

Developing Process Research Through Multi-Case Methods in Network Research

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Abstract

The network approach to business marketing is based on the conceptual tenets of interaction processes and the developing value-alignments between connected firms. The theoretical perspective of interaction rests on time, process and network context elements that drive research towards undertaking deep case studies. The strong element of change arising from interactions means that single case research, often with the longitudinal reality left unexplicated, has dominated empirical research. In this methodological article we contribute by scrutinizing more explicitly how to implement multiple case research in conjunction with longitudinal process studies in the field of interactive business and network research. A review of extant literature and avenues for conducting process research across multiple cases is critically examined together with a practical exemplification and implications for researchers.

Keywords: constructivism; interpretation; longitudinal data; multiple case study; networks; process research

Introduction

Processes are created as a series of actions leading to a socially known change or development. According to Pettigrew (1997: 338) processes are a “sequence of individual and collective events, actions, and activities unfolding over time in a context.” Thus, processes can be observed within the interactions between two actors, or across multiple actors. But researching processes is difficult because what is socially known or even considered an action or an event is a matter of perspective, or ones’ standpoint, which is also necessarily a social construction. Yet somehow human societies, and their industrial networks, are more than an aggregation of the simple interactions between two actors. This strongly advocates for a better consideration of time and process research into the field.

Interactive and network research has dominated the field of business marketing since the early 1980s, especially in Europe and later on in other parts of the world. The approach is based on an understanding that a market is a mutually connected value network instead of the classic conception of unrelated atomistic actors (Håkansson, Ford, Gadde, Snehota & Waluszewski 2009). Researchers of the interaction and network (IN) approach are conducting empirical research by noting the role of interaction, actors, resources and interdependent relationships (Easton 1992; Håkansson and Snehota 1995), as the core conceptual constituents. The IN approach has also been closely analyzing the practice of business in industrial markets to develop a theoretical base.

Thus, the predominant method to develop and inform the IN approach to business marketing has been the single case study. This is a reflection of the centrality of interaction, and so change, in the business network approach (Dubois and Gadde 2002; Easton 1995; Halinen and Törnroos 2005; Quintens and Matthyssens 2010). The issue of network change has more recently been addressed by using a temporal and time-based and process perspective within case studies (Halinen et al. 2012; Halinen et al. 2013;

Hedaa and Törnroos 2008; Medlin 2004). Case studies are well suited to process research because the sequence of events is laid out and given an interpretation first by the informants and then by the researcher.

However, most IN research does not take explicitly the process concept as the way to open up the case to a researcher interpretation. Rather the approach has been predominantly the business relationship (Håkansson and Snehota 1995) and its interaction episodes (Håkansson 1982) including activities between partners (Dubois 1998). In such an approach the relationship becomes the surrogate for the temporal dimension, whereas a process in being within multiple relationships and also longitudinal within new relationships can be a substantially longer set of socially known activities and interactive processes. This longitudinal aspect of process research as a method in business network research needs more temporal theorizing. A further elaboration is how processes combine to form larger social movements (i.e. associated processes become developments or advances). Here not only are longitudinal process studies required, but also multiple and associated case studies appear the relevant method. But how to undertake multiple temporally cognizant case studies that allow theoretical comparison to understand social and industrial developments or advances is hardly understood. Thus, our purpose in this paper is to explore the possibilities of a multiple temporally cognizant case study method.

The multiple case method has rarely been applied. This gap is noted explicitly in the review of 352 articles applying case studies, published between 2002 and 2011 in the 20 top management and business journals where, Runfola et al. (2016) found that only about 6% of the case studies were comparative.

Further, the literature on multiple case studies has until now taken the perspective that increasing the number can improve the transferability of the generated understanding, or in a positivist sense increase theorizing and generalizability. For example, Eisenhardt (1989) reflects a desire by researchers to rise above the specificity and the problems associated with theorizing based on a single case study. Arguments have also been raised that a multiple case strategy will result in parsimonious and less complex theories in comparison to single case studies (Eisenhardt and Graebner 2007). In this perspective only the patterns and associations that fit with all or most cases will be kept and included in the resulting theory. By contrast single case studies may result in more detailed theories adapted to the specificities of the chosen case (Eisenhardt and Graebner 2007). At issue here is the nature of the research and the choosing of the case. Rather than see multiple cases as the means to generate more generalizable research, we foresee a multiple temporally cognizant case study method that generates deeper understanding of larger social developments and advances within business networks.

Case studies are flexible which implies a fit when dealing with complex research topics. Dealing with case data and degrees of conceptual equivalence and difference in the interaction and network approach to business marketing is complicated for a number of reasons. Key issues of the network approach deal with: (i) interactivity and connectedness between actors (Håkansson and Ford 2002), (ii) relationship heterogeneity and resource interdependencies (Håkansson and Snehota 1995), and (iii) the rich character of business situations and network contexts. As a consequence the network can be analyzed from many different angles and perspectives and each giving a different understanding (Araujo and Easton 1996; Håkansson and Johanson 1993; Iacobucci 1996), and there are issues with multiple analysis levels and actors interacting over periods of time. Furthermore, the business network entity is both structurally and organizationally in a constant state of change and emergence (Halinen et al. 2012). Interactive and institutional processes are therefore key issues to tackle. In addition, taking in the key actors that have a specific role to play in the connected relationships needs careful consideration. As the number of networks and multiple players expand, the researcher needs to find a relevant way to limit the boundaries of each case study.

Comparability of case studies is relatively easy concerning firms, whereas network contexts are complex because of the noted heterogeneity between firms as well as with multitude of connections and interdependent resource ties. The study of networks through multiple cases can be done in different ways. But the key to reduced complexity is to develop a theoretical angle and distinction, forming a joint perspective, while keeping different forms of commonality. For a relevant analysis of network change we need to be able to hold together two or more networks that share some commonalities, e.g. in terms of case delimitation and how time periods are defined, to such an extent that they are comparable with each other (Yin 1994). Due to the increased need for delimitation to avoid an overwhelming data-gathering situation from the start, multiple case studies are less flexible than single case studies. Finally, the data should be accessible and rich enough to have comparative quality across the organizations and, importantly, the networks studied.

In spite of these complications, calls have been raised for longitudinal multiple case studies in network context and further methodological guidance regarding the specific challenges related to studies of industrial marketing topics (Halinen and Törnroos 2005; Piekkari et al. 2010; Quintens and Matthyssens 2010), The paper thus takes the perspective of the researcher in tackling issues when conducting multiple case research using an IN approach.

In the following we start by motivating methodological standpoints for conducting qualitative and theory generating case studies of business networks (Langley 1999). We thereafter consider how and why organizing a longitudinal, multi-case approach may improve theory development within the IN approach. Key issues of process research in networks will be discussed as well as the tenets of developing and using multiple case research in order to generate new knowledge about business networks and their inherent change dimensions.

We thereafter illustrate and elaborate our methodological argument by means of an illustrative empirical study. First, we deal with the comparability of research objectives, analysis themes and situation issues. Then, we apply our theoretical framework, focusing on interests, roles and network positions. Finally, we address differences in network context using a temporal unit setting by taking the view of a number of focal actors in their embedded networks (e.g. within their specific network contexts and industries) and noting potential similarities or differences in how these networks emerge and unfold over time in their contexts (Pettigrew 1997; Van de Ven 1992). We end the paper by giving implications for conducting network process research by summarizing and discussing both positives and negatives of the use of multiple case research.

Methodology and methods for case studies in business networks

The case study method usually focuses on ‘how’ and ‘why’ questions in relation to certain phenomena (Yin 1994). Developing a case study is a flexible and evolving method, usually allowing for an overlap of data collection and data analysis in an interactive fashion. Case studies thus mainly apply an abductive approach (Dubois and Gadde 2002). The data collection is not static, but allowed to develop in the light of new insights gained during the research process and the resulting theory is based on patterns among constructs that emerge during the research process. As a result the case study method is also well suited for capturing dynamics and is recommended as especially suited for research in a network context (Halinen and Törnroos 2005), and we would add in longitudinal studies.

In particular, the focus on dynamics in the network suggests longitudinal case studies, whether developed from historical data or by following respondents over time (Quintens and Matthyssens 2010). Four arguments in support of longitudinal studies have been presented by Stevens and Dimitriadis (2004): (i) events can be identified while they take place, (ii) ex-post rationalization is more easily avoided, (iii) decisions can not only be studied in retrospect but also in light of what preceded and how the discussions

went at the time and, (iv) a casual perspective on behavior can be obtained. However the approach also needs good access to data over time in order to secure rich information to uncover change processes. Case studies typically combine various data collection methods, e.g. interviews, observations, secondary data from various archival sources and at times also questionnaires. A case study may thus build upon both qualitative data (e.g. words and narrative stories) and quantitative data (numbers) and can provide descriptions, test theory or generate theory (Eisenhardt 1989). But noteworthy is that unlike a cross-sectional survey, qualitative data is collected in an ordered and also unordered procedure, and then is often interpreted in a different sequence. Thus, a researcher must hold true to a single perspective at each interpretation period to make sense of data. That is in qualitative research time matters in data collection and interpretation periods.

Inspired by Easton (1995), Halinen and Törnroos (2005) identified four major problems associated with case study research in a network context: boundaries, complexity, time and case comparisons. To this set of categories we would add processes, which bring together the complexity and temporal nature of network change within boundaries or contexts. Pettigrew (1997, 338) defined a process as “a sequence of individual and collective events, actions, and activities unfolding over time in a context.” Thus, Halinen and Törnroos (2005) final problem in this paper becomes comparison of processes in search for not only patterns but also actionable knowledge (Bizzi and Langley 2012), as for instance exemplified in the study of buyer and supplier attractiveness by Tanskanen and Aminoff (2015). In the remainder of this section we elaborate boundaries, complexity, temporal matters and process before finishing with case comparisons based on the preceding four noted issues of relevance.

Boundaries

The delimitation of a case study between the network context and its setting is challenging as a business network in principle is boundless (Håkansson and Johanson 1993) i.e. extending and all-encompassing without borders. Moreover, every border limitation implies a loss of the connectedness that is the essence of networks (Easton 1995). Thus, to understand a phenomenon requires a specific actor framing denoting the network context, that is the chosen connected actors that matter to how change and development proceed when researching through interactions a specific phenomenon. In this paper we use the term network context to specifically focus on why and how actors are connected and how those connections change.

But also required is the boundary for the surrounding case study setting: the spatial, social, technological, institutional, political and market characteristics that prevails also need to be considered and chosen as a relevant framework. We refer in this paper to these issues as the ‘changing situation’ of the study. The various aspects of a situation, which are in fact also empirical choices when selecting cases, must be dealt with conceptually. Prevailing case situation characteristics impart specific meaning to the way actors interact. Thus decisions must be made concerning whether they form a theoretical part of the study, and so are influencing the actors within the network context, or if they instead are adjunct concepts of less critical importance. Given these difficulties one wonders if there might be better ways to study network change, but presently the case study remains the dominant research method. In fact, Yin (1994) argues that case studies are well suited when the boundaries between the phenomenon and setting are not clearly evident.

Complexity

Performing case studies within the business network approach is a difficult task, as multiple levels of analysis are often involved and interaction takes place between multiple actors over periods of time. The interaction is substantive (Håkansson et al. 2009), meaning that activities and resources are applied to achieve mutual value creation. Actors are for example individuals, firms, and strategic nets or legitimized

entities in the social sphere. Further, actors, activities and resources are addressed in a network context that both structurally and organizationally is in a constant state of change and emergence. This complexity of events, actors, data and information requires care in disentangling. Further, the complexity means that the network can be analyzed from many different angles and that no specific angle is necessarily correct or efficient (Håkansson and Johanson 1993), and that the interactive and relational processes are key issues to tackle. The flexibility of the case study method is considered a strength in capturing the complex and evolving nature of relationships and interactions in industrial markets (Dubois and Araujo 2004). However, case descriptions tend to be extensive in order to present a holistic picture of the complexities at hand, and the amount of data might become overwhelming, especially to less experienced researchers.

Undertaking case analysis thus requires a researcher to impose analytical constraints, which reduce complexity. In each study the actors, resources and activities require definition, as does the nature of interaction between actors, and if different networks are involved these also need to be theoretically and empirically distinguished and defined. For example local networks can be defined differently to a wider network of which it is a part by applying the terms micro versus macro-network, effectively constraining complexity by applying a set of theoretical and empirical boundaries.

Time

The temporal dimension is at the core of network research due to the constant state of flux of the studied entities. There are strong reasons for including time aspects in marketing theories in general but not the least in business network theories, focusing on interaction and relationships. George and Jones (2000, 666) note that “content and activity do not exist apart from time and to understand content and activity, we must consider their temporality.” However, after reviewing the treatment of time in case based marketing research Quintens and Matthyssens (2010, 91) conclude, “marketing scholars need a stronger involvement of time to enrich case study research.” These authors find a “remarkable” lack of knowledge about how conceptualization of business and society are affected by time. Although business network theory acknowledges that relationships develop over time, multi-case longitudinal process studies remain scarce. The authors therefore recommend case selection on the basis of differences in various process time dimensions like speed and degree of linearity.

Pettigrew (1990, 271) underlines that there is “a crucial issue of time and perspective” as “time sets a frame of reference for what changes are seen and how those changes are explained.” Perspective in time is the key – one can follow the events, or look backwards. If a development over time is to be understood, a number of events (with varying duration) over time may thus have to be considered in order to single out certain aspects that seem to be decisive for the trajectory or path of a process. For example, in a network context, an action undertaken by a single actor or in a specific relationship may, over time, cause domino effects that affect many other actors and relationships (Hertz 1998). Ideally, the duration of effects and time lags between events/actions/activities should be clarified.

Alternately, retrospective research may clarify recurrent cycles and breakpoints since it may be easier to identify critical events and causal associations in retrospect (cf. Halinen and Törnroos 1995). Events classified as non-important at the time, or not recognized as events at all, may in retrospect gain greater significance as their consequences become visible and demand further actions. Finally, events that stretch over a long period of time may be easier to detect in retrospect. George and Jones (2000, 677) conclude: “In the immediate present, situational forces may seem to dominate in determining behavior. However, as we consider behavior extended through time, stable patterns may be discerned”. Leonard-Barton (1990) applied an interesting data gathering mix in comparing a longitudinal case study with several cases based on retrospective data. Thus, longitudinal case studies in which time is noted are more likely to allow a researcher to apprehend patterns of interest.

Time also opens a whole new set of opportunities for constraining network case studies. Langley et al. (2013) argue that the number of temporal observations within a case is important, and not only the number of cases. A temporal unit is an event or period with a specific theoretical meaning, for example a sales meeting, or product development meeting. Temporal units, or sequences of temporal units, can be theoretically comparable to each other. This approach implies that theoretical ideas can be replicated and tested in successive time periods of a specific case or in several cases. This was for instance done by Beverland and Lindgreen (2007) who compared two cases of creating a market orientation in terms of organizational characteristics before and after the change as well as roles, activities and challenges at three different stages of the change process. For single case studies, the temporal units are likely to be more comparable than across multiple case studies. This suggests that a viable method for a multiple study of a process is to remain within a single case study, but found must be situations and network contexts where a temporal unit holds the same process.

The transitions between temporal units also provide a method opportunity because that period allows temporal observations, both to the past and a future. Further the characterization of the transition can add a further element to understanding the change in a longitudinal process. The understanding gained will depend necessarily on the network context and changing situation, both of which are part of the researcher perspective.

In studying time, a number of practical challenges have to be addressed. Longitudinal data can be archival, historical (interviews) or real-time field observations. As an observer of behavior in natural environments, the researcher gets first-hand information but has to deal with interpretation and must try to avoid having an impact on the processes being observed. Alternatively, or complementary, data can be collected from interviews, ideally from actors likely to have different perspectives on the phenomenon in question and before and after major events like specific meetings or the making of major decisions. But in the case of interviews, the information received may be biased and incomplete. Archival data can then assist in clarifying event chronologies and meanings over long periods of time.

Network processes

Processes aid in case study research by placing meaning/s on sets of interactions, events and activities. Thus, detecting z process allows researchers to handle boundaries, complexity and temporal matters. Pettigrew (1997, 340) suggests five internally consistent guidelines for process research: “(1) consider embeddedness by studying processes across a number of levels of analysis, (2) address the temporal interconnectedness by studying processes in past, present and future time, (3) include context and action in explanations, (4) search for holistic rather than linear explanations of process, and (5) link process analysis to the location and explanation of outcomes.” In a network context this implies that also when specific firms are the focus, not only endogenous factors related to the firms in question, but also exogenous and network factors should be considered and included in the analysis, because influencing events and factors may originate from macro, meso as well as micro levels.

The chosen time element(s) of relational process deserves careful attention. From a constructivist standpoint, time has both a subjective and an objective dimension, also called inner time and standard time (Berger and Luckmann 1966). The standard, clock time, can provide an objective temporal measure, whereas the psychological and social situation will affect subjective time perceptions. Importantly, the bracketing of time affects the identification of events. When time is periodized, by aggregating events into a socially known process, there is an ability for a researcher to reflect upon and give meaning, but the chosen time period is also likely to affect the meaning attributed (George and Jones 2000; Schutz 1967). Moreover, as different individuals may chose differing time brackets, the derived interpretations are likely to vary.

The researcher thus has to choose between different event interpretations and meaning structures, performing a “double sensemaking process” (Halinen et al. 2013, 1218) in developing his or her own view and description of how a certain process emerged over time. Such differences in bracketing, for instance regarding a certain event in a relationship, may furthermore cause different interpretations of events, leading to different expectations, that in turn will imply different interpretations of future events. Subjective aspects of interactions, like individual time and bracketing by informants, thus have to be observed and taken note of if relationship development is to be understood by the researcher. The researcher must maintain and hold multiple meanings in the case description, so that complexity is not hidden, but rather is acknowledged and taken into account.

Whetten (1989) argues that process studies should identify key constructs as well as how and why they are related, but also the boundary conditions that apply and where and when they are applicable. These aspects are however interrelated as the when (time) element directly influences the what, how and why elements. In a similar note Dubois and Gadde (2002, 557) point out that: “Studies focused on processes have to come to an end, whereas the processes in the real world continue. This makes the conclusions a function of the time at which the study was conducted. The researcher has a deliberate choice on how far back in time he wants to trace the process in question.” Likewise Langley et al. (2013, 10) question “the overwhelming emphasis that most management research tends to place on the importance of outcomes”, arguing that few processes have final stopping points. For all processes, what is outcome at a certain point in time also is the input of any future activity. Thus, even though imposing a process meaning allows a researcher to capture a theoretical idea, there is also a very real warning that one is imposing a meaning structure on an on-going set of activities between actors.

Comparison

Finally comparison, which is the point of each of the preceding sections, requires even greater care and attention for the researcher. Comparison involves equally finding theoretical resemblances and differences, while holding surrounding concepts similar across cases. In a realist sense this is not easy, as is evident in the depth of research applying multiple case. In the constructivist sense, when one would look to how multiple longitudinal processes lead to social developments and advances, a researcher must also manage the distinctions across time.

Acknowledging the uniqueness of firms within a network and the basic assumptions of firm interdependence complicates cross-case comparisons (Aaboen et al. 2012). Where should the researcher draw a line between like cases and unlike cases, between cases suitable or unsuitable for comparison? The viability of cross case analysis becomes increasingly dubious with increased diversity among the chosen cases. As noted by Ragin (2000, 35) “variable-oriented” research involves “homogenizing assumptions” so that data points are comparable. But there is very little point in performing cross case study analysis unless there is a variation in the dimensions of theoretical interest, and ideally other potential confounding factors should be kept as constant as possible.

Each of the four issues (i.e. boundary, complexity, time and process) presents a different way to constrain or free constructs. To compare, cases researchers must decide theoretical and empirical, as well as temporal, boundaries that constrain a set of firms with different or similar (i) value creating processes, (ii) institutional, firm and individual actor connections, and/or (iii) timing of processes.

Multiple case studies in networks

In spite of increased complexities, there are advantages to be gained in moving from single case studies to multiple cases as the latter allows for tracing relationship development over time from the perspective of more than one actor in different situations and network contexts. A pattern, or change, observed in one

setting can then be examined in another. It is argued that such comparisons “force investigators to go beyond initial impressions” (Eisenhardt 1989, 542). Thus, multiple case studies are likely to provide complementary aspects of a phenomenon and result in not only more precisely defined constructs and understandings but also enhanced transferability (Lincoln and Guba 1985). Thus, there is potential to provide a richer and more holistic understanding of why a business relationship or the use of a resource develops in a specific direction.

In multiple case studies, case selection is usually theoretical and purposeful rather than reflecting the chosen purpose in terms of replication, comparison of polar types or based on extreme contexts in order to develop theoretical categories (Yin 1994). Multiple case studies are seeking for cross-case comparisons in search for similarities and differences, often pairwise to begin with, regarding for instance specific categories and dimensions. Cases may thus be selected a priori, on the basis of the literature, but also added in later stages as a result of findings. Nevertheless, replication in multiple sites implies that researchers should try to identify in advance some characteristics of the phenomenon under study that are common to all cases.

Since multiple case studies tend to be resource demanding, the number of cases must be limited. As a general rule, the number of cases should be guided by the amount of information that can be expected from additional cases (Eisenhardt 1991), i.e. come to a halt when theoretical saturation is reached (Glaser and Strauss 1967). Adding further case studies will increase the complexity of data gathering, access and analysis and make the study very demanding in terms of resources like time and money. One way of addressing this challenge is to form cooperatives among two or more research teams, each addressing a specific unit type within a joint, pre-set frame of theoretically informed concepts that allows for cross case comparisons. The complexity may also be reduced by choosing similar case situations such as an industry and within each case choosing similar types of informants (Halinen and Törnroos 2005). Finally, like Prévot and Spencer (2006), studying inter-organizational transfer of knowledge, one main case can be put into perspective by the use of minor, comparative, cases. An important issue, however, is the new understanding gained as interpretation and data acquisition are rarely equally sequential when multiple case studies are developed. The new understanding will lead to new viewpoints and theoretical implications, which can easily change the focus of study, so subverting the point of a multiple case approach.

The richness of a multi-case study can be further enhanced by applying a longitudinal approach with multiple temporal units (Langley et al. 2013). However, when multiple temporal units are included, finding comparable delimitations poses a further challenge to the researcher than in single temporal unit studies. A trade off between the number of temporal units in and over time and the number of actors of comparative networks is a central dilemma to consider in developing a methodological framework in this setting. This forms a boundary issue as well as a temporal issue to tackle. For instance, Baraldi et al. (2014) in studying different types of controls applied in different mechanisms for commercializing science, purposefully selected their cases so that sufficient variation would be achieved on key theoretical dimensions based on previous studies. Thereby they were able to not only identify tendencies but also variation and likely reasons for such variation in the light of different inter-organizational contexts.

In the interaction and network approach, one can study a number of connected firms separately but also from the perspective that each has a similar type of network issues (e.g. their roles and positions in the network are somehow similar in nature). The analysis can in such a situation focus on understanding how these network issues form a common or a disparate view of the actors in the studied focal net. Second, one, or a number of, “micro-nets” can be studied in relation to a larger network, allowing processes and outcomes to be compared for different settings and contexts. The third perspective we propose is to work in close connection with all the studied firms and follow a specific interactive process in these firms over time (e.g. within a project, or an innovation process) where the differences and similarities can be taken to

the fore. As a result a comparative case study consisting of at least two network cases and temporally many “units or tracking points” should stay strong as a base for theorizing from practice. This also entails a clear and strong process perspective.

An empirical exemplification

Based on the foregoing we elaborate our method and decisions by a multiple case study comprising network development processes in two situations. We present a cross-case comparison of two previously published case studies. The first is an Australian biofuel study (2015; Medlin and Törnroos 2014), and the second is a study in the same industry but based in Sweden (Lundberg et al. 2016). Each situation is different culturally and socially, yet in each the process of developing an innovation within the same industry is undertaken through networking and over the same time period, but of course following a different pace. The distinctions and similarities allow us to illustrate how a construction of time units can bridge cases and form a basis for cross-case comparison. Thus, the reason for the choice of cases is to exemplify, and the similarities and distinctions aid in that purpose. In comparing across cases the following issues (based on Halinen and Törnroos 2005) are taken into consideration:

- Common research objectives concerning network development are considered using a process research approach. Thus, the data in each case study is bracketed by change events to create some equivalence in temporal units;
- The situations are comparable also in social terms, i.e. there is a current interest in developing biofuel technologies and innovations, and the analysis themes are thus similar;
- Comparisons across cases are made possible by using the same theoretical and methodological base and concepts;
- The case data is presented with the actors, the case networks, situation specific industry/setting and the process under scrutiny in each of the compared cases. This elaboration of different actors and situations allows comparisons to be made at different levels according to network contexts.

We elaborate these issues concerning our exemplifying study here. Researchers need to address both similarities and overlaps concerning the comparability on the three issues above as well as acknowledging the differences, which will always exist.

First, the point concerning common objectives, analysis themes and situation issues needs to be addressed across cases. Our two cases deal with the research objective of network emergence and development. This is a prime research objective in both case studies. In each case the analysis themes, situations and issues deal with biofuel innovation development and commercialization processes. Thus, the research objectives, analysis themes and situation issues are comparable. There are contextual differences in the situations, one is in Australia and the other is in Sweden, but these are also connected to the theoretical distinctions of the cross case analysis.

Second, the theoretical framework we apply to the two studies concerns interests (Medlin and Törnroos 2014), roles and network position (Abrahamsen et al. 2012; Low and Johnston 2009) during an innovation. We set out to explore empirically how network roles and positions over time periods reflect the configurations of actor interests. Since our purpose here is to exemplify multi-case method, we do not present the theoretical background. However, evident is that this multi-case study follows prior theoretical research. For the Swedish case this required a re-analysis of all of the data according to the theoretical framework. For the Australian case, the interests were reported but the network roles and positions had to be developed from the reported case. To move this research forward we take the view of a number of focal actors in their two embedded networks (i.e. within a specific industry) and note potential similarities or differences in how each network emerges within the industry context.

At the start a clear theoretical difference to note across the two cases is that the root cause for the start of the innovation processes differed according to the interests of the concerned actors. In the Australian case self-interest and a more profit focused approach is taken, while in the Swedish case the actors garner mutual-interest support. In both cases strong institutional actors also play a role, promoting a societal collective interest by supporting biofuel innovation.

The third issue deals with differences in network context. The individuals, private firm actors and public entities are placed in a temporal unit setting, so that changes in network context are apparent. While no two processes of development or change are reconcilable on purely temporal grounds we contend that the theoretical and temporal as well as methodological similarities mean that the cases offer good comparative bases for analyzing network development across the two longitudinal studies. The Australian case was originally presented as five periods of development (See Table 1). The Swedish case was re-analyzed into seven periods using the published data of eleven critical events (see Table 2). Thus the Australian case with five periods is comparable but not completely similar to the seven periods of the Swedish case. Still the processes of innovation and its pace, irregularity and tempo for the actors, network structure and change are available for analysis (Dawson 2013; Quintens and Matthyssens 2010). Analysis of the innovation process and changes in network role and position are given for the Australian and Swedish cases in Tables 3 and 4 respectively.

To develop Tables 3 and 4 we approached the reported cases in three ways. First, we take the view of a number of focal actors in their embedded networks (e.g. within a specific industry) and note potential similarities or differences in how the network emerges within the industry context during the time span of both studies.

Second, there is a need to bring the activities and outcomes of the processes into alignment across the cases. This requires, in this case deciding that Period two of the Australian case is similar to Periods two-three-four-five of the Swedish case. In the Australian case period two concerns seeking and obtaining finance and includes bring new actors into play; and in a very similar manner the actors in the Swedish case for periods two-three-four-five bring in new actors and seek and gain finance. The Swedish case is more complex, but gaining resources for the next step is the key to declaring these periods to be similar. The declaration is on the basis of a process outcome, rather than the how of the process.

There are other options for treating these sequenced time units, although the exemplifying case does not allow these examples to be displayed. For example, there can be reasons why sequences of times might be in different orders across cases, or why a specific set of events in a period might be skipped altogether. The indeterminate nature of a constructivist ontology means that cause-effect associations can be lagged or inappropriate.

Third, we study how the network contexts change when events come into play as well as how the actors, their activities and relationships need to adapt and in some cases cease if a need arises to develop new relationships. In this manner the process, if successful and expanding, creates new connections, resource alignments and embeddedness of actors. Also when specific goals and plans are fulfilled, new issues might emerge to tackle. In the process also exits and changes might occur as plans and business ideas, such as finance, fail.

Table 1: Summary of Australian case by changing situations and episodes in network emergence

Situational, Network contexts and events	1 Triggering event	2 First finance and innovation episode	3 New actor network emerging	4 Production network starting	5 Extended networking episode
Sensemaking and interactive episode	<ul style="list-style-type: none"> - Individual researchers find mutual interest for developing biofuel by growing algae in seawater at the University and seek finance - Finance fails 	<ul style="list-style-type: none"> - Making sense of resources and new actors - Mutual new co-operation in developing biofuel from algae. - APP grant scheme enables R&D and interaction with new research partners (x, y, z). 	<ul style="list-style-type: none"> - Together with new actors, both self- and mutual interests grow as the research network plans for industrial biofuel production. 	<ul style="list-style-type: none"> - New actors and interests develop - Potential jet fuel buyers show interest - Global Centrifuge and Coppermania actors bring their resources and mutual interest 	<ul style="list-style-type: none"> - An enmeshed actor networking starts: (i) governmental-social, (ii) potential business partners, (iii) local-regional actors and (iv) the AOC-focal actors.
Actors and network embeddedness	<p>Acting in research roles with relevant skills and competence</p> <p><i>- Personal networking and the University</i></p>	<p>Active roles by the researchers in their academic community</p> <p><i>- A research team network</i></p>	<p>Local actors in West-Australia are giving resources to develop a test plant</p> <p><i>- A research and regional + 1 private actor network</i></p>	<p>Key actors still focus on the technology and solutions. Also a role in finding new relevant actors</p> <p><i>- Embedded in a financial, local and research network</i></p>	<p>The role of the firm, AOC, grows in the final emerging commercialization stage.</p> <p><i>- Embedded in a multi-actor network for commercialization</i></p>
Position and role of key actors	<p>University research positions giving important roles in order to act.</p>	<p>New role through finance and new connections that strengthen position.</p>	<p>Increasing connections with position as innovator. These connections open a key role</p>	<p>New actor roles in the commercial sphere. Stronger position in due to break-through technology</p>	<p>Position and new role in a more multi-actor and extended network.</p>

Table 2: Summary of Swedish case by changing situations and episodes in network emergence

Situational, Network contexts and events	1 Triggering event	2 Important new actor (fund provider)	3 A CEO is hired	4 A crisis	5 First major external funding	6 New actor network emerging	7 Some products reach the market/extended networking
Sensemaking and interactive episode	- Individual managers finding mutual interest for continuing joint R&D in spite of representing separate firms rather than different units within an MNC.	- Looking for ways to frame their ideas in order to find support and funding from external sources.	- New founding allows for employing a CEO for network coordination and new funding.	- Reaching R&D results takes longer time than expected. The question is raised – end or continue?	- Major public funding enabling R&D and interaction with new partners. - Making sense of resources	- Together with new actors, both self- and mutual interests grow among the firms as various R&D projects and some pilot production sites are created.	- New actors and interests develop -Some R&D projects reach the market - Increasingly formalized structures for resource sharing - Increased market orientation; important for future legitimacy.
Actors and network embeddedness	- Acting in management roles with relevant skills/competence <i>- Previous personal and business networking within the MNC. Also personal interaction on social occasions like hockey games in the small town. Trust from the start.</i>	- Support from private actors both in financial and networking terms creates new opportunities.	- CEO very active in spreading intentions; extensive cooperation with the local municipality, which acts on behalf of the network.	- New CEO in one of the firms successfully argues for a continuation and increased funding from network firms.	- Increased research cooperation with the local university and other research institutions.	- The number of cooperating actors keeps growing worldwide. <i>- Recognized and is invited to join several new R&D applications in cooperation with various research institutions</i>	-Key actors still focusing on technological solutions for various opportunities. <i>- Embedded in an extensive research network – both nationally and internationally</i>
Position and role of key actors	Management roles facilitated taking action.	Well-connected new key actor increases legitimacy.	Having a CEO able to work full time boosts networking.	New firm CEO takes leading role supporting the initiative.	Improved financial situation and increased number of relationships strengthen position.	Increasingly central position among actors with an interest in bio refinery production.	Continuing development of central position among actors with an interest in bio refinery production.

Table 3: Summary of Australian case by phase and key constructs

Phase	1	2	3	4	5
Interests	Personal self-interests of two researchers align with a global collective interest	Self- and mutual interests of three researchers align with collective interests — government, global, financial and research interests.	Widened mutual self- and mutual interests including business oriented players.	Pronounced personal and collective interest in the network as well as global collective interests. Also strong specific and mutual interests.	More commercial and specific and mutual interest of partners including the global relevance. The self-interest of individual actors is embedded within the interests of the business relationship
Role	The researchers have roles inside a University.	Key innovator roles in R&D in biofuel development jointly with an enlarged research group	Innovating role with new actors and testing the process in practice	Focal networking role of the now firm actor. Key investor role together with new actors. More business-orientated role in network	Firm actor now operating in an extended network of similarly developing actors all pursuing complementary innovations in biofuel.
Position	The researchers are in a university department within the Australian research network.	The position continues, but with an innovating position backed up by new institutional investment	Key innovator position in networks with local, research and business actors in testing technology in practice	Leading position in the start-up episode of biofuel investment in Coppermania	Continuing leading position in an expanding network.

Table 4: Summary of Swedish case by phase and key constructs

Phase	1	2	3	4	5	6	7
Interests	Mutual interest of firms. Local collective interest also motivates the individuals.	Stronger mutual interest of firms. Support from a private foundation and collective interests.	Mutual interests and collective interests extended with new actors.	Crisis situation evokes mutual interests being scrutinized and clarified leading to growing collective interests.	Strong mutual interest in core firms. Specific interest added by new joining firms. Very strong collective interests.	New actors and interests come into the picture. Extended mutual interest and collective local as well as regional interests emerge. The social interest prevails.	Extended mutual interest and collective local interest interplay with regional interests as pilot plants are organized.
Role	Managerial roles in local firms. Strong individual social roles.	CEO role initiated. Seeking funding from the national and European levels. Developing new R&D ideas.	CEO role emerges – a major facilitator in bringing together actors in an R&D funding competition.	CEO supported by additional administrative and R&D supporting staff.	Bio-refinery vision extends CEO role. CEO supported by additional R&D supporting staff.	Actions still focus on arranging joint R&D technology, and solutions related to commercialization. Developing and marketing of pilot plants and finding new actors.	Firms focus on R&D. Local actors develop their positions relative to their region. CEO and supporting staff is busy coordinating. R&D council formed to handle increased funds in a structured way.
Position	Actor initiated network for R&D cooperation.	New funding allows for increased R&D, i.e. increased network cooperation.	More complex network emerging. New partners, new funders.	Innovator position in an enlarged and strongly connected network.	Network extending and positions multiplying.	Strengthened through stronger funding and new and stronger links and bonds.	Actors' positions are clearer as pilot plants are developed. Innovator position in a complex network extending across Europe and the globe.

Table 5 presents the final cross case analysis. We find that initial network context and interests open options for the next moves. This is not an extraordinary result, because context and interests are necessarily tightly bound. But also evident, by implication only, is that network context and the resources accessible by individuals are strongly indicative of the possible options for the actors to move forward. This idea is evident in the second row of analysis (Table 5), where sources of funding are found as a result of individual roles and positions within network contexts. This is so for both cases, regardless of the different social approach to solving business problems in the two situations (row one). Next in row three interests and network roles and positions continue to elaborate and enmesh. As the complexity of the network context increases, there is again a difference between the two cases in how individuals take roles (row four). In the Australian case the move is to individuals holding positions within actors in the network, but in the Swedish case the network is more to the foreground and the individuals take key roles within the network. The more social and collectivist interests of the Swedish situation might be the reason for these differences in the way coordination is achieved. Finally, the key role of social entities is evident (row five) in both cases, although given that as researchers we are now alerted to the distinctions coming from situation, one might now ask is the nature of the social collective in each situation the same? However, these research issues are not the point of our exemplifying study. What we see instead is the steps and method of multi-case analysis, and the decisions with their trade-offs coming into view.

Table 5: Similarities and differences of roles and network positions compared for the two case studies

Australian Case	Swedish Case
A trigger starts from two individual researchers – researcher roles inside a university network	A trigger is a managerial collaboration for funding aiming at R&D possibilities – individual firm roles in a network left from divestment by a multi-national
<p style="text-align: center;">Criticality of funding in the first emergent phases Using individual roles and positions to find actors with funds and influence In both cases individual actors start to develop ideas and acting</p>	
<p style="text-align: center;">As stronger interests, roles and positions develop, commitment and trust are strengthened. The network starts to develop and gets more complex The cases display processes of irregular development and critical moments in their networking processes. New actors step in when ideas and investments as well as innovations break through.</p>	
<p style="text-align: center;">One individual moves to a firm role and also a university role, others remain in the university. New actors in each phase play supportive and complementary roles.</p>	<p style="text-align: center;">Individual roles multiply as the network deepens and extends. New actors in each phase play supportive and complementary roles. Some actors play critical roles.</p>
<p style="text-align: center;">Local, regional and national institutional actors play important surrounding and supportive roles from positions reflecting their level of network.</p>	

Conclusions and implications for research

Business networks are exchange relationships that consist of both structural (connected actors sets) as well as changing processual (interactive) entities. Comparing these processes and structures over time is a complex matter. An issue fore-fronted here is to conduct longitudinal, multi-case research to improve theory of these networks. As being noted, several challenges face the researcher in this endeavor. In the paper we have the perspective of the researcher in aiming for theory generation through multiple case research (Eisenhardt 1989, Eisenhardt & Graebner 2007).

First, the problems of network boundaries needs to be addressed as the cases that are compared need to have a similar set of connections and settings where they operate. The second issue concerns complexity of networks where the researchers for comparative reasons need to access a number of cases from a fairly well-defined conceptual angle, perspective and related concepts. (e.g. adaptation in developing new business relationships within an industry). Third, the processes of interaction and change needs to be considered in order to enable the interactive element to come into life and

materialize into an emerging set of structures and processes that unfolds among a set of actors. The fourth issue is an enmeshment of these three problems in a case comparison. The problem of comparison rests in the fact that these changing connected network entities are case specific in essence. Having research questions and a conceptual perspective that is focused across cases, and yet where contexts and processes are studied within gives the researcher(s) waypoints in overcoming these hurdles. Of course without similarities in settings and comparable timelines the results are likely meaningless. Finally, in conjunction to these and the issues facing the researcher the following points and implications are set forth.

We note first, following Weick (1979), that some research goals may not be entirely compatible. In particular, there is an inherent conflict between accuracy, which demands closeness to a phenomenon, and simplicity and considerable ‘sameness’ across cases for comparative studies is needed. Typically prerequisites of studies aiming at generalization from a realist perspective, forego accuracy. The methodological choice should be guided by the research objectives and the supporting empirical data, but the decisions are also a matter of researcher orientation and epistemological standpoint. Consequently, it is hard to find any single “best practice” for comparative and longitudinal multi case studies. We argue however that such an approach to network research can assist the researcher in identifying similarities and differences that may identify not only new dimensions and/or further clarify dimensions of network constructs but also in providing a richer understanding of networking processes within a specific actors set and context. This also gives wider empirical support and understanding concerning the mechanisms causing change, thereby offering a basis for new propositions or hypotheses for further testing and/or theory generation.

We also acknowledge that the complexity of network research makes identification of, and creating access to, a number of cases suitable for cross case comparisons challenging. However, we believe that this should not lead to the extreme conclusion that multiple case studies should not be performed in network contexts. On the contrary. Since the number of multiple network-case studies still is so limited, comparisons can be of value even if ideal cases for comparisons are hard to be found and/or accessed. Moreover, many case studies have been published, and if there are ways to re-interpret these then there are also methods to allow for cross case comparison. This means that researchers might re-use published cases to explore theory, rather than undertake a full research project. Such an approach would be facilitated by open data, i.e. if full access to anonymous data sets could be shared, for instance publicly through the Internet or at least within a research community. Further, a multi-case approach to previously published case studies might in some circumstances, with appropriate assumptions and re-interpretations, be a very good way to begin a new comparative case study. As many of these cases already exist and researchers have access to them it can be fruitful also to follow these cases over time continuously in order to get a more longitudinal view of the networking processes.

The purpose of a theoretical view is that questions can be asked concerning managerial events and behaviors, namely process, and events, time and timing are key constructs framing these activities. In order to deal with the concept of time, process and temporality issues in the multi-case method points to the following key ideas for comparing cases in a temporal sense:

- look for a triggering event or situation that can assign the start of a process.
- accept the irregularity of developments and processes, there are many paths and steps can be missed or circumvented while still achieving managerial outcomes.
- notable critical and unexpected situational issues can slow down the processes at times, when new issues need sensemaking, actions and adaptations by the actors involved.
- networks mean timing of processes and events can arise both from inside the close micro-net as well as from outside in the wider network.
- causality cannot be a guide to imposing comparable time units across cases. In the two cases we can see that previous developments are in a causal manner related to later upcoming development, but not unanimously. Events that are not at all related to the past have taken the actors by surprise

(e.g. the sudden oil-price decrease in 2014 in the Australian case). There is a duality of causal types of processes as well as 'wild' and sudden realities happening and exerting strong influence. A prediction about the turbulence prevailing today is a tricky matter. But coping with and relating to potential others through sensemaking when change thrives is clearly seen in both cases, as a way to deal with uncertainties in network development. Thus, accepting chance and looking for the unusual and different effects that follow is a key aspect in case study and multi-case method.

Our exemplifying comparisons across two cases have dealt with common themes. We first dealt with the approach and method in conjunction with time issues. Thereafter we dealt conceptually with the IN approach and how it aids in capturing change as a process materializes. Our perspective was to keep the process in focus (Van de Ven and Poole 1995) to illuminate the changes taking place in their networking context. How actors are embedded in their networks as they unfold illuminates changes taking place in the network structure and the performed actors-resources-activities, including adaptations.

We recommend the use of verbal tables as a way of presenting case information while facilitating case comparisons. Tables can be used for quotes and/or for conceptually based comparisons for different time periods (as in our example). These tables are the researchers interpretation and reduction of the data mass that is being collected and in this way the comparisons can be made easier when the issues are focused and streamlined in this manner across the compared cases.

We conclude that longitudinal multi case research that offers many temporal units or tracking points can provide richer and thicker data for analysis and so more easily uncover emergent processes for theorizing. Consequently, despite its potential caveats, we urge researchers wishing to contribute to the interaction and network approach to business marketing to apply a temporally cognizant multiple case study method to a greater extent. In particular, we expect that as the method develops in sophistication our range of conceptual tools will enhance researcher's ability to understand how processes managed across multiple business relationships in a network can lead to new industrial developments and advances.

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