This book series on research in international human resource management and strategy is designed to stimulate discussions on current developments in these disciplines. The scope of this series reflects the importance of the fields of strategy and human resource management in the international environment of a globalised world. Both fields have the potential to contribute essentially to the description and explanation of competitive advantage realisation, performance issues and to achieving other corporate goals and objectives. Therefore, these areas need attention in research as well as in practice. This series will focus on the latest research results in this field.

This volume consists of concepts and cases from research in the field of industry clusters by different authors. The aim of this book is to undertake an in-depth exploration of the topic of industry clustering from both management and policy perspectives. The book examines clustering from the standpoint of the single firm in the cluster and, in so doing, derives a novel formulation of clusters as comprising single firms with surrounding concomitant chains of relationships with suppliers, other similar firms and, institutions of government and its agencies. Because of the resources that then can be attributed to firms within the cluster, the resultant conceptualisation of industry clusters is called value adding webs. It is contended that these then develop as a series of overlapping value adding webs forming an industry cluster. The concept is elaborated and applied to different cluster cases in this book.

Key words: Value Adding Webs, Industry Clusters, Strategy,
 Competitive Advantages, Public Policy, Case Studies

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Value Adding Webs and Clusters

Concepts and Cases

VALUE ADDING WEBS AND CLUSTERS—CONCEPTS AND CASES

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CHAPTER 1: SINGLE FIRMS, PUBLIC POLICY AND INDUSTRY CLUSTERS: SOME REFLECTIONS ON THE FIELD

Kerry Brown, John Burgess, Marion Festing, Susanne Royer, Robyn Keast

Our aim in this book is to undertake an in-depth exploration of the topic of industry clustering from both management and policy perspectives. The book examines clustering from the standpoint of the single firm in the cluster and, in so doing, derives a novel formulation of clusters as comprising single firms with surrounding concomitant chains of relationships with suppliers, other similar firms and, institutions of government and its agencies. Because of the resources that then can be attributed to firms within the cluster, we refer to the resultant conceptualisation of industry clusters as value adding webs (VAWs). It is contended that these then develop as a series of overlapping value adding webs forming an industry cluster.

Several strands of research questions follow from this formulation. One area is to examine the relational, organisational and structural resources supporting single firms in creating value within clusters. Another area is to be able to identify the optimal policy approaches to foster the emergence and growth of regional industry clusters. A further consideration is to understand how certain firms might leverage from being located in a cluster to create value such as the value of proximity in creating knowledge and the ways in which there might be a multiplier effect in sharing resources such as knowledge across the different cluster firms.

The focus is the role of a single actor embedded in a (regional) value adding web and understanding the benefits as well as disadvantages. Our cluster studies are not based on the assumption that all clusters are 'good' but that industry clusters sustain cluster resources and their value creation potential arises on different cluster levels. The aim is to understand the drivers for value creation as well as reasons for mal-performing clusters.

The field of industry cluster research has progressed from the early work of Alfred Marshall and his work on industrial districts around a century ago in the early 1900s. McCann and Folta (2008) put forward that Marshall's seminal research on industrial districts was one of the first studies outlining the economic benefits of similar firms locating in close proximity to each other.

McCann and Folta (2008) in their wide-ranging review of the 'state of play' for research based on theories of agglomeration or co-location suggest that the resultant cluster research has advanced in two main streams; the first is through the field of economic geography and the second is through management research. Economic geography research focuses on the importance of location for gaining firm advantage and examines geographic agglomeration of firms. Within management research, industry clustering has been dominated by the extensive and popular work of Michael

Porter who linked clusters to the achievement of economic growth, employment, innovation and competition through the synergies created by geographic co-location (Porter 1981, 1985, 2000).

The work of others in the economic geography field especially Martin and Sunley (2003) and Taylor (2009) go to the crux of the research problem addressed in this volume, namely acknowledging that the field of economic geography has not been able to address policy aspects of industry clusters. Following Porter's landmark research in the management field, Martin and Sunley (2003) offer that economic geography has 'largely been ignored'. Our study sheds new light on this area of industry clustering and forges new thinking outside the field of economic geography and into management and policy arenas.

Thus the management and policy fields of research are the main arena within which the contributions to this book are located. This book takes as its core assumption that modern industry clustering offers a unique opportunity to study the way in which firms may create value from harnessing the dynamics of working together in a particular location.

The first part of the book canvasses a range of management issues relating to industry clustering to provide a coherent picture of the field of research and practice. Different management and policy mechanisms to create value for the clustered firms are outlined in each of the three chapters comprising this section.

Chapter 2 offers a new approach to understanding industry clustering. The research focuses on putting forward and testing the utility of a new conceptual framework for clustering. The chapter authors, Kerry Brown, John Burgess, Marion Festing, Susanne Royer, Charlotte Steffen and Jennifer Waterhouse, suggest that to the present time, public policy has been limited in its effectiveness in promoting clustering. This chapter aims to investigate a more holistic approach to cluster policy by focusing, not just at the level of the cluster or industry, but at the way policy intersects with different cluster levels—the context, relations between cluster actors and firms operating within it. Resources on these different levels are identified and an analytical tool is suggested to assess their value creation potential. Such assessments then deliver a sound basis for public policy decisions regarding regional development.

In their chapter on clusters and regional development, Andreas Cornett and Mads Bruun Ingstrup investigate the effects of industry clustering as a vehicle for regional development, particularly in relation to the Danish situation. The focus of this chapter is on clusters as a tool to develop the competitiveness and sustainability of industries and regions. Thus, this chapter focuses on the contextual level of clusters. For the Danish cluster context it is highlighted that the public actors in the different Danish regions have a similar approach to cluster development: they favour a bottom-up approach, apply a life cycle perspective on clusters and use similar implementation and administration procedures. Cornett and Ingstrup illustrate this approach for different types of clusters in the region of Southern Denmark. The

chapter ends with an assessment of the usefulness of cluster development as a tool in regional business development policy.

In the following chapter, the relational level is the focus of interest here. While there has been considerable interest in organisational clustering, the influence of proximity on knowledge sharing within industry clusters has remained relatively unexplored. Authors John Burgess, Rebecca Mitchell and Jenny Waterhouse have responded to this research gap by examining the contribution of different proximity dimensions to knowledge sharing in Chapter 4. The aim of this chapter is to theoretically investigate the utility of relational and geographic proximity dimensions in understanding the nature of knowledge sharing in clusters. This investigation adds to existing literature by exploring the mechanisms through which proximity conveys knowledge-related advantage. By identifying four types of proximity: organisational, institutional, personal and cognitive proximity, the authors build a convincing case that the reach of knowledge can be increased, along with the ability to share knowledge through these differing proximal avenues. The output of this process is a framework that categorises the contribution of different proximity dimensions in terms of the knowledge-based value they bestow on clustered organisations.

The second part of the book offers interesting case studies to examine the industry cluster conceptualisations put forward in the first part of the book. While empirical evidence regarding clusters has been collected in previous case studies of the Californian wine cluster (Porter 1998), financial, chemical, manufacturing and instrument clusters (Austrian 2000), these have not been examined in terms of the multi-layered and comprehensive value adding webs as conceptualised here. Therefore our empirical approach will take the form of a comparative case study analysis of clusters drawn from different regions in Germany, Norway, Switzerland and Australia. The aim is to come to an understanding of the value creation potential of resources on the firm, network and context level of the investigated value adding web in the analysed clusters.

Case studies are the preferred strategy with regard to 'how' or 'why' questions at multiple levels of analysis combined with little control of investigators over events and when a contemporary phenomenon is in the centre of attention (Yin 2002). Cases are seen as a useful means to illustrate general facts or theoretical concepts (e.g., Stake, 1994). Investigating the value of resources in different levels of a cluster corresponds with the following conditions that indicate case research (Punch, 2003, 153). It investigates a contemporary and dynamic phenomenon and a related emerging body of knowledge in this area (e.g., Eisenhardt, 2002; Yin, 2002). The analysed levels and actors may be too complex for other methods, i.e. causal links are too complex for surveys or experiments (e.g., Eisenhardt, 2002). Moreover, inclusion of data from many sources is desirable (e.g. Eisenhardt, 2002).

Multiple case studies (i.e., four analysed cases of value adding webs) are employed to establish external validity. Case studies are related to single cases, thus the unit of analysis is a cluster conceptualised as a value adding web and its resources on the outlined three levels. The four selected cases comprise two sets of matched pairs, allowing comparison of similar types of cases but allow an overall comparison of two different industry sectors. The range of clusters chosen offers a variety of types with different characteristics, operating in different jurisdictions, but with a common sectoral base for the two sets of cases. We suggest that this type of case selection will lead to a broad base for analysis.

The first set of cases focuses on agriculture, with a wine cluster in the Australian Hunter Valley and a Norwegian apple cluster as key examples. The second set of cases examines clusters in the 'high end' manufacturing sector of handcrafted mechanical watches. The watch clusters are located in Switzerland and Germany.

The concluding chapter highlights the clustering issues raised in the book and summarises the different contributions to aid understanding about industry clustering. It also reflects the field of cluster research using the findings of cluster cases.

This book outlines and describes a comprehensive approach to categorising the different features of industry clusters. It aims to put forward a way of conceptualising both strategy and policy to construct a more coherent field of research and build a framework with the intention of better understanding the potential and pitfalls of industry clustering.

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PART I

CHAPTER 2: CONCEPTUALISING CLUSTERS AS OVERLAPPING VALUE ADDING WEBS (Kerry Brown, John Burgess, Marion Festing, Susanne Royer, Charlotte Steffen, Jennifer Waterhouse, Robyn Keast)

CHAPTER 3: CLUSTER DEVELOPMENT AS AN INSTRUMENT OF REGIONAL BUSINESS DEVELOPMENT POLICY: CONCEPTS AND DANISH REALITY (Andreas P. Cornett, Mads Bruun Ingstrup)

CHAPTER 4: PROXIMITY AND KNOWLEDGE SHARING IN CLUSTERED FIRMS (Rebecca Mitchell, Jennifer Waterhouse, Karen McNeill, John Burgess)

CHAPTER 2: CONCEPTUALISING CLUSTERS AS OVERLAPPING VALUE ADDING WEBS

Kerry Brown, John Burgess, Marion Festing, Susanne Royer, Charlotte Steffen, Jennifer Waterhouse, Robyn Keast

2.1 Introduction

One major issue in the field of cluster research lies in finding a suitable and widely accepted definition of clusters and the underlying elements. There have been many approaches to this in the literature (e.g., Andersen 2006, Dalum, Pedersen and Villumsen, 2002; Porter, 2000; Waits, 2000). Cluster researchers from different disciplines contributed to a better understanding of geographic (e.g., Martin and Sunley, 1996; Tracey and Clark, 2003) and industrial characteristics of clusters (e.g., Audretsch and Feldman, 1996; Feser and Bergman, 2000). However, due to the inter-disciplinary interest for the topic it is still seen as a major problem that there are so many differing understandings of what a cluster actually is. This has an impact on the state of the field since it makes it difficult to reach progress in research and to facilitate exchange between the researchers dealing with the topic.

Another deficit of cluster research lies in the fact that the role of single firms as core actors in a cluster has been somewhat neglected. The question if and how a single firm may profit from being embedded into a cluster of cooperating and competing firms is however highly relevant for firm strategy and adherent competitive advantage realisation. In turn, such an approach could contribute valuable insights for public policy as to how to facilitate and support clusters. In the current cluster literature a fundamental tension between clusters profiting from the cooperation but also from the competition between the embedded actors on the one hand and the role and position of single firms in this context in terms of dealing with a 'cooperative' regional environment is a challenge regarding the strategic management of these players.

The outlined deficits in cluster research are the points of reference for this chapter. Taking the different sides of cluster activities into account, we take the role and position of single firms and their ability to create value and generate competitive advantage as a starting point for our investigation. However, this does not mean that we focus on the resources and competences of single firms exclusively. We rather take value adding webs (VAWs) around cluster firms and the adherent resources on different levels as our unit of analysis.

This chapter has the objective of describing the elements of such a *resource-based view of clusters*. The reasoning behind this is further elaborated in the following section. Building on this reasoning, considerations for the different analytical levels (firm, network and context level) are elaborated. A summary of the investigated elements and joining them to become a resource-based perspective on clusters takes place in the latter part of the chapter. The conceptual framework

developed here, later builds the basis for the investigation of different cluster cases (see Chapters 5 and 6).

The chapter also outlines a coherent framework for understanding how best to direct public policies to aid cluster development. Due to the apparent benefits of clustering, national and regional governments have become increasingly interested in fostering cluster development and, in some cases have financially supported and actively engaged in cluster creation and development. However, it is argued that this resource allocation and attention by government has been uneven in its application and not well targeted to achieve the intended economic prosperity objectives for regions (Enright and Roberts, 2001). In line with the key role of government as a lateral actor in the development of clusters, this section examines the role of government in supporting (or otherwise) clusters and assesses the different vehicles for action in this regard. For example, while some cluster-specific policy such as zoning of land designated for an industrial park supports cluster development directly, policy prescriptions outside cluster development such as levies and restrictions on changing agricultural land to mixed use such as farmland/holiday accommodation, may inhibit the development of resource-based clusters. The possible mixes and targets of policies for supporting clustering are examined in the final section of the chapter.

2.2   Towards a resource-based view of clusters

In the field of strategic management resource-oriented concepts became the dominant perspective of understanding competitive advantage realisation of single firms (e.g., Royer, 2005). Approaches such as the resource-based view (RBV) (e.g., Barney, 1991; Grant, 1991; Peteraf, 1993) and the dynamic capabilities view (e.g., Eisenhardt and Martin, 2000; Rindova and Kotha, 2001; Teece, Pisano and Shuen, 1997) have been developed since the 1990s in the context of increasingly dynamic and competitive markets. They substitute and complement the concepts of strategic positioning (e.g., Porter, 1980, 1981, 1985) that previously dominated the field of strategic management.

The resource-based view of the firm sees resource heterogeneity as the first pre-condition for rent creation of single firms. Ex ante limits to competition may prevent such rents from being offset by costs, while ex post limits to competition in the form of isolating mechanisms help to sustain resulting rents in the firm. Appropriation of rents for single firms becomes possible due to imperfect mobility of resources (Peteraf, 1993). Thus, the resource-based view of the firm builds on clear assumptions that are different from traditional economics. These assumptions, i.e. resource heterogeneity, imperfect information in terms of asymmetrical distribution of information and knowledge among actors and imperfect mobility of resources, also hold true for our concept that identifies context-specific and network-specific resources in addition to firm-specific resources as critical to cluster performance and competitiveness.

The sketched perspective in the field of strategy takes valuable resources as the unit of analysis. While in the beginning it focuses exclusively on the resource profile of single firms, the perspective has recently been widened in terms of also taking into account resources jointly owned by cooperation partners (see Dyer and Singh, 1998; Lavie, 2006). The increasing relevance of networks and other disintegrated forms of value creation organisation is increasingly taken into account (e.g., Bovel and Martha, 2000). Cluster researchers have started to use the resource-based view to analyse industry clusters (see e.g., Hervas-Oliver and Albors-Garrigos, 2007; Oliveira Wilk and Fensterseifer, 2003; Brown et al., 2007).

In their resource-oriented study of clusters Oliveira Wilk and Fensterseifer (2003) use the resource-based view to identify and analyse resources shared in a cluster of firms. The authors aim at coming to a better understanding of strategic resources in the cluster context. They transfer the resource-based perspective to analyse shared resources on the cluster level. They use this approach to study a wine cluster in Southern Brazil and identify the resources shared by the firms in the cluster and the interactions between these resources. The results are strategic resources such as "expertise in exploitation of multiple topographies with vineyards", "tourist attractiveness of mountainous topography" or "long-term-contracts between wineries and grape-growers" (p. 1007). This gives insights into different valuable resources that are of strategic relevance for different cluster actors and identifies that they may be embedded into different levels of the cluster.

The identified resources and bundles of resources provide a basis for strategy formulation on the cluster level. Oliveira Wilk and Fensterseifer (2003: 1007) link the identified strategic resources and resource bundles with the conditions to sustain competitive advantage. Hereby they do not differentiate between resources on different levels but mix firm-level resources (e.g., "expertise in exploitation of multiple topographies", p. 1007), network-level resources (e.g., long-term contracts between wineries and grape-growers", p. 1007) as well as location-level resources (e.g., "distinct climatic characteristics", p. 1007). While the mentioned expertise is an asset for a single firm, the long-term contracts relate to at least two partners and thus include relational aspects. The climate in the region finally affects all cluster actors and thus forms a "contextual" cluster resource.

Even though Oliveira Wilk and Fensterseifer (2003) stay rather vague regarding the interaction between the different resources identified and the described conditions that sustain competitive advantage, their paper builds a starting point for the approach to be developed in this paper in terms of showing the general adequateness of transferring the resource-based perspective to clusters as a useful systematisation approach and also the potential to build well-founded analyses of valuable resources of the cluster on it. Building on a resource-based perspective we, however, want to establish a better understanding of valuable resources on different cluster levels. Further, our research aims at coming to a more systematic approach of analysis to come to more in-depth findings regarding the value creation and appropriation potential for the different actors in a cluster.

Hervas-Oliver and Albors-Garrigos (2007) suggest that analysing resources and capabilities of clusters contribute to the understanding of cluster performance. The aim of their resource-based cluster study is to come to an empirical application of the resource-based view to the cluster concept and further relate them to performance. To reach this aim they investigate ceramic tile clusters in Spain and Italy. Regarding these clusters, Hervas-Oliver and Albors-Garrigos (2007: 113) investigate "variables which address skilled labour availability, social capital, linkages, business sophistication and network effects." These variables are analysed to enhance the understanding of valuable resources in a cluster of firms. They are linked to cluster performance in terms of financial data as well as productivity data before the two investigated clusters are compared with each other.

Hervas-Oliver and Albors-Garrigos' (2007) approach is very systematic and contributes to reducing the gap of cluster research regarding the better understanding of how resources (on different levels) may contribute to cluster performance. From the literature they develop six hypotheses which link cluster assets (skilled workers' availability, social interaction, first- and second-order linkages, a firm's business sophistication and external linkages (network effects)) with resource value in terms of a cluster's set of unique resources and capabilities (Hervas-Oliver and Albors-Garrigos, 2007: 116-118). In a seventh, somewhat global, hypothesis they state that "A cluster's unique set of capabilities influence a cluster's performance" (Hervas-Oliver and Albors-Garrigos, 2007: 118). The resources investigated focus on the context level of the cluster as well as on the relations between the cluster actors. Single firms and their internal resource profile are less central.

The authors not only conceptually use a systematic approach to cluster resources but also with regard to the methodology chosen for the two case studies of tile clusters in Emilia-Romagna (Italy) and in Castellon (Spain). Except for the first hypothesis that suggested that skilled workers' availability would contribute "to configure the cluster's unique set of resources and capabilities" (Hervas-Oliver and Albors-Garrigos, 2007: 116), all hypotheses could be confirmed by the data collected. Overall the authors state that their study has shown that the unique set of resources and capabilities of a certain cluster forms a relevant impact on cluster performance. By pointing out that "[f]uture research should provide more insight about different approaches to identify and measure cluster's resources and capabilities and their performance" (Hervas-Oliver and Albors-Garrigos, 2007: 133) and that "additional research is needed on RBV application on different types of clusters" (Hervas-Oliver and Albors-Garrigos, 2007: 133) the paper gives valuable points of reference for further developing a resource-based perspective on clusters.

In this paper, we want to further develop the resource-based view of clusters suggested by Brown et al. (2007, 2008, 2010) which identifies resources on the level of the cluster location, the relationships between the cluster actors (the "network") as well as the level of the firm which are based in the cluster. The identified resources are then analysed regarding their value creation potential. On the firm level tangible (e.g., machinery or buildings), intangible (e.g., customer loyalty or patents) as well as

human resources of the single cluster actors are the focus of analysis. Relationship-specific resources (e.g., knowledge sharing activities of the cluster actors) are analysed on the network level. Sectoral competitive forces (e.g., the number of (in)direct competitors in the cluster) as well as locational factors (e.g., natural resources such as minerals or water) are analysed on the contextual level.

Since value creation on the firm level is central to our cluster investigation we here investigate value adding webs around single cluster actor. Value adding webs in this context are understood as "a series of linkages between single firms in a certain surrounding. Understanding clusters as value adding webs takes the connectivity of individual firms on different levels in a cluster into account. Value is added by horizontal, vertical and lateral actors" (Brown et al., 2008: 159). Building on this understanding we come to the following definition of a cluster consisting of a certain number of value adding webs around single firms which overlap each other and are "constituted by a connection of horizontal, vertical and lateral value adding activities contributed by different actors in proximity to one another which all act in relation to a specific industry sector. The actors have relationships characterised by interdependencies of different strength and quality that define the boundaries" (Brown et al., 2007: 20).

Using this perspective on clusters we take into account firm resources as well as relational resources (jointly owned by cluster actors) as well as locational resources (as assets from which all cluster members may profit). The resource-oriented conceptualisation of clusters as overlapping value adding webs makes it possible to focus on value-adding processes in clusters and the role of facilitating actors (such as public policy or research institutions) with regard to these processes. To systematise the contributing cluster actors they are grouped into horizontal (i.e., the firms that provide the central product or service of the cluster), vertical (i.e., buyers and suppliers located in the cluster) and lateral actors (i.e., facilitators of the cluster competitiveness in terms of public policy actors or research institutions). These actor groups are described in the following section.

2.3 Relevant cluster actors

Horizontal actors contribute the main products or services of the central cluster industry. In general, they are in competition with one another—however to different degrees and in direct as well as indirect ways. Horizontal actors are core to our perspective on clusters in terms of their role as the actors that "provide the principle means of value adding while sharing and dividing the value created" (Brown et al., 2008: 160). Individual firms that add value to the products or services produced by the horizontal actors by providing knowledge, products, services and other resources to the cluster as well as those who take the produce of the horizontal cluster actors as an input are categorised as vertical actors, i.e. the buyers and suppliers of the horizontal actors.