Industrial Marketing Management 105 (2022) 48–59

Contents lists available at ScienceDirect

Industrial Marketing Management

journal homepage: www.elsevier.com/locate/indmarman

Resource interaction: Key concepts, relations and representations

Frans Prenkert [a,*], Klas Hedvall [b], Nina Hasche [a], Jens Eklinder Frick [e], Morten H. Abrahamsen [c], Heli Aramo-Immonen [d], Enrico Baraldi [e], Roberta Bocconcelli [f], Debbie Harrison [c], Lei Huang [g], Lars Huemer [c], Johan Kask [a], Maria Landqvist [b], Alessandro Pagano [f], Andrea Perna [e,h], León Poblete [b], Milena Ratajczak-Mrozek [i], Sofia Wagrell [e]

[a] Örebro University School of Business, Center for Sustainable Business, Örebro, Sweden
[b] Chalmers University of Technology, Gothenburg, Sweden
[c] BI Norwegian Business School, Oslo and Stavanger, Norway
[d] Turku University of Applied Sciences, Turku, Finland
[e] Uppsala University, Uppsala, Sweden
[f] University of Urbino, Urbino, Italy
[g] Stockholm School of Economics, Stockholm, Sweden
[h] Universita' Politecnica delle Marche, Ancona, Italy
[i] Poznań University of Economics and Business, Poznań, Poland

ARTICLE INFO

Keywords:
Resources
Value
Resource interaction
IMP
Resource interaction approach (RIA)
Business relationships and networks

ABSTRACT

Value co-creation is a core focus area in both B2B marketing and strategy research, necessitating resource utilization within and across organizational boundaries. In the Industrial Marketing and Purchasing (IMP) group, scholars have focused on the interactions among resources as one important way to analyze central questions about resources in business relationships and networks. This has produced a breadth of investigations and concepts that are locally defined and utilized. This may hamper further theoretical development and inhibit analytical precision. The purpose of this paper is to develop a more general shared understanding of resource interaction by identifying and explicating the key concepts used, and to assess its status as an approach. The paper synthesizes 20 years of research to identify key concepts and the relationships across concepts. This provides both a platform for further conceptual and empirical research within IMP and potential for cross-fertilization with parallel B2B areas.

1. Introduction

Resources occupy a central place in the analysis of business relationships and networks. Within the IMP approach (Håkansson, Ford, Gadde, Snehota, & Waluszewski, 2009), resources are one of the layers of substance by which inter-organizational interactions unfold (Håkansson & Snehota, 1995). Analyses of the interactions between and across resources stresses their heterogeneity (Penrose, 1959) when embedded in resource combinations and development paths (Håkansson et al., 2009). In particular, resource interaction can be viewed as a phenomenon of its own, which has been defined as *"[…] the processes of combination, recombination, and co-development of resources"* (Baraldi, Gressetvold, & Harrison, 2012a: 266). The aim of this paper is twofold; to (i) stimulate the development of a shared understanding about the phenomenon of resource interaction, and (ii) to assess to what extent it may qualify as an 'approach' on its own merits in terms of how key concepts can be systematically related.

As for the first aim, the empirical scope of current research on the phenomenon of resource interaction is wide ranging (for a recent detailed review, see Bocconcelli et al., 2020). Briefly, it includes technical development (Håkansson & Waluszewski, 2002a, 2002b;), logistics (Jahre, Gadde, Håkansson, Harrison, & Persson, 2006), value creation (Harrison & Håkansson, 2006), relationship creation (Gadde, Hjelmgren, & Skarp, 2012), and SME-large firm dyads (Bocconcelli, Murmura, & Pagano, 2018). The extensive empirical scope has resulted in a range of studies with varying conceptual levels and concepts, covering both structure and process (Bocconcelli et al., 2020; Prenkert, Hasche, & Linton, 2019). For example, some researchers have addressed specific concepts such as resource embedding (e.g. Holmen, 2001; Tian, 2019), while others investigate how a new resource becomes an innovation

* Corresponding author.
E-mail address: frans.prenkert@oru.se (F. Prenkert).

https://doi.org/10.1016/j.indmarman.2022.05.008
Received 7 July 2021; Received in revised form 6 May 2022; Accepted 13 May 2022
Available online 2 June 2022

(Baraldi, Gregori, & Perna, 2011), while still others provide more specific conceptualizations of resource interfaces (e.g., Prenkert et al., 2019). What remains to emerge is a more widely shared understanding of the phenomenon and this paper contributes to this by beginning to form such a more widely shared understanding.

The contribution of this paper relates to the process of theorizing (Weick, 1995). We do not claim to build strong theory in the general sense (Sutton & Staw, 1995). Instead, we provide an interim stage of theorizing in a systematic attempt to intentionally shift towards stronger theory (Weick, 1995). Such middle range theorizing is recognized as a necessary means by which strong general theory can be developed in strategic management and organization theory (Eisenhardt & Bourgeois, 1988; Weick, 1989).

Merton (1967: 39) defines middle range theory as something that "… *lie between the minor but necessary working hypotheses that evolve in abundance during day-to-day research and all-inclusive systematic efforts to develop a unified theory that will explain all the uniformities of social behaviour, social organization and social change*". Hence, middle range theory and middle range theorizing have a bridging function. They provide an interim stage between empirical material and general theory that enables the connecting of processes of justification to processes of discovery (Brodie, Saren, & Pels, 2011).

In this paper, we provide an account of a collective process of middle range theorizing. This is because we have systematized research on resource interaction beyond the mundane use of day-to-day working hypotheses into a middle range theory. While it does not qualify as a unified theory that explains all aspects of resource interaction, it does, however, explain *some* aspects. We aim at explaining one specific, central issue: the links between resource interaction and value. We explain why, when, and how resource interaction is linked to value creation in business relationships and networks. We shall return several times to the discussion of value and its relation to resource interaction in this paper.

We recognize that the explication of the links between resource interaction and value is dependent on the approach adopted. Recognizing the vantage point taken is key when aiming at communicating within and across fields (Möller & Halinen, 2022). By 'approach' we mean a view of a phenomena from a specific angle or vantage point. It impacts on how we can gain knowledge of phenomena and on the choice of methods to investigate them. Hence, it relates to both ontology and epistemology and is a weaker label than 'theory'. We use the weaker label 'approach' here to indicate that we are engaged in a process of theorizing that involves the systematic linking of key concepts from a specific vantage point.

The vantage point we take is a relational stance to industrial marketing that emphasizes the centrality of the interaction across resources in business relationships and networks (e.g., Håkansson & Snehota, 1995; Penrose, 1959) typically referred to as the 'IMP approach'. This resonates with the idea that much of marketing in general is relational, and indeed that industrial marketing in particular may be even more so (Iacobucci, 1996: xv). Epistemologically this entails a focus on processes (Bizzi & Langley, 2012; Medlin, 2004) and contextual conditions (Mattsson, 1985), which favors qualitative methods such as case studies in research designs (Halinen & Törnroos, 2005).

As such, research on resource interaction has since the early 2000s progressively added concepts, analytical tools, and models (cf. Baraldi et al., 2012a; Baraldi, Gressetvold, & Harrison, 2012b; Bocconcelli et al., 2020; Prenkert et al., 2019). Established concepts from the IMP approach such as business relationships (Håkansson, 1982), interdependence (Håkansson & Snehota, 1989), and interconnectedness (Anderson, Håkansson, & Johanson, 1994; Håkansson & Snehota, 1995), have been used as a starting point for conceptual development about how resources interact. Works within this stream of research have also coined newer concepts such as 'resource interfaces' (Dubois & Araujo, 2006; Håkansson & Waluszewski, 2002a; Wedin, 2001), 'heaviness' (Håkansson & Waluszewski, 2002a; Prenkert et al., 2019) and 'imprints' (Håkansson & Waluszewski, 2002a; Ingemansson & Waluszewski, 2009).

In this paper, we claim that research about resource interaction faces a major challenge. We argue that there is a clear need for conceptual refinement as well as continued empirical application. This is due to the presence of substantial variation and partial inconsistencies in how concepts are used and defined (Bocconcelli et al., 2020; Prenkert et al., 2019). For example, the difference between 'interfaces' and 'imprints', both indicating how two or more resources influence one another, is unclear. It appears that at least some concepts have been introduced in order to fit a particular empirical application or analytical purpose and have not been clearly related to other concepts in a systematic way. The multitude and partial overlap of concepts creates possibilities for misunderstandings and limits development. In particular, as noted by Prenkert et al. (2019), there is a risk that empirically driven conceptual richness obscures analytical precision.

The development of a common understanding is important not only for researchers interested in business networks and relationships at large, but also for communicating and engaging with other fields or academic brands beyond the IMP community (Aramo-Immonen et al., 2020; Cova, Ford, & Salle, 2009). As Aramo-Immonen et al. (2020) underscore, the interaction with other schools of thought not only enables a better diffusion of ideas, but also stimulates debates with – and feedback from – scholars of other fields. Despite recent attempts at identifying and resolving inconsistencies between concepts, and how they are employed in empirical research, for example by Prenkert et al. (2019) further research is needed to develop greater conceptual coherence (see also Bocconcelli et al., 2020).

This paper addresses three research questions. First, 'which are the most common concepts used to investigate resource interaction and how can these be categorized?'. The second question asks, 'what are the differences and overlaps between apparently similar concepts? Third, we address 'how can the key concepts be systematically related to explain the links between resource interaction and value?' While some prior research has already labelled resource interaction as an approach (e.g., Baraldi et al., 2012a; Huemer & Wang, 2021), it has been done as a suggestion rather than based on some given criteria and it has not been systematic. In answering these three questions we investigate if resource interaction can qualify as a 'Resource Interaction Approach' on its own merits using criteria set up here.

In setting up these criteria we depart from the relational stance described above and argue that a Resource Interaction Approach would need to incorporate a broad analytical framework which comprises several concepts and models to investigate and possibly explain the phenomenon of resource interaction. This includes two important parts: concepts and models. In this paper, we focus on theorizing by conceptual development and hence on the concepts. Thus, models are acknowledged when warranted but not in focus.

The paper proceeds as follows. In the next section we outline our research methodology. In section 3, we introduce the concepts most commonly used to investigate resource interaction and propose an initial categorization. In section 4 we analyze these concepts and discuss the differences and overlaps between them, stressing how they relate to one another. This is followed by three exemplar conceptual representations in section 5. We conclude the paper with suggestions for further research in section 6. Overall, the paper contributes to existing literature by collating the concepts most commonly used to investigate resource interaction, and then by assessing the status of resource interaction as an approach. The paper adds value to both experienced and new IMP researchers, as well as scholars in parallel B2B areas, interested in resource utilization for value co-creation.

2. Research design

2.1. Conceptual literature review

This article is underpinned by a conceptual literature review

conducted by way of a collaborative process involving a large team of authors. The conceptual literature review was used to identify and explicate concepts, relationships between concepts, and models used (Hulland, 2020; Kennedy, 2007). A conceptual literature review is anchored to a defined research question and "*aims to reconcile and then extend past research in a particular domain in a meaningful, conceptual way*" (Hulland, 2020: 28). A conceptual literature review is suitable to link together studies with different scope and purpose (Baumeister & Leary, 1997). Conceptual literature reviews focuses on diversity of evidence and not only on the quantity (Baumeister & Leary, 1997). A conceptual review also allows researchers to be more selective by using their own judgement (Hurmelinna-Laukkanen & Nätti, 2018) in drawing on the existing relevant discussions. It also enables "*the flexibility to address the complexity of the substantive issues*" (Kennedy, 2007: 146) and to build "*common ground on which to build a new and enhanced conceptualization*" (Jaakkola, 2020: 21) and "*propose novel ways of thinking about a phenomenon*" (Hulland, 2020: 31).

We adopted Hulland's five steps (2020: 28) in designing the review process. That is, "*(i) establishing the scope of the domain under review, (ii) integrating and synthesizing extant knowledge within the domain, (iii) resolving inconsistencies, (iv) highlighting gaps in the existing literature, and (v) setting an agenda for future research*".

2.2. A conceptual literature review by a large author team

Two main strengths are obtained by combining a conceptual literature review with a large author team. First, the multiplicity of author insights about different parts of the literature facilitated us in gaining substantive understanding of the current concepts and how they related to each other.

The co-author team behind this paper consists of researchers with different theoretical backgrounds and experience levels. The team therefore contains a mixture of specialism and diversity, as well as familiarity and freshness (Whitfield, 2008). The heterogeneity of the co-author team is beneficial in multi-authored papers (see e.g., Nason & Pillutla, 1998), since the quality of decisions increases (e.g., Hoffman, 1979; McGrath, 1984) and a paper is more likely to generate insightful contributions (Northcraft & Neale, 1993).

The second main strength is that we were able to engage in substantive discussions on how to systematize concepts. We benefitted from disagreements and opposing views. For example, in differentiating the significance of concepts. This is critical for producing a quality scientific contribution when we aim to generate a shared understanding within the field (Barlow et al., 2018).

We have applied a dynamic and iterative process to the review (Hulland, 2020) (see Fig. 1). This involved working in author-sub-teams. We used multiple review loops, and iterated back and forth to shape our understanding. Over time, this resulted in an overlapping understanding of concepts and their relations.

Table 1 outlines the main activities undertaken by the multiauthor team. When setting the scope of the research an initial output was an extensive list of concepts. The rationale here was to be as inclusive as possible. The initial list of 17 concepts was then discussed within the group of co-authors over several iterations. Based on these discussions, different views on the scope and focus of the paper was identified.

Through the stepwise approach described in Table 1, the original list of 17 concepts were shrunk to a list of 14 concepts. Then, the co-authors were divided into sub-teams, each focused on several of the 14 concepts. The sub-teams searched for papers based on existing knowledge of key references (e.g., seminal works and review articles) as well as a keyword search. We included book chapters and PhD dissertations.

The analysis resulted in the inclusion of 92 references. Each sub-team (i) described the development of their assigned concepts over time; (ii) summarized the (multiple) definitions of the concepts, including inconsistencies, and (iii) elaborated the (different) applications of those concepts. Each sub-team also reviewed on the work of other sub-teams.

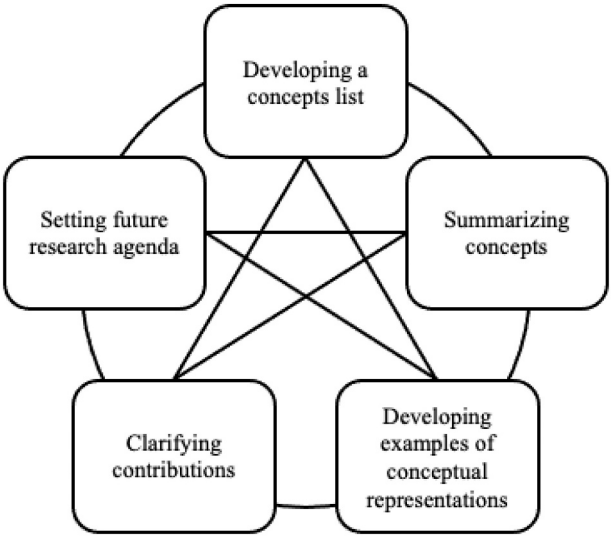

Fig. 1. The iterative and interrelated research process.

Table 1
Summary of the research process.

Key tasks	Processes	Main activities
• Establishing the scope of the review	• Developing a concepts list	– Starting a discussion about the need for consolidation in resource interaction by four IMP Special Interest Group members. – Constructing an initial concepts list (version 1) – Revising the concepts list (version 2) after wider discussion. Establishing a Coordinator Team, and authors' sub-teams. – Updating of the Concepts List (version 3)
• Integrating and synthesizing extant knowledge • Identifying and resolving inconsistencies • Highlighting gaps in the existing literature	• Summarizing concepts	– Sythesizing the work of the authors' sub-teams (including reviews of seminal works and review articles) – Discussing concepts in the whole author group to attempt a shared understanding – Revising the concepts in the authors' sub-teams, based on two rounds of review – Concept integration and modification in revised authors' sub-teams. – Classifying the concepts as foundational and supportive
• Grouping concepts together	• Clarifying contributions • Developing shared understandings	– Assigning a dedicated team (three authors) to develop an initial conceptual representation (version 1) based on the concepts list – Updating the conceptual representation (version 2), summarizing concepts (within the whole author group). Developing final examples of conceptual representations.

This made it easier to make decisions in agreement with all co-authors. During the process, it became clear that – perhaps not surprisingly – the authors did not share a common understanding of some of the concepts.

The inconsistencies and gaps resulted in the next step of the analysis, to verify the concept descriptions. To do so, new sub-teams were formed. The aim of this step was to resolve inconsistencies in a systematic way and identify gaps in the existing literature (Hulland, 2020). This allowed us to agree on the most relevant concepts.

Overall, from the start, we were aware of the risks associated with writing a paper with a large number of authors. That is, "*individuals could end up working only on topics that peer consensus defines as the most interesting. The diversity of choice and opportunity may be diminished*" (Adams, 2012: 336). However, our stance was that, if disagreements were handled in a constructive way, we would benefit from heterogeneity of a large co-author team by increasing the quality of decisions (e.g., Hoffman, 1979; McGrath, 1984), and thus generate insightful scientific contributions (Northcraft & Neale, 1993). These benefits of different views were especially visible in the next stage of the review, in which we conceptually classified concepts as (i) foundational or supportive, and (ii) as concepts related to single resources or to resource combinations. Afterwards, three examples of conceptual representations were created.

2.3. Developing examples of conceptual representations

We understand conceptual representations as the way that information about categories is organized and interlinked (Markman, 2006). Conceptual representations provide support for further research by showing how resource interaction can be applied in various research topics and challenges. Several attempts to develop different conceptual representations were discussed. The first attempts took into account all the concepts, as well as all the connections among them, resulting in an extensive and complex representation. We quickly realized that, while it might be theoretically possible to create a representation that includes all 14 concepts, such a complete picture would look different depending on the research aims and themes, and also based on the specific perspective of each individual researcher. Moreover such complex representation becomes extremely general and blurred. However, not making any attempt at groupings is obviously not satisfactory and provides little help for researchers attempting to understand the field. This is a challenge of middle range theorizing.

Since our aim is to explain how and why resource interaction is so important for value creation in business relationships and networks we manage this challenge by developing three representations (Figs. 2, 3 and 4) on this topic. Naturally they share the common theme of value but deals with three slightly different value contexts or situations: The first is a representation of value creation, the second of value measuring and capturing, and finally the third is on value creation in new business ventures. We contend that this theorizing helps us better understand why, when, and how resource interaction is linked to value in business relationships and networks. Providing these conceptual representations contributes to sharpening our understandings, and is even a step towards consolidation, but without unnecessary formalization. Fig. 2 shows how the analysis of production efficiency can be undertaken using five concepts (value, heterogeneity, variety, interconnectedness and embeddedness). For the analysis of more complex questions, more concepts would be needed (compare Figs. 2 and 3).

3. Resource interaction: key concepts

Having established the method, we now address the first research question, '*which are the most common concepts used to investigate resource interaction and how can these be categorized?*' We have identified 14 concepts that are most common (see Table 2). The concepts can be categorized into two broad categories, 'Foundational' and 'Supportive'. We consider concepts which are of a type and character that makes them essential to explaining the phenomenon of resource interaction as *foundational*. Foundational concepts provide a basis for our understanding and analysis of resource interaction processes in network

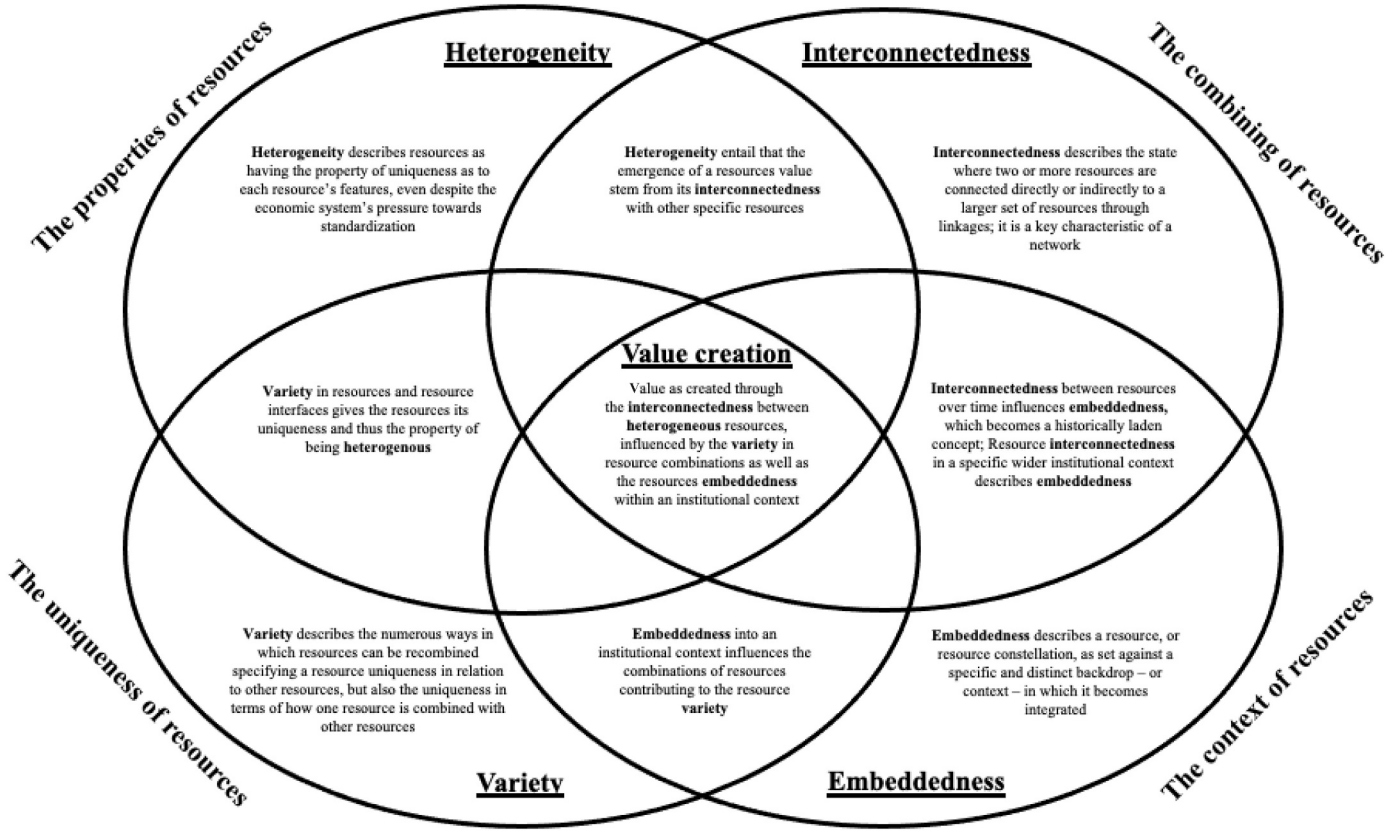

Fig. 2. The overlaps among Heterogeneity, Interconnectedness, Variety and Embeddedness.

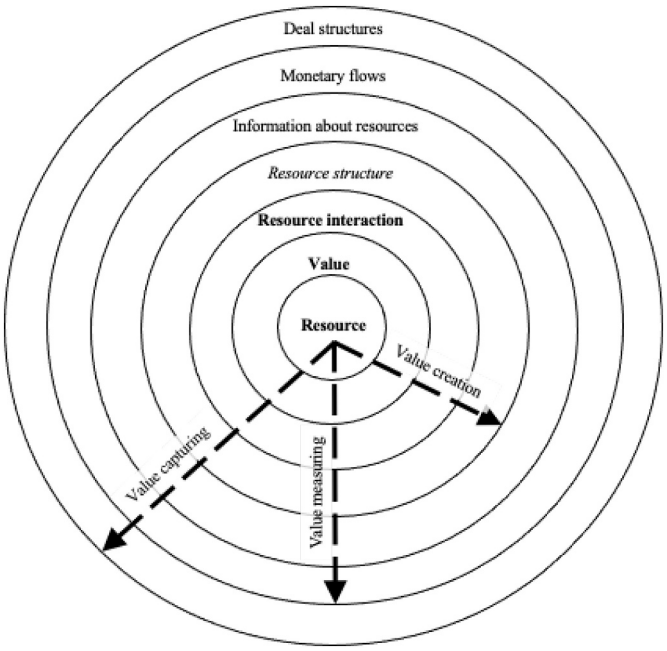

Fig. 3. A representation of concepts to conceptualize three value processes.

contexts.

On the other hand, we consider concepts that are included in a given study because of their relevance to the specific research question at hand as *supportive*. In other words, not all research that takes resource interaction as the theoretical starting point includes supportive concepts. This does not mean that they are of less importance or relevance, only that the use of a supportive concept is arbitrary and much dependent on the purpose and focus of each investigation.

We argue that there are six foundational concepts (FC) of resource interaction. These are: resources, heterogeneity, value, interconnectedness, interaction, and interdependence. Together these concepts provide the foundation for basic theorizing about resource interaction. That is, to be able to theorize on this phenomenon, we need *resources* (FC 1) which are *heterogeneous* (FC 2) and characterized by *interdependence* (FC 6), in the basic sense that the *value* (FC 3) of a resource is depedent on other resources. Furthermore, *value* (FC 3) emerges through the *interaction* (FC 5) between resources, reflecting also their *interconnectedness* (FC 4), that is, their multiple and indirect connections.

Many times, supportive concepts provides detail and further specification and elaboration of foundational concepts. For instance, the supportive concept *interface* specifies and elaborates FC 5 *interaction* and FC 4 *interconnectedness* by showing specifically how interactions occur along the boundaries of single resources and how specifically they are interconnected (if one considers the interfaces between several resources, i.e., not only two resources); and the supportive concept *resource type* specifies and elaborates FC 1 *resources*.

3.1. Exploring the six foundational concepts

In this section, we discuss in detail the six foundational concepts in Table 2, resources, heterogeneity, interconnectedness, interdependence, value, and interaction.

In the IMP perspective, elements are defined as *resources* (FC 1) if some actor identifies some use for them and hence considers them as valuable (Håkansson & Snehota, 1995:132). Early classifications of resources include physical, financial, and human (Håkansson, 1987). The 4R-model (Baraldi, 2003; Baraldi & Bocconcelli, 2001; Håkansson & Waluszewski, 2002a; Wedin, 2001) classifies resources into four types; products, facilities, business units, and business relationships. Hence, while in the ARA-model (Håkansson & Snehota, 1995) the resource layer forms part of relationships, the 4R-model considers relationships as resources in themselves (see Bocconcelli et al., 2020 for further discussions).

Each resource can be combined with other resources in numerous ways (e.g., Baraldi, 2003; Biemans, 1992; Håkansson & Waluszewski, 2002a) making new *values* (FC 3) of a resource emerge in interaction with other resources. Therefore, resources are inherently dynamic

Table 2
The 14 concepts identified in the existing literature.

#	Concept	Classification
1	Resource/s	Foundational
2	Heterogeneity	Foundational
3	Value	Foundational
4	Interconnectedness	Foundational
5	Interaction	Foundational
6	Interdependence	Foundational
7	Interface	Supportive
8	Embeddedness	Supportive
9	Imprint	Supportive
10	Heaviness	Supportive
11	Variety	Supportive
12	Friction	Supportive
13	Resource structure	Supportive
14	Resource type/s	Supportive

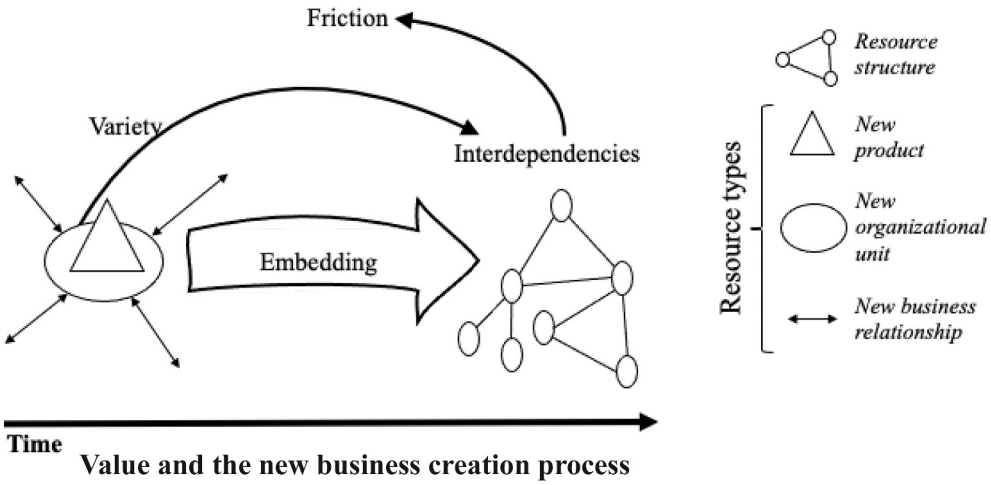

Fig. 4. A representation of concepts for conceptualizing new business formation.

(Håkansson & Snehota, 1995) and open objects, whose features are emergent and context dependent (Baraldi et al., 2012a).

This emergent and context-dependent nature of resources is captured by the second foundational concept, namely the notion of resource *heterogeneity* (Penrose, 1959), which challenges the idea of homogeneous resources of neoclassical economics and of many managerial optimization models (Håkansson, Harrison, & Waluszewski, 2004). Viewing resources as homogenous implies that their value and features are intrinsic in a resource, easily comparable and defined simply by their scarcity in relation to demand. Instead, the concept ot resource heterogeneity includes two elements (cf. Holmen, 2001): (i) the uniqueness of each resource's features (e.g., design, shapes, expertise etc.) within the same type of resources (e.g., products, facilities, organizations), even despite the economic system's pressure towards standardization; and (ii) the emergence of a resource's value(s) from combinations with other specific resources with which specific interfaces are created in development, production and use settings (Håkansson & Waluszewski, 2007).

Interconnectedness is another key concept (FC4), which stresses that two or more resources are interconnected directly or indirectly to a larger set of resources (Håkansson & Snehota, 1995: 12–18; 40). While the ARA-model (Håkansson & Snehota, 1995) applies the notion of interconnectedness to business relationships in order to stress how several relationships can indirectly link one actor to many other actors in a network, the notion of interconnectedness can be applied also to resources in order to capture the complex patterns that relate them directly and indirectly within networks.

The next foundational concept, *interdependence* (FC 6), denotes a more specific, stronger connection between resources than interconnectedness. The concept of interconnectedness stipulates in fact that some resources are not only connected but also dependent on each other. Such a mutual dependence can concern the fact that one resource has been created to support another resource, which would not exist without the former, or the fact that two resources improve each other's functions, especially following some adaptation between them. Interdependent resources affect each other's values through the aforementioned notion of heterogeneity (Penrose, 1959) or what Alchian and Demsetz (1972) called team effects. Stressing the difference between FC 4 and FC 6, two resources may be connected, but not interdependent (that is mutually dependent), but two resources that are simply interconnected, for instance because they are provided by the same supplier, rarely influence each other's value (e.g., Baraldi & Strömsten, 2006). Thus, the notion of resource interdependence overlaps largely with the weaker or more general form of resource embeddedness, but not with the stronger form of resource embeddedness which requires that the interdependence is rooted into an institutionalized resource structure as a backdrop.

As a consequence of heterogeneity and interdependence, a resource's *value* (FC 3) is relative, emergent, indeterminate, and highly context dependent (Baraldi & Strömsten, 2006). The value of a resource emerges through its interaction with other resources embedded in the network structure (Harrison & Håkansson, 2006; Håkansson et al., 2009:65). However, as different actors may perceive value differently, firms involved in combining their resources may aspire for different resource combinations (Cantù, Corsaro, & Snehota, 2012). One consequence is that a single resource cannot be investigated in isolation. Instead, a resource must always be considered as interacting with other resources, hence the notion of 'resource *interaction*' (FC 5). Baraldi et al. (2012a): 266) define resource interaction as "…*the processes of combination, recombination, and co-development of resources that happen through the interaction among organizations.*"

3.2. The eight supportive concepts

We now discuss the eight supportive concepts: resource interfaces, embeddedness, imprints, heaviness, variety, friction, structure, and types. Next to addressing particular facets or research questions about resource interaction, the supportive concepts also specify and elaborate the foundational concepts.

3.2.1. Resource interfaces

As Wedin (2001: 38) puts it: *"…Interaction between resources will… form interfaces, which in turn will influence the value of a specific resource"* (Wedin, 2001: 38). In particular, the concept of resource interface *"… penetrates and cuts surgically into the texture of resource interactions by pointing at the specific contact points between two resources defined along relevant technical, economic, and social dimensions"* (Baraldi, 2003: 18). Thus, resource interfaces can be defined as "interconnections" (Dubois & Araujo, 2006: 22) or "contact points" (Baraldi et al., 2012a: 267) between resources. As such, resource interfaces denote a shared interconnecting boundary that links resources and make interactions and influence between resources possible (Håkansson & Waluszewski, 2002b).

Various empirical studies have developed and applied the concept of resource interface, proposing, for example, to distinguish between technical and organizational interfaces (Dubois & Araujo, 2006) and mixed interfaces, depending on the different types of resources that an interface involve (Jahre et al., 2006). Furthermore, a single resource interface (between two resources) should not be viewed in isolation. A resource can have other interfaces with several other resources in the network. Consequently, if one interface is changed or disconnected it may impact other connected resource interfaces spread across the whole network (Hasche, Kask, Linton, & Prenkert, 2020).

3.2.2. Resource embeddedness

Inspired by economic sociology (Granovetter, 1985; Uzzi, 1996, 1997), the concept of resource embeddedness has been primarily used to synthetize the multiple deep ties that make resources become tightly related to each other over time and at several levels. For example, technical (e.g., Wedin, 2001), institutional (e.g., Andersson, Forsgren, & Pedersen, 2001; Ratajczak-Mrozek, 2017), and social and political levels (Halinen & Törnroos, 1998). Resource embeddedness indicates that a resource is set against a specific and distinct backdrop, or context, in which it becomes integrated (Granovetter, 1992; Wedin, 2001). This backdrop, which develops and evolves over time, can be seen as a temporally and institutionally pre-existing set of resources against which each resource is defined and to which it becomes firmly attached.

Thus, resource embeddeness is a more defined and specific expression of the foundational concepts of interconnectedness (FC 4) and interdependence (FC 6), because it requires that the interdependence among a focal resource and the surrounding ones is rooted into a historically shaped and institutionalized resource structure acting as a backdrop.

3.2.3. Resource imprints

With an understanding of the concept of resource interface in place, we can now consider the interaction across several resource interfaces. Specifically, resource imprints can be defined as *"…the form of pressures to develop certain other features that may be unimportant for a focal interface, but that are necessary for satisfying the technical, social or economic requirements of other resources in order to fit better in a network context"* (Baraldi et al., 2012a: 268).

Imprints have been used mainly (but not exclusively) within the buying/selling context concerning interaction between products, and in the producing/using setting concerning interaction between facilities (Håkansson & Waluszewski, 2002a, 2002b; Hjelmgren & Dubois, 2013). Later studies underpinned by the Developing-Producing-Using Setting framework (Dubois & Araujo, 2006; Håkansson & Waluszewski, 2007; Ingemansson & Waluszewski, 2009; Waluszewski, Baraldi, Linné, & Shih, 2009) have also adopted the concept of resource imprints as key.

3.2.4. Resource heaviness

Heaviness is another concept which has been employed to

characterize resources and their interaction. Håkansson and Waluszewski (2002a, 2002b) state that *"…the heaviness of a certain resource will give the resource more distinct features as well as multiply its effects. Along with increased heaviness of a certain resource, the freedom in terms of alternative use decreases – while its importance in established interfaces increases."* The quote implies that a resource can vary in its degree of heaviness, which in turn, has effects on interactions with other resources. Baraldi et al. (2012a): 268) suggest that heaviness is *"…the difficulties in breaking apart resource interfaces and changing resource combinations"*. This definition can be interpreted in the sense that heaviness refers to the concept of resource interface rather than being a property of a resource, as the previous quote illustrated.

These multiple interpretations point to understandings of *heaviness* as a feature of both resources and of resource interfaces. Considering these multiple interpretations of *heaviness* in the literature, following Prenkert et al. (2019), we argue that resource heaviness and heaviness of resource interfaces should be considered as two separate concepts. The two concepts are related, however. A 'heavy resource' is likely important to other resources, however, this heavy resource does not need to interact with other resources through a heavy interface.

3.2.5. Resource variety

The resources available in the business network open up the opportunity for a huge number of combinations and thus new interfaces. This is a result of both the multitude of resources available and the potential to find new possibilities to combine any two specific resources. Thus, variety is a concept that describes the numerous ways in which resources can be recombined (Håkansson & Waluszewski, 2002a, 2002b). Waluszewski and Håkansson (2001) define the aspects of variety as (i) due to the difference in contexts of resource application, (ii) where one resource is adapted in different ways by becoming a large number of, in principle, different resources, or (iii) where several different combinations of resources can produce the same output. This indicates that resource variety is first and foremost interactional; that is, it depends on how one resource is combined with others.

3.2.6. Resource friction

Friction is a result of any destabilizing force or movement of resources in relation to other interconnected resources (Håkansson & Waluszewski, 2002b). The three main features of resource friction are that it is (i) a relational concept, (ii) is time dependent, and (iii) creates transformation by affecting the features of the interacting resources. Friction implies that "*if an external force is directed towards a resource interacting with other resources, the effect will never be local. Friction will distribute it, creating some kind of reaction within a number of related resources – changing some and perhaps even breaking up some interfaces*" (Håkansson & Waluszewski, 2002a: 218). In other recent contributions friction is related more to the actor dimension and is discussed in combination with actor-network theory (Mattila, 2017).

Resource friction is central to any change process (e.g., Bygballe & Ingemansson, 2014; Hoholm & Olsen, 2012; Huemer, 2004). However, the effects of friction "…*can both hinder and facilitate change*…" (Håkansson et al., 2009: 81) and may be both stabilizing as well as destabilizing for existing resource interfaces (Håkansson & Waluszewski, 2002b). Indeed, friction has been linked to controversies and confrontations (Fremont, Eklinder Frick, Åge, & Osarenkhoe, 2018; Hoholm & Olsen, 2012), and Fremont et al. (2018) suggest a conceptual dichotomy between friction and controversy in their study of digitalization processes among producers and users. The concept of friction is mostly used for the analysis of product innovation and technology processes (Bocconcelli et al., 2018; Håkansson & Waluszewski, 2002a, 2002b; Hoholm & Olsen, 2012).

3.2.7. Resource structure

The concept of resource structure is widely used within the resource interaction literature, yet it lacks an explicit definition and has been somewhat taken for granted. Other concepts used to address resource structures within the broader IMP literature include resource constellations (Håkansson & Snehota, 1995) resource configuration (Baraldi & Strömsten, 2006; Bocconcelli et al., 2018) or resource networks (Bengtson & Håkansson, 2007; Harrison & Håkansson, 2006).

The concept of resource structure goes beyond dyadic interaction because it captures the numerous indirect interfaces that may impact on the direct interaction between two or more resources. In extant literature, resource structures have foremost been used to investigate change and innovation processes (Håkansson & Waluszewski, 2007; Ingemansson, 2010; Landqvist, 2020). More specifically, the notion of resource structure contains both current and potential resources and resource interfaces. The activated structure (current) is defined by Håkansson and Waluszewski (2002a) as "…*the current set of interfaces across the four types of resources*…" (see also Baraldi et al., 2012a). That is, the activated structure is the materialized, current resource structure. It is both an enabler and a barrier to change/development efforts (Håkansson & Waluszewski, 2002b). Activated resource structures are temporal in nature because they are based on a particular set of resource combinations at a point in time.

There is also a cognitive dimension within the resource interaction approach, which concerns the *imagined*, rather than the current resource structure. The 'idea structure' is used synonymously with the 'image layer' (Håkansson & Waluszewski, 2002a) to discuss possible development potential. No single actor/individual can have full knowledge of any resources; "…*only fragments of what is happening in the physical structure can ever be captured*" (Håkansson & Waluszewski, 2002a: 73). Rather, different actors will have different ideas, perceptions, interpretations and knowledge of a resource's qualities and features. Put differently, as Abrahamsen and Håkansson (2015: 7) suggest "…*the specific features of a resource are not only created by interaction, but also dependent upon how actors perceive the resources can be used in combination with other resources*."

There is an interplay between the idea structure and the activated structure, as sressed in Håkansson and Waluszewski's (2002a: 73) seminal contribution: "…*ideas, through interaction, are confronted both with other ideas and the activated structure*". Idea structures offer alternative solutions that might be realized in the activated structure. Two possibilities may emerge: one where the activated structure is adapted to meet new ideas and one where the idea structure is adapted to existing problems and opportunities in the activated structure. Abrahamsen, Naudè, and Henneberg (2011) see the interplay between idea structures and activated structures as one way to understand network dynamics.

3.2.8. Resource types

Resource types are the last supportive concepts in our review and represent a way to delve deeper into the notion of resources (FC 1). Håkansson and Waluszewski (2002a) classify resources into four groups: products, facilities, business units, and business relationships. The four resource types can be summarized in the 4R-model, which is a tool for mapping and analyzing how resources interact (e.g., Baraldi et al., 2012a; Bocconcelli et al., 2020; Jahre et al., 2006). Products and facilities are physical resources, whereas business (or organizational) units and business (or organizational) relationships are social resources. The business unit contains several organizational dimensions such as internal knowledge, competences, and routines, whereas business relationship can enable access to important resources outside the firm's boundary (Gadde et al., 2012).

We provide a summary of the 14 concepts outlined above in Table 3 (below). Further discussions on the specific concepts can be found in Baraldi et al. (2012a) and Bocconcelli et al. (2020).

4. Analysis: relating concepts

Many of the concepts outlined in section 3 are closely related and have overlaps. As such, as a response to research question 2 *(what are the*

Table 3
Interpretations of the most commonly used concepts.

#	Concept	Classification	Main interpretation
1	Resource/s	Foundational	An entity that has a known use and hence value to an actor (Baraldi et al., 2012b; Håkansson & Snehota, 1995; Prenkert et al., 2019).
2	Heterogeneity	Foundational	Resources have multiple and varying values and features which are activated within resource combinations (Håkansson & Snehota, 1995; Penrose, 1959).
3	Value	Foundational	Indicates the possibility for an actor to use a resource to achieve its goals, depending on how the resource can be combined with other resources in a heterogeneous context (Baraldi & Strömsten, 2006; Håkansson et al., 2009).
4	Interconnectedness	Foundational	The idea that the various elements within a network context are all connected to each other through direct as well as indirect linkages (Håkansson & Snehota, 1995).
5	Interaction	Foundational	The process that creates linkages between resources that are interconnected in a network context. This process can include more or less complex patterns, ranging from simple exchange to mutual adaptations between the actors involved (Håkansson, 1982).
6	Interdependence	Foundational	When resources have developed over time, making close connections that are difficult to separate and use in isolation (Håkansson & Snehota, 1995).
7	Interface	Supportive	A shared boundary between two entities (Baraldi et al., 2012a).
8	Embeddedness	Supportive	Indicates that resources are interconnected and interdependent in patterns that attach a specific resource within a wider network of resources (Wedin, 2001).
9	Imprint	Supportive	The effect on a resource from the *"…pressures to develop certain […] features […] that are necessary […] to fit better in a network context"* (Baraldi et al., 2012b: 268).
10	Heaviness	Supportive	*"…the difficulties in breaking apart resource interfaces and changing resource combinations"*Baraldi et al. (2012b: 268).
11	Variety	Supportive	Describes the extent to which resources can be (re)-combined (Håkansson & Waluszewski, 2002a, 2002b).
12	Friction	Supportive	*"How an alteration force directed at one resource is transferred to resources it is interacting with and how this friction can act as both a stabiliser and a destabiliser of existing resource interfaces"* (Håkansson & Waluszewski, 2002a: 217).
13	Resource structure	Supportive	A structure of activated resources which affects resource interfaces (Håkansson & Waluszewski, 2002a).
14	Resource types	Supportive	The most common typology is that of the "Four Resource Interaction or 4R model". This classifies resources into products, facilities, business units, and business relationships (Håkansson & Waluszewski, 2002a).

differences and overlaps between apparently similar concepts?) we will discuss distinctions and connections across concepts in this section. In section 5, we will thereafter answer our third research question; *'how can the key concepts be systematically related to explain the links between resource interaction and value'?* To this end, section 4 and 5 provides three examples of representations of the relations between concepts, all sharing a focus on how resource interaction relate to FC 3 'value'. We use FC 3 as a common theme, as value constitutes one of the most important and fundamental themes in extant literature already since Penrose (1959). This unique character of value is manifest in a very special way: It is meaningful *only as a relational* concept and is thus inherently linked to the assumptions made about industrial marketing as inherently relational as was postulated at the introduction. This is fundamental and we shall therfore discuss it in detail next.

4.1. Overlaps and differences

Table 4 provides a simplified analysis of the differences between the concepts presented in section four. The concepts are divided into two categories based on how they have been used in previous research to analyze and understand resource interaction. Thus, concepts are classified into two types: Those usually (but not exclusively) used to describe features of (i) single resources and (ii) resource combinations.

Readers should note that Table 4 contains only 12 out of the 14 concepts previously identified. 'Resources' and 'value' are omitted. Resources, because it is the very first foundational concept – the genetic origin of resource interaction. It could be termed a *genetic* concept because without this, no other concepts would make any sense in analyses of resource interaction: In resource interaction 'resources' are axiomatically assumed being central and around which an understanding of economies can be developed. It is from this concept that all other becomes sensible. As such it does not make sense to categorize this concept as related to single resources or resource combinations, since it is the benchmark against which all other concepts are evaluated here. The benchmark cannot be benchmarked against itself.

The concept of value is omitted for another reason: In order to define the value of a resource in resource interaction, a specific combination of singe resource features and how these specifically relate to other specific resource features in a context is always required. Hence the dichotomy of single and multiple resources does not represent a meaningful distinction and thus becomes irrelevant for the concept of value, because it always requires the attention of both aspects of resources to be properly understood – it is a relational concept always requiring at least two resources and it is meaningful only as a relational concept. However, the remaining concepts may be fruitful to classify thus and have indeed been used in this way in previous research on resource interaction. We argue that because not all analyses of resources focus on their value, it can be useful to distinguish between concepts centered on a single resource and those concerning combinations of multiple resources. The left side of Table 4 presents concepts that can be used to describe a single specific resource and its effects on another resource. The right side lists concepts focusing on resource combinations. From an IMP approach as we have defined it here, we would not consider an analysis of single resources particularly meaningful due to the emphasis on the relational stance towards reources and hence on resource *interaction*. However, this distinction becomes blurred in some investigations of resources.

For instance, resources are analyzed in terms of their various types – products, facilities, organizational units and relationships – a categorization which focuses on single resources without necessarily penetrating their relational value. Heaviness can also be seen as a characteristic of a specific resource, even if it derives from the interfaces with other resources. Similarly, friction and imprints may well imply two or more interacting resources, but they can both be observed as effects on single resources (Håkansson & Waluszewski, 2002a): friction concerns how the changing forces applied on a specific resource transfer to another resource, while imprints are effects of change pressures visible on a specific resource. While recognizing the general relational aspect of all resources, we can identify situations where characteristics of single resources take precedence.

The right-hand column of Table 4 includes more distinctly relational concepts, in that these focus on how several resources are combined,

Table 4
Classification of concepts: single resources and resource combinations.

Single resources	Resource combinations
Type	Interconnectedness
Heaviness	Interaction
Imprint	Interdependence
Variety	Interface
Friction	Structure
	Embeddedness
	Heterogeneity

especially in structural terms. For example, 'resource interaction' encompasses how multiple resources become interconnected and interdependent. Resource interaction also creates resource interfaces and embeds resources in a wider resource structure. Finally, resources are heterogeneous when combined, because their value depends on how they are combined with other resources.

4.2. Connecting and grouping several concepts

Whereas in the prior section 'value' and 'resources' were not included in the classification due to their special character as relational and genetic concepts in investigations of resource interaction, we shall now contrarywise put these concepts center stage in an analysis of how concepts of resource interaction relate to them. First we shall analyze how we can understand value creation in relation to resource interaction by relating 'embeddedness', 'interconnectedness', 'heterogeneity' and 'variety' from Table 4 to each other. 'Embeddedness' and 'interconnectedness' are similar and partly overlapping, but also different, which can create confusion. Both concepts indicate that resources are connected to each other in a larger resource structure, but these concepts also indicate that resources are connected in different ways. Two other similar but also different concepts are 'variety' and 'heterogeneity', which concern the features of resources.

As is shown in Fig. 2, the four concepts 'interconnectedness', 'embeddedness', 'heterogeneity, and 'variety' can aid researchers to conceptually understand how resources relate to each other to create value in business networks. In particular, Fig. 2 helps us address the second research question by demarcating these four concepts, that is, separating them but also showing how they overlap by means of the intercepting circles. The definitions of, and relation between, the concepts also serve to explain the conceptual difference between the concepts since they all fill a specific and separate purpose in explaining how value emerges from networks of interacting resources.

In Fig. 2, we define heterogeneity in terms of the value of a resource deriving both from the uniqueness of a specific resource and from its combinations with multiple, interconnected resources. Moreover, interconnections between specific resources occur in an institutional and historical context captured by the concept of embeddedness. It is this focus on the historical and institutional context that distinguishes embeddedness from interconnectedness. The latter concept is more general, referring to the simple fact that two or more resources are connected, irrespective of the temporal or institutional origin of such a connection.

In the IMP approach, embeddedness is used occasionally in a more general sense to indicate that something is situated in a context (e.g., Araujo & Rezende, 2003). However, since this weaker form of embeddedness simply means that resources are interconnected, we suggest using the concept of interconnectedness instead of embeddedness to convey this kind of meaning. In this regard, resource interconnectedness can be used to describe that resources are simply linked to each other through resource interfaces, but not how, why and with which effects.

A more qualified and specific type of connection between resources would instead be expressed by the concept of interdependence (see Table 2). This can be used to emphasize that resources are mutually dependent, with specific effects such as friction or heaviness. Finally, resource embeddedness can be used to emphasize that two or more resources are not only connected and mutually dependent, but also that a strand of these resources constitutes a preexisting institutionalized structure which embraces the other resources.

Fig. 2 shows that the embeddedness and interconnectedness of resources in turn affect the variety of resources (the numerous ways in which a resource can be recombined with other resources). This further contributes to the uniqueness of that resource and hence its heterogeneity. There is still, however, some conceptual confusion about the definition of the concept of variety, as variety stems from both the primary resources in itself, as well as from the manufactured man-made variety from production and transformation processes in organized economic activity (Håkansson & Waluszewski, 2002a; Prenkert et al., 2019). Variety sometimes refers to the uniqueness of a resource compared to other resources, and some other times to the unique ways in which one resource can be combined with other resources. We suggest that whenever variety is used as a concept, researchers should explicitly specify *how* it is used (as relating to the resource itself or to the ways it can be combined).

Finally, the loop of intercepting circles in Fig. 2 is completed by defining variety as the concept that describes resource uniqueness, which in turn gives resources the property of being heterogeneous. Furthermore, all of these concepts in the loop help to conceptually understand how value is created, as we stress in the interceptions across all four ovals in the center of Fig. 2.

Taken together, Fig. 2 depicts some connections across the important concepts within resource interaction as related to value creation. However, there are also other ways of linking concepts to each other in relation to value. In section 5, we cluster concepts in three representations based on how they have been used in previous analysis, i.e. depending on the theme of the research in question. First we shall look at how concepts from resource interaction can been used to understand value creation using Fig. 2 as a point of departure. Second, we shall look at not only value creation, but also value measuring and value capturing. Finally, we shall look at how concepts from resource interaction can be used to understand the indirect role of value in new business creation.

5. Discussion: Three example representations

Referring once more to Fig. 2, we begin this section by analyzing the multiple connections across the five concepts of value, heterogeneity, interconnectedness (all foundational concepts), and variety and embeddedness (two supportive concepts). (The rationale behind this is discussed in the methodology section as well as in the introduction). By a logical process, we can first look at connections between sets of two concepts, and then among all five.

The connection between heterogeneity and interconnectedness can be expressed as the specific ways in which a resource is interconnected with other resources influences in unique ways that resource's feature. This implies that changes in these interconnections would also change the resource's features, including its value. The connection between variety and embeddedness can be expressed as the possible combinations of a resource with other resources can be both restricted and facilitated by the specific context in which that focal resource is embedded. We posit that these four concepts can be connected to value and value creation (see the center of Fig. 2). Specifically, the value of heterogeneous resources stems from the variety in the possibilities of combining each of them with other interconnected resources within the frame of an institutional context embedding all these resources.

These are examples of connections that can be made between and across concepts based on abstraction and conceptual discussion. However, groupings of concepts can be made based on different purposes and logics, depending upon the question at hand. As such, in this section we explore examples of representations covering, first, only a small number of foundational and supportive concepts, and then, second, a broader set of concepts. The first grouping relates to a set of specific connections focusing on three particular processes related to value and resource interaction (Fig. 3). The second relates to a set of connections focusing on analyzing the role of value in a specific empirical phenomenon in terms of a new business formation (Fig. 4).

5.1. Conceptual representations of value creation

Fig. 3 features a total of seven concepts to address the processes of value measuring and value capturing (Baraldi & Lind, 2017), beyond that of value creation which was discussed above. In this figure, the

foundational concepts are found at the center and in bold typeface, and the supportive concepts at the outer rims in italicized typeface. Concepts not classified as neither foundational nor supportive in Table 3 are at the periphery in non-emphasized type face.

While value creation can be understood by using the four concepts in the center of the figure, three foundational ones (*resource*, *value*, and *interaction*) and a supportive one (the *resource structures* embedding the focal resource), measuring and capturing value can be better understood by introducing concepts that have so far not played a central role in analyses of resource interaction. In particular, value measuring is the process of assessing the value created around a specific resource by means of accounting information about resources (Baraldi & Lind, 2017), while value capturing is the process whereby particular actors appropriate value from a resource through *monetary flows* regulated by a *deal structure* that grants actors particular rights to resources (Håkansson & Olsen, 2015).

Concepts such as information, money and deals would expand the toolbox presented in Table 3. In particular, money can be seen as a "particular kind of resource" (Håkansson & Olsen, 2015: 207) which allows performing exchanges between actors and measures value through mechanisms like prices. A conceptual challenge for resource interaction would be to embrace a resource which has been traditionally considered as homogenous, standardized, and easy to move (Håkansson & Olsen, 2015), as opposed to the heterogeneity and embeddedness of the other resource elements. A step towards viewing money as a relational concept is considering the monetary flows associated with business deals, which emerge from interactions among certain actors during a negotiation process whereby they try to evaluate and gain control over resources as well as distribute costs and revenues associated with them.

Information about resources can be seen as explicit knowledge that can be exchanged between actors for instance during negotiations as a way to represent the involved resources, that is, as a meta-resource (Baraldi, 2003). At the same time, knowledge is considered mostly as embodied within resources, both physical ones as technologies, and social ones such as organizations and relationships, where knowledge is manifested in routines or the employees' skills (i.e., as tacit knowledge). These two facets suggest that knowledge and information are particular resources that, like money, deserve further conceptualization.

Our second example, see Fig. 4, focuses on the particular purpose of investigating new business formation. It also zooms in on the central part of Fig. 3 in terms of value and resources, as new business formation represents a particular manifestation of value creation.

Fig. 4 proposes using the concepts of *embedding*, *resource types*, *resource structure*, *friction*, *variety* and *interdependencies*, to make sense of new business formation. In particular, Fig. 4 depicts a process whereby the two specific resource types of a new organizational unit and its own new product(s) become embedded into a resource structure. This embedding happens against a set of complex technical and social interdependencies in the existing resource structure, which can expose the specific resource types 'new product' and 'new organizational unit' to friction. However, the process of embedding the new business and its product(s) can be facilitated by the variety of these two resource types and by relying also on the resource type new relationships being created around the new business (Ciabuschi, Perna, & Snehota, 2012).

6. Conclusions

At the outset of the paper, we identified the need to substantiate a 'Resource Interaction Approach'. Our aim was to start to develop a shared understanding about the phenomenon of resource interaction, and to assess to which degree it might qualify as an approach. We posit that the research about resource interaction *as a phenomenon* may qualify as an approach comprising several concepts as discussed here. What remains to be done is to further develop existing models and create new ones to complement the conceptual development shown here. Thus, we conclude that resource interaction currently may qualify as an approach in itself based on the *phenomenon* of resource interaction. However, it does not qualify as an approach based on its *theoretical* constructs. At present, it draws theoretically on the assumptions made in the IMP approach. Over time, resource interaction may evolve into an approach also in a more theoretical sense. The paper by Baraldi et al. (2012a) is an early harbinger of this development, and those by Bocconcelli et al. (2020) and Huemer and Wang (2021), more recent ones. We certainly need more knowledge on this issue. Nevertheless, we can already conclude that it is important to explicitly state the way in which one uses the term 'approach', whether it is based on resource interaction as a *phenomenon* or as a theoretical *construct*.

To qualify as an approach based on a theoretical construct, an important factor is a shared understanding of the vantage point from which the phenomena of resources and resource interaction are studied. We started our investigation by taking an IMP approach in which a relational stance is core. Our discussion shows that this stance is not always kept intact, especially when it comes to discussions on resource types and resource characteristics. To foster continued systematic development, upholding the assumptions made in the IMP approach would seem fruitful, for several reasons: First, it creates coherence. Second, it reduces confusion, conceptually and linguistically. Third, it catalyzes development, and fourth, it offers identity and profile to the work. The latter would perhaps make it easier to access by other fields that make different assumptions and perhaps take alternative vantage points on similar phenomena. Alternatively, this discrepancy could point to the fact that resource interaction is developing into an approach also from a more theoretical point of view. More research is needed to clarify whether this is indeed the case and what it entails.

We also set out to explain why, when, and how resource interaction is linked to value creation in business relationships and networks. Our three representations provide some tentative middle range theory to explain why resource interaction is linked to value. That is, resources are heterogeneous, varied, interconnected, and embedded. Resources are therefore imbued with value only by way of interaction (Fig. 2). How this is done varies depending on whether creating, measuring, or capturing value is in focus (Fig. 3). When value is created in a new business venture, it entails exploiting the variety of a resource by embedding it into a new context of interdependencies. However, this may also create friction which must be managed in some way (Fig. 4). Taken together, our results provide a step towards a more detailed understanding of resource interaction and explain some links between resource interaction and value.

We propose that our paper can be useful for (at least) three groups of researchers: (i) experienced IMP scholars, (ii) new IMP scholars, and, of course, (iii) curious scholars from parallel B2B areas. For experienced scholars, the analytical work in the paper can serve as stepping stones for developing further conceptual and empirical knowledge about resource interaction. For example, any or all of Figs. 2 to 4 might shape work on value creation, value measuring and value capturing. Second, for new IMP scholars, the paper should provide a rapid overview of the key concepts, relationships among concepts, and examples of conceptual representations. For scholars in parallel B2B areas, such as SDL and servitization, our paper makes it easier to identify main themes, and potential commonalities, and perhaps identify new ways to combine theoretical ideas.

Moreover, the focus in the paper on value might also serve as an entry point for scholars in the fields of accounting and financial management to use resource interaction as a research tool. Thus, this work can add to and extend the works already done by IMP scholars on accounting in networks (e.g., Håkansson, Kraus, & Lind, 2010; Kraus & Lind, 2007; Lind & Thrane, 2010). Further research could, for example, investigate how value is measured and captured in complex networks by focusing on resource interaction. Lastly, we argue that investigating resource interaction has relevance also in broader analyses of interconnected complex economies in general. The 14 concepts can be used to better understand, for example, interactions between natural and

man-made resources, how different materials interact and the role of artificial intelligence, etc.

6.1. Limitations and suggestions for further research

This paper has relied on a conceptual review. As such, the categories and representations need to be explored and tested in further empirical research. Moreover, in this paper we have assumed resources to exist both as natural, or man-made independent of human interaction, as well as dependent on human cognition, perception and action (Håkansson and Waluszewski, 2002a), as social constructions. While there are degrees of social construction, going into more sophisticated ontological and epistemological discussions is outside the scope of this paper. However, this is an important issue to investigate further. More research is also needed to reveal how and in what way resource interaction can be considered an approach both from a phenomenon and a theoretical point of view.

Finally, while the paper has focused on resource interaction, we acknowledge that resources do not exist in a network vacuum: they are attached to actors and enable activities. However, as we have focused on resource interaction, actors appear indirectly in our research, as do activities. Novel avenues for research could, for example, include the way that resources can be attached to actors by way of the institution of property rights.[1] The role of contracts and resource interaction is also worthy of further development, as is the sensemaking, sensegiving and sensebreaking work involved in forming and changing resource combinations.

References

Abrahamsen, M. H., & Håkansson, H. (2015). Resource heterogeneity and its effects on interaction and integration in customer-supplier relationships. *IMP Journal, 9*(1), 5–25.

Abrahamsen, M. H., Naudè, P., & Henneberg, S. C. (2011). Network change as a battle of ideas? Analysing the interplay between idea structures and activated structures. *IMP Journal, 5*(2), 1–18.

Adams, J. (2012). Collaborations: The rise of research networks. *Nature, 490*(7420), 335–336.

Alchian, A. A., & Demsetz, H. (1972). Production, information costs, and economic organization. *American Economic Review, 62*(5), 777–795.

Anderson, J. C., Håkansson, H., & Johanson, J. (1994). Dyadic business relationships within a business network context. *Journal of Marketing, 58*(4), 1–15.

Andersson, U., Forsgren, M., & Pedersen, T. (2001). Subsidiary performance in multinational corporations: The importance of technology embeddedness. *International Business Review, 10*(1), 3–23.

Aramo-Immonen, H., Carlborg, P., Hasche, N., Jussila, J., Kask, J., Linton, G., Mustafee, N., & Öberg, C. (2020). Charting the reach and contribution of IMP literature in other disciplines: A bibliometric analysis. *Industrial Marketing Management, 87*, 47–62.

Araujo, L., & Rezende, S. (2003). Path dependence, MNCs and the internationalisation process: A relational approach. *International Business Review, 12*(6), 719–737.

Baraldi, E. (2003). *When information technology faces resources interaction: Using IT tools to handle products at IKEA and Edsbyn*. Doctoral Thesis. Sweden: Uppsala University.

Baraldi, E., & Bocconcelli, R. (2001). The quantitative journey in a qualitative landscape: Developing a data collection model and a quantitative methodology in business networks studies. *Management Decision, 39*(7), 564–577.

Baraldi, E., Gregori, G. L., & Perna, A. (2011). Network evolution and the embedding of complex technical solutions: The case of the Leaf House network. *Industrial Marketing Management, 40*(6), 838–852.

Baraldi, E., Gressetvold, E., & Harrison, D. (2012a). Resource interaction in inter-organizational networks: Foundations, comparison, and a research agenda. *Journal of Business Research, 65*(2), 266–276.

Baraldi, E., Gressetvold, E., & Harrison, D. (2012b). Resource interaction in inter-organizational networks: introduction to the special issue. *Journal of Business Research, 65*(2), 123–127 (2012).

Baraldi, E., & Lind, J. (2017). Value measuring and value appropriation in business networks. In H. Håkansson, & I. Snehota (Eds.), *No business is an island* (pp. 47–66). London: Emerald.

Baraldi, E., & Strömsten, T. (2006). Embedding and utilising low weight: Value creation and resource configuration in the networks around IKEA's Lack table and Holmen's newsprint. *IMP Journal, 1*(1), 39–70.

Barlow, J., Stephens, P. A., Bode, M., Cadotte, M. W., Lucas, K., Newton, E., … Pettorelli, N. (2018). On the extinction of the single-authored paper: The causes and consequences of increasingly collaborative applied ecological research. *Journal of Applied Ecology, 55*(1), 1–4.

Baumeister, R. F., & Leary, M. R. (1997). Writing narrative literature reviews. *Review of General Psychology, 1*(3), 311–320.

Bengtson, A., & Håkansson, H. (2007). Introducing "old" knowledge in an established user context: How to use wood in the construction industry. In H. Håkansson, & A. Waluszewski (Eds.), *Knowledge and innovation in business and industry* (pp. 66–90). London: Routledge.

Biemans, W. G. (1992). *Managing innovation within networks*. London: Routledge.

Bizzi, L., & Langley, A. (2012). Studying processes in and around networks. *Industrial Marketing Management, 41*(2), 224–234.

Bocconcelli, R., Carlborg, P., Harrison, D., Hasche, N., Hedvall, K., & Huang, L. (2020). Resource interaction and resource integration: Similarities, differences, reflections. *Industrial Marketing Management, 91*, 385–396.

Bocconcelli, R., Murmura, F., & Pagano, A. (2018). Interacting with large customers: Resource development in small b2b suppliers. *Industrial Marketing Management, 70*, 101–112.

Brodie, R. J., Saren, M., & Pels, J. (2011). Theorizing about the service dominant logic: The bridging role of middle range theory. *Marketing Theory, 11*(1), 75–91.

Bygballe, L. E., & Ingemansson, M. (2014). The logic of innovation in construction. *Industrial Marketing Management, 43*(3), 512–524.

Cantù, C., Corsaro, D., & Snehota, I. (2012). Roles of actors in combining resources into complex solutions. *Journal of Business Research, 65*(2), 139–150.

Ciabuschi, F., Perna, A., & Snehota, I. (2012). Assembling resources in the formation of a new business. *Journal of Business Research, 65*(2), 220–229.

Cova, B., Ford, D., & Salle, R. (2009). Academic brands and their impact on scientific Endeavour: The case of business market research and researchers. *Industrial Marketing Management, 38*(6), 570–576.

Dubois, A., & Araujo, L. (2006). The relationship between technical and organisational interfaces in product development. *IMP Journal, 1*(1), 21–38.

Eisenhardt, K. M., & Bourgeois, L. J. I. (1988). Politics of strategic decision making in high-velocity environments: Toward a midrange theory. *Academy of Management Journal, 31*(4), 737–770.

Fremont, V. H. J., Eklinder Frick, J., Åge, L.-J., & Osarenkhoe, A. (2018). Interaction through boundary objects: Controversy and friction within digitalization. *Marketing Intelligence & Planning, 37*(1), 111–124.

Gadde, L.-E., Hjelmgren, D., & Skarp, F. (2012). Interactive resource development in new business relationships. *Journal of Business Research, 65*(2), 210–217.

Granovetter, M. (1985). Economic action and social structure: The problem of embeddedness. *American Journal of Sociology, 91*(3), 481–510.

Granovetter, M. (1992). Economic institutions as social constructions: A framework for analysis. *Acta Sociologica, 35*, 3–11.

Håkansson, H. (1982). *International marketing and purchasing of industrial goods – an interaction approach*. New York: Wiley.

Håkansson, H. (1987). *Industrial technological development: A network approach*. London: Croom Helm.

Håkansson, H., Ford, D., Gadde, L.-E., Snehota, I., & Waluszewski, A. (2009). *Business in networks*. Chichester: Wiley.

Håkansson, H., Harrison, D., & Waluszewski, A. (Eds.). (2004). *Rethinking marketing. Developing a new understanding of markets*. Chichester: Wiley.

Håkansson, H., Kraus, K., & Lind, J. (Eds.). (2010). *Accounting in networks*. New York: Routledge.

Håkansson, H., & Olsen, P. I. (2015). The roles of money and business deals in network structures. *Industrial Marketing Management, 45*, 207–217.

Håkansson, H., & Snehota, I. (1989). No business is an island: The network concept of business strategy. *Scandinavian Journal of Management, 5*(3), 187–200.

Håkansson, H., & Snehota, I. (Eds.). (1995). *Developing relationships in business networks*. London: Routledge.

Håkansson, H., & Waluszewski, A. (2002a). *Managing technological development. IKEA, the environment and technology*. London: Routledge.

Håkansson, H., & Waluszewski, A. (2002b). Path dependence: Restricting or facilitating technical development? *Journal of Business Research, 55*(7), 561–570.

Håkansson, H., & Waluszewski, A. (Eds.). (2007). *Knowledge and innovation in business and industry. The importance of using others*. London, New York: Routledge.

Halinen, A., & Törnroos, J.-A. (1998). The role of embeddedness in the evolution of business networks. *Scandinavian Journal of Management, 14*(3), 187–205.

Halinen, A., & Törnroos, J.-Å. (2005). Using case methods in the study of contemporary business networks. *Journal of Business Research, 58*(9), 1285–1297.

Harrison, D., & Håkansson, H. (2006). Activation in resource networks: A comparative study of ports. *The Journal of Business & Industrial Marketing, 21*(4), 231–238.

Hasche, N., Kask, J., Linton, G., & Prenkert, F. (2020). Conceptualizing tangible resources in interaction: Sites and interfaces. In *Proceeding EURAM, European Academy of Management, Dublin, June 10-12*.

Hjelmgren, D., & Dubois, A. (2013). Organising the interplay between exploitation and exploration: The case of interactive development of an information system. *Industrial Marketing Management, 42*, 96–105.

Hoffman, L. (Ed.). (1979). *The group problem-solving process: Studies of a valence model*. New York: Praeger.

Hoholm, T., & Olsen, P. I. (2012). The contrary forces of innovation. A conceptual model for studying networked innovation processes. *Industrial Marketing Management, 41*(2), 344–356.

Holmen, E. (2001). *Notes on a conceptualisation of resource-related embeddedness of interorganisational product development*. Doctoral Thesis. Denmark: University of Southern Denmark.

Huemer, L. (2004). Balancing between stability and variety: Identity and trust trade-offs in networks. *Industrial Marketing Management, 33*, 251–259.

[1] We are indebted to one of the reviewers for bringing this to our attention.

Huemer, L., & Wang, X. (2021). Resource bundles and value creation: An analytical framework. *Industrial Marketing Management, 134*, 720–728.
Hulland, J. (2020). Conceptual review papers: Revisiting existing research to develop and refine theory. *AMS Review, 10*(1), 27–35.
Hurmelinna-Laukkanen, P., & Nätti, S. (2018). Orchestrator types, roles and capabilities – A framework for innovation networks. *Industrial Marketing Management, 74*, 65–78.
Iacobucci, D. (Ed.). (1996). *Networks in marketing*. Thousand Oaks, CA: Sage Publications.
Ingemansson, M. (2010). *Success as science but burden for business? On the difficult relationship between scientific advancement and innovation. Doctoral thesis*. Uppsala University, Sweden.
Ingemansson, M., & Waluszewski, A. (2009). Success in science and burden in business. On the difficult relationship between science as a developing setting and business as a producer-user setting. *IMP Journal, 3*(2), 20–56.
Jaakkola, E. (2020). Designing conceptual articles: Four approaches. *AMS Review, 10*, 18–26.
Jahre, M., Gadde, L.-E., Håkansson, H., Harrison, D., & Persson, G. (Eds.). (2006). *Resourcing in business logistics - the art of systematic combining*. Malmö: Liber and Copenhagen Business School Press.
Kennedy, M. M. (2007). Defining a literature. *Educational Researcher, 36*(3), 139–147.
Kraus, K., & Lind, J. (2007). Management control in inter-organisational relations. In T. Hopper, D. Northcott, & R. Scapens (Eds.), *Issues in management accounting* (pp. 269–296). Harlow: Prentice Hall.
Landqvist, M. (2020). *The case of start-ups approaching the Swedish energy system*. Doctoral Thesis. Sweden: Chalmers University of Technology.
Lind, J., & Thrane, S. (2010). Towards accounting in network settings. In H. Håkansson, K. Kraus, & J. Lind (Eds.), *Accounting in networks*. New York: Routledge.
Markman, A. B. (2006). Conceptual representations in psychology. In *Encyclopedia of cognitive science*. Wiley.
Mattila, M. (2017). Coping with friction during technology commercialisation. *IMP Journal, 11*(2), 251–273.
Mattsson, L.-G. (1985). An application of a network approach to marketing: Defending and changing market positions. In N. Dholakia, & J. Arndt (Eds.), *Changing the course of marketing: Alternative paradigms for widening marketing theory* (pp. 263–288). Greenwich, CT: JAI Press.
McGrath, J. (1984). *Groups: Interaction and performance*. Englewood Cliffs: Prentice-Hall.
Medlin, C. J. (2004). Interaction in business relationships: A time perspective. *Industrial Marketing Management, 33*(3), 185–193.
Merton, R. K. (1967). *On theoretical sociology: Five essays, old and new*. New York: The Free Press.
Möller, K., & Halinen, A. (2022). Clearing the paradigmatic fog — How to move forward in business marketing research. *Industrial Marketing Management, 102*, 280–300.
Nason, S. W., & Pillutla, M. M. (1998). Towards a model of international research teams. *Journal of Managerial Psychology, 13*(3/4), 156–166.
Northcraft, G., & Neale, M. (1993). Negotiating successful research collaboration. In J. Murnighan (Ed.), *Social psychology in organizations: Advances in theory and research*. Englewood Cliffs: Prentice-Hall.
Penrose, E. T. (1959). *The theory of the growth of the firm*. Oxford: Basil Blackwell.
Prenkert, F., Hasche, N., & Linton, G. (2019). Towards a systematic analytical framework of resource interfaces. *Journal of Business Research, 100*, 139–149.
Ratajczak-Mrozek, M. (2017). *Network embeddedness. Examining the effect on business performance and internationalization*. Cham: Palgrave Macmillan.
Sutton, R. I., & Staw, B. M. (1995). What theory is not. *Administrative Science Quarterly, 40*(3), 371–384.
Tian, M. (2019). Turning a technology into many solutions: A case study of embedding an information system. *Journal of Business Research, 101*, 23–39.
Uzzi, B. (1996). The sources and consequences of embeddedness for the economic performance of organizations. *American Sociological Review, 61*(4), 674–698.
Uzzi, B. (1997). Social structure and competition in interfirm networks: The paradox of embeddedness. *Administrative Science Quarterly, 42*(1), 35–67.
Waluszewski, A., Baraldi, E., Linné, Å., & Shih, T. (2009). Resource interfaces telling other stories about the commercial use of new technology: The embedding of biotech solutions in US, China and Taiwan. *IMP Journal, 3*(2), 86–123.
Waluszewski, A., & Håkansson, H. (2001). *Co-evolution in technological development. The role of friction. Paper presented at the 17th IMP-conference, Oslo, Norway*.
Wedin, T. (2001). *Networks and demand: The use of electricity in an industrial process. Doctoral Thesis. Department of Business Studies*. Uppsala: Uppsala University.
Weick, K. E. (1989). Theory construction as disciplined imagination. *Academy of Management Review, 14*(4), 516–531.
Weick, K. E. (1995). What theory is not, theorizing is. *Administrative Science Quarterly, 40*(3), 385–390.
Whitfield, J. (2008). Group theory: What makes a successful team? *Nature, 455*, 720–723.