfilling the overall goal of the project. In addition, the two goals are parallel in that they both provide guidance or direction (Engwall, 2002) for the resource development to the goals. Hence, the two goals are worked to in parallel during the project – as seen in the example with the oats field tests, which both were a way of directly pursuing the overall goal and functioned as input to the research process to the specific goal. The goals are

also parallel in that the specific goal is an end in itself, especially for the two research departments involved.

Having two project goals entails obvious risks of having a diverse understanding of the project, and not least what should be achieved and who should do what in the project. However, in the case of the winter oats project the two project goals, being connected and parallel in character, seem to have functioned as a unifying force. The overall goal has functioned as a vision for the project, and the project members have managed to work jointly, mainly to the specific project goal. At a closer look, the specific project goal in the winter oats project may have been more of a latent project goal (Christensen and Kreiner, 1997) and therein the visionary aspects of goals are combined with more concrete aspects of aiming to understand a very specific aspect of the oat genome.

Project goals can seldom be completely formulated at the start of a project. It is then crucial to be able to adapt the methods to the current project goal, e.g. if an unexpected problem arises. The winter oats project, the overall and the specific goals appear to have been formulated in the beginning of the project and kept all the way. One possible explanation for this may be, as argued above, that they are visionary or latent in character. But through scrutiny, the specific project goal was broken down for several research activities – e.g. the difficulties with the gene-sequence data were handled through additional contacts with the sequencing firm and old manuals to understand the facilities set-up. This was not planned initially but a need that arose during the research process. Still, the objective for each research activity was performed to fulfil the specific project goal, which in turn was a step to the overall goal.

Another aspect of the nestedness of the overall goal and the specific goal is concerned with the issue of setting extremely high project goals. As noted earlier, it is argued that when the goals are set high, the project members' achievements are likely to become greater than if the goals were set at a more moderate level (Sundström and Zika-Viktorsson, 2009; Christensen and Kreiner, 1997). The overall goal of the winter oats project can be seen as an extremely high goal, almost impossible to fulfil, and this highly set project goal may have driven the research process to the specific goal further, than if only the specific goal had been formulated. The overall goal also represents a clear future application of knowledge, which could have contributed to creating high achievements from the project. The overall project goal was also the rationale for the plant breeding firm and the farmer's co-operative to be involved in the project.

The formulation of project goals is likely to have an impact on the results of a project. However, it may also be the other way around; the probable achievements of a project may influence the formulation of the project goals. While the overall goal of the winter oats project was concluded to be impossible to fulfil, the specific goal was regarded as a likely achievement of the project. Hence, the overall goal may have been refined into a specific goal in order to suit the potential

results potentially coming out of the project, also due to the project members' individual goals in taking part in the project.

Hence, although the risks of having a blurred view of what to be achieved, formulating two goals that are connected and parallel in character appears to be a fruitful basis for an inter-organisational project. The goal nestedness was not a given initially in the project but is something that emerged. Importantly, this goal nestedness may have functioned as a unifying force and thereby as a facilitator of resource development in the project.

The project members of the winter oats project had their individual goals already when starting the research project and based on those, the project members aimed for fulfilling the two project goals. For instance, the farmers' co-operative had a direct interest in the overall goal, since by fulfilling this goal it can provide its members with an oat variety that will ensure higher yields. In a similar vein, the plant-breeding firm had a direct interest in the fulfilment of the overall goal, since it was keen on including winter oats in its assortment. However, the specific goal is to be regarded more as a means to the overall goal by the farmers' cooperative and the plant-breeding firm.

In contrast, the research organisations, molecular biologists and computer scientists, were directly interested in pursuing the specific goal of the project, and more indirectly interested in pursuing the overall goal. Both the research organisations were thus directly interested in fulfilling the specific goal, but in two different ways. The molecular biologists were directly interested in pursuing the specific goal – and in fact the project's specific goal corresponded very well with its individual goal – while the computer scientists aimed at developing the methods for pursuing the specific goal and thus only indirectly interested also in the specific project goal. See Figure 3.

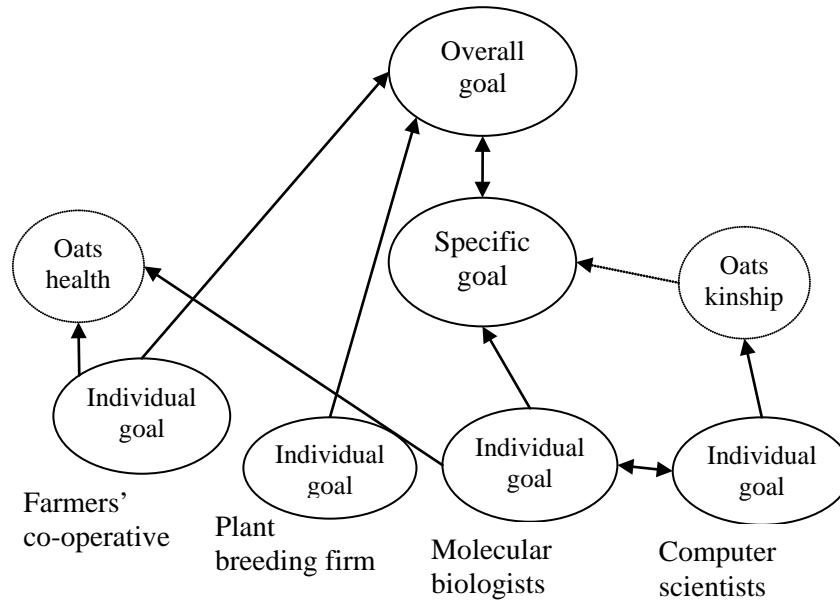


Figure 3: Actors and goal nestedness of the project.

Some of the resources developed in the project that could not be used directly to any of the project goals were pursued by the project members in other settings – as in the instances of the farmers’ co-operative and molecular biologists working efforts based on the health-related genes, and the plant-breeding firm pursuing a certain character of the data in a plant-breeding programme. In these cases the project members managed to use resources developed in the project to pursue their individual goals, which in turn may develop the resources further. It seems important to allow the project members to develop their individual goals based on results produced in a certain project as in the example with the computer scientists, who managed to use a fraction of the gene-sequence data to study kinship of oats. This individual goal can be seen as emerged during the project due to the available resources.

CONCLUDING DISCUSSION

Instead of formulating one single project goal as recommended for in the project management literature (e.g. Mantel et al., 2001), this particular case shows multiplicity in terms of goals. There are different project goals formulated in overall and specific terms, the goals are broken down for individual research activities and depending on the results of one activity the goal for the subsequent activity is formulated. There is evidence for how the participating actors’ goals emerge during the resource development of the project, as in the instance of the computer scientists that became interested in the family tree application. Identifying differences with regard to goals among collaborating actors is also in line with other researchers (Cantú et al.,

2012; Corsaro and Snehota, 2011). However, all the different goals are not unrelated; they are nested in different ways. This goal nestedness made it possible for the project members to relate to the goals in different ways. Hence, the emergent nestedness is an important aspect of having many different goals in a project.

From a network strategy point of view, Baraldi (2008) identified matching of goals and resources as a crucial task. In this project, the emergent goal nestedness can be seen as a way of matching the project participants' goals since they all had their individual interests. Implications for research and development managers following from this study regard the view of goals and in specific seeing a potential in emergent goal nestedness. Emergent goals are difficult to plan and foresee but is something management needs to be open to during inter-organisational research collaborations. By allowing project participants to develop their individual goals but relate them to the project goals, novel resource combinations as well as goals may develop.

By looking at this particular inter-organisational project, it is possible to argue that the multiplicity of nested goals has facilitated resource development. With basis in the assumption of resource heterogeneity, the multitude of goals of an inter-organisational project can be framed as "goal heterogeneity". Goal heterogeneity is then strongly related to resource heterogeneity and has to do with actors combining their heterogeneous resources to different but nested goals. These goals may be individual as well as common project goals. Hence, goal heterogeneity has to do with different goals driving the interaction among actors but is different from just having many goals. Goal heterogeneity also has to do with the many different goals being nested in various ways. Similarly to solutions as defined by Cantú et al. (2012), goal heterogeneity is a way of framing the connection between actors and resources of the Activity-Resource-Actor model. Goal heterogeneity may be a mechanism that facilitates resource development specific to research collaborations developing new knowledge, as in this particular project in which both firms and research organisations were involved. For future research, it would be interesting to further the understanding of goal heterogeneity, both in terms of a connection between actors and resources and as a facilitator of resource development.

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