This book brings together a collection of applied studies covering attempts to develop clusters in a range of industry sectors in a number of different countries. Despite the variety of examples presented, strong common themes are found across these papers. There is common agreement as to what constitutes a cluster, what the benefits expected from cooperation are, what the objectives of intervention are, and even of the type of barriers encountered by cluster programs. The objective of this book was to counter-position studies of cluster formation from authors with various discipline backgrounds in order to observe the different approaches used. This has been achieved, with economists taking a more theoretical, conceptual approach which provides the basis on which other disciplines have developed. Management studies focus more on how clusters can be encouraged and made to function effectively, the governance issue. Marketing studies emphasise ‘branding’, or how each cluster can achieve a distinct identity among its competitors based on what it does most effectively. Information technology studies, on the other hand, return to basic concepts of cost efficiency, and unlike the other three disciplines represented here, use an a-spatial concept of networks rather than the spatial concept of clusters.

Within this common framework, the studies presented here address a number of specific themes common to cluster analysis.

- The role of government in the promotion of clusters (Efendioglu; Perry) or
- The role of government-business partnerships (Nasir, Bulu and Eraslan, Teigland, Hallencreutz and Lundequist) or
- The role of business led standardisation programs (Gerst and Jakobs).
The function of innovation systems (Teigland, Hallencreutz and Lundequist; Rosson and McLarney, Efendioglů).

Problems of industry definition to facilitate data collection and analysis (McRae-Wiliams; Rosson and McLarney), which results in

The widespread use of Case Study methodologies in cluster analyses (Efendioglů; Brown; Teigland, Hallencreutz and Lundequist; Nasir, Bulu and Eraslan; Rosson and McLarney).

The differences between clusters (collaborations of firms in geographical space) versus groups (Perry), or

The differences between clusters and networks, which do not require geographic proximity (Rowe and Burn), or

The evolution of clusters over time (Falcone 1)

The differences between clusters (informal) versus alliances, which involve tight pro-active interaction (MacGregor and Vrazalic).

The importance of distinctiveness and reputation of each cluster particularly in heavily populated industries such as biotechnology and software development (Rosson and McLarney, Merrilees, Miller and Herington, Falcone 2).

Contrary to the expectation that clusters are most relevant to ‘high technology’ sectors, the studies included this book covered a range of different sectors.

- Biotechnology (Efendioglů; Teigland, Hallencreutz and Lundequist; Rosson and McLarney);
- High Technology (Merrilees, Miller and Herington)
- Tourism (McRae-Williams, Nasir, Bulu and Eraslan);
- Engineering and Manufacturing (Perry, Gerst and Jakobs, Falcone 1);
- General spread (Rowe and Burn, MacGregor and Vrazalic, Falcone 2).

Clusters have often been proposed as a means of encouraging economic development in developing countries, which lack the presence of large companies able to establish an international presence in their own right. It is argued that a cluster of small businesses cooperating together in different parts of the value-chain could duplicate the internal economies of scale available to large firms and so become internationally competitive on a collective basis. This was how Italian industrial districts, the forerunner of cluster analysis, functioned. However, the range of studies presented in this book suggests that clusters are still found mostly in the advanced, industrialised world. Only two case studies came from middle-income economies, and none from developing countries. Thus clusters appear to be following the example previously established with networks and alliances and, despite their obvious applications in developing economies, are very much a mechanism used in the developed world and which helps those economies to remain at the forefront of economic development.

The geographical spread of the studies in this book is as follows:
• USA (Efendioglu)
• European Union (Gerst and Jakobs)
• Sweden (Teigland, Hallencreutz and Lundequist; MacGregor and Vrazalic)
• Italy (Falcone)
• Canada (Rosson and McLarney)
• Australia (McRae-Williams; Rowe and Burn; Merrilees, Miller and Herington)
• New Zealand (Perry)
• Turkey (Nasir, Bulu and Eraslan)
• Taiwan (Efendioglu).

In Chapter II, a framework synthesised from the literature on applied cluster analysis is provided. Using that framework, it is clear from the studies provided in this book that clusters arise in response to two main sets of conditions: psychological and cultural conditions and market-orientated conditions. To a large extent this reflects the dominance of management orientated research in applied cluster analysis derived particularly from the seminal works by Porter (1990) and Saxenian (1996) as discussed in that chapter.

The importance of psychological and cultural conditions to the development of clusters is demonstrated in many of the studies in this book. The role of entrepreneurship is particularly highlighted by Efendioglu, who discusses it in terms of the culture in western California which encourages risk-taking and independence, creating an environment encouraging new firm start-ups. McRae-Williams, Falcone and Nasir, Bulu and Eraslan highlight the importance of developing trust between members before cooperation can occur. The movement of labour between firms implies that the tacit knowledge of firms, often a major source of the competitive advantage of small firms, is also shared and only firms that are prepared to trust each other would take this risk. Rowe and Burn also focus on the importance of relationships between firms, arguing that while trust and commitment were important, geographical proximity was not if appropriate ICT were used. Merrilees, Miller and Herington emphasise the importance of relationship management in cluster development, arguing that high levels of interaction are necessary to develop the culture and identity of the cluster and thus conditions need to be established where firms believe they can safely cooperate for a cluster to function successfully. Falcone argues that the social and cultural relationships associated with trust form the basis of the transaction cost savings that result in the efficiency benefits enjoyed by firms in clusters.

Thus an essential lesson from the studies in this book is that clusters can only be effective and contribute to improved industrial and regional economic development if the pre-condition of a ‘safe’ environment is established where business owners and managers feel they can freely communicate and discuss their ‘trade secrets’ relating to production technologies, marketing strategies, etc., without risk of ‘moral hazard’. It is seen to be the role of the government agency, as a third party, to develop this environment in which trust, the essential cultural element, can develop among members. It takes time to do this, five years was mentioned in Nasir, Bulu and Eraslan, and it is difficult to have small business owner/managers commit to such a program without any early outcomes, when they have many immediate demands on their time. Nevertheless, our studies indicated that if sufficient commitment could be maintained over this time, positive outcomes for the businesses involved could be achieved.
The second major focus in these studies was on the importance of establishing essential business relationships between firms if successful outcomes from clusters were to be achieved. Many of the authors highlighted the particular importance of the relationship between producer firms and local suppliers to the success of a cluster. Thus the ‘value chain’ or supply relationship within the local regional economy was considered an essential element to successful cluster performance. Where producer firms had access to a strong range of local suppliers which could respond to their needs for specialised inputs and services in a quick, efficient and technologically proficient manner, clusters enhanced the international competitiveness of local firms. This component of cluster performance was emphasised in the studies by Efendioglu, Perry, MacGregor and Vrazalic, and Rosson and McLarney, and essentially reflects the diamond model from Porter. Falcone discusses how cluster branding brings collective benefits to firms in a particular geographical area.

The importance of this client-supplier relationship to successful cluster functions highlights the dilemma facing proponents of cluster development programs. A strong, specialised and diversified supplier base is only available in highly developed advanced industrial regions, to be found in the initial countries from which cluster analysis originated – Western Europe, USA Japan. Smaller economies cannot duplicate the mass of suppliers available in large industrial regions, and this becomes an essential constraint on cluster development in the rest of the world, particularly the developing world. Firms supplying international markets need to be able to respond quickly to any technological innovations by their competitors, and need suppliers who have the technical capacity to help them in this response. Firms embedded in clusters which have only a thin spread of suppliers are disadvantaged in this competitive process. Information technology relationships offer a means of overcoming this problem by allowing regional firms to establish supply and other relationships with firms from a broader geographical network. However, in doing so they break down the essential nature of clusters, which requires geographical proximity to facilitate personal communication and the transfer of tacit knowledge, and gives rise to the regional development benefits which lie at the heart of many cluster development initiatives.

More recently, analysts have used the concept of a ‘creative milieu’ as discussed in Chapter II, to describe the conditions necessary for successful cluster activity, especially in technologically advanced industries. The essential additional feature of creative milieu clusters is the role of educational and research institutions as a means of providing a ‘safe’ mechanism to disseminate new knowledge to member firms. Educational and research institutions can also act as a mechanism to facilitate the spin-off of innovation into new business start-ups by providing business planning and venture capital support. The role of educational institutions in providing this function is particularly discussed in Efendioglu who gives the example of a university sponsoring an international business planning competition, which encourages start-up firms to locate in its area. Teigland, Hallencreutz and Lundequist discuss the role of an institution combining university, business and government partners as a mechanism for developing innovations and value-chain suppliers for the biotechnology industry. While the creative milieu concept has been subjected to much analysis, the number of regions which host appropriate educational and research institutions is much more limited and again, most are found in western Europe, the USA and Japan again ensuring that the benefits from cluster development are mainly to be found in the advanced industrialised countries.

The final condition for cluster development which was addressed by studies in this book was the role of large organisations as an initiator and means of spreading technological improvement to the smaller firms which form part of that cluster. This issue was particularly
addressed by Gerst and Jakobs, who from an IT perspective, discussed the role of large automobile companies in enforcing standardisation of information and technical systems on their smaller suppliers. Standardisation brings efficiency benefits and potentially widens the market by allowing one supplier to service a number of clients. However, it is costly for small firms to implement these systems and they have little input into their design. Cluster organisations provide one means for smaller firms to participate in such decision-making processes.

Summary of Chapters

Chapter I: Small Business Clustering Across Disciplines, Ann Hodgkinson. This chapter provides a summary of the main concepts and relationships used in applied cluster analysis from a predominantly theoretical and economic perspective. It develops the theoretical concepts from regional economics in the form of three models: pure agglomeration (internal returns to scale, localization and urbanisation economies), industrial complex (input-output and supply-chain), and social networks (transaction costs, trust and entrepreneurship). It then discusses the relevant technological change concepts in terms of various types of innovation systems. Finally it develops a framework of 10 conditions considered to result in cluster formation grouped as market conditions, psychological and cultural conditions, role of large organisations, creative milieu conditions and innovation processes. The concepts developed in this chapter are now widely used across all disciplines and form the theoretical basis of the applied studies which follow.

Chapter II: Leveraging the Benefits of Small Business Clusters: A Branding and Stakeholder Management Framework, Bill Merrilees, Dale Miller and Carmel Herington. This chapter begins with a short summary of the status of cluster development in Australia. It then builds a conceptual framework based on branding and stakeholder management principles in which clusters can be assessed from a marketing perspective. It then moves into the key problem associated with marketing clusters, which is their lack of distinctiveness. This makes it difficult to determine their particular competitive advantage, particularly for smaller clusters in industries where numerous well known clusters already exist. The question of how such a cluster can be branded is addressed. It is argued that effective branding can improve the governance of the cluster and help develop trust among members. It is further argued that information technology platforms can be well utilized in this process through the internet and ideas such as specialist e-mails.

Chapter III: Small and Medium Enterprise Clusters: Marketing and Communication Management, Paola Falcone. This chapter provides an overview of Italian industrial districts, the specific collective structure which was the forerunner of the more general concept of clusters. It discusses the factors resulting in the evolution of these structures over time in response to exogenous (e.g. demand, competition, technology) and endogenous (adaptability, organizational and innovation capability) factors. Industrial districts go through a four stage life-cycle. Firstly, district initiation due to a spontaneous convergence of pioneer firms attracted by some particular attraction in an area. Secondly, district growth as suppliers of specialized goods and services move into the area. Consequently a specific labour market develops and knowledge and information circulate among firms. Growth continues with new start-ups and spin-off firms, attracting more investors into the area. Thirdly, at district
maturity, non-market advantages are most important arising from the presence of layers of
sub-contractors, dense circulation of knowledge, large numbers of suppliers and customers
in the district. However, at this stage the danger of crystallization occurs which may create
rigidities blocking innovation. The final stage is decline as the district becomes static and
looses competitiveness. It is argued that many Italian industrial districts are now facing this
threat of decline. Pressures arise from demand contraction for many manufactured goods,
aggressive global price competition and non-spatial means of knowledge diffusion utilizing
ICT. Industrial districts have to adapt to these pressures if they are to survive.

Chapter IV: Italian Industrial Districts: Nature, Structure, and Value Creation, Paola Fal-
cone. This chapter discusses how small and medium enterprises within a geographical cluster,
when faced with substantial international price competition, can use marketing strategies, and
in particular, cluster branding to preserve their competitive position. By using a collective
local brand they create a common image and gain benefits from joint marketing activities.
The cluster brand reflects a combination of the region’s imagery, culture and history and
the productive image and resources of the firms comprising the cluster. The cluster’s im-
age, reflected in its brand, can be stimulated through a variety of strategies. These include
initiatives to regenerate the dynamics of the region by encouraging young entrepreneurs and
students and by organizing specialized training courses, while also conserving the district’s
historical memory and identity with museums, databases, etc. The cluster can also build its
own collective Internet portal and undertake national and international advertising campaigns
and produce information materials such as samples, CD-roms, videos or souvenirs. Further,
it can promote the district through delegations, competitions, special events, organize and
participate in industry fairs, etc. The collective brand helps smaller firms to compete in non-
price terms, reduces marketing and transaction costs and because it works as a guarantee,
helps build trust between the firms and their customers.

Chapter V: Industry Clusters in Peripheral Regions: A Biotechnology Case Study, Philip
Rosson and Carolan McLarney. This chapter addresses the question of whether cluster
development can occur in more distant, peripheral regions using a case study of the bio-
technology industry in Halifax, Canada. The study focuses on the relationship between the
industry firms and local suppliers of support services. The most commonly used services
were finance, human capital (attraction and retention of technically skilled employees)
and research infrastructure (research space, technology networks). The main barriers en-
countered were access to start-up capital, lack of experienced technical workers, and lack
of government leadership and assistance. They also identified a poor commercialization
culture, inadequate research facilities and the inadequacy of the R&D tax credit system as
problems. The biotechnology grouping in Halifax was considered to be a nascent cluster
but one suffering from organizational ‘thinness’. It is argued that initiatives such as de-
veloping an industry — research centre of excellence to promote joint research, linkages
between players, training and technology transfer programs would help. Improvements
in infrastructure, promotion of spin-offs and expansion of existing firms and provision of
venture capital were also suggested.

Chapter VI: Cluster Development: Issues, Progress and Key Success Factors, Alev M.
Efendioglu. This chapter provides a comparison of two biotechnology clusters, one well
developed in California, USA and the other less developed in Taiwan. It compares the eco-
nomics driven development path of the Californian cluster with the government driven path
in Taiwan. The Californian cluster developed from 1976 in conditions similar to a creative
milieu with a concentration of research centres, financial sources, pharmaceutical customers,
contracting and outsourcing opportunities and workforce training and educational institutions. The Taiwanese cluster began in 1980 but in 2003 the government deliberately established a science park in the area with a range of research and networking centres. A number of biotechnology firms are establishing in the park and growth rates are now increasing. Comparisons of the growth paths of the two clusters show that the Californian cluster has been considerably more successful. The main factors contributing to this better performance were considered to be: the focus of educational institutions which encourage business planning and new firm spin-offs, the availability of venture capital, the entrepreneurial culture in the area, the infrastructure and supporting activities available and the range of design and service firms in the area.

Chapter VII: Regional Clusters: Classification and Overlap of Wine and Tourism Micro-Clusters, Pam McRae-Williams. This chapter uses the concept of micro-clusters to analyse wine and tourism enterprises in regional Victoria, Australia. It provides a brief review of the development of tourism and wine clusters in Australia. It then examines how co-location has led to the development of wine tourism enterprises in smaller boutique producers. Comparison is made with similar developments in the Napa Valley in California. Clusters were generally found to be under-developed in Victoria relative to potential. However, they were considerably more developed in the wine industry than in tourism. It was felt that cluster-related benefits could be enhanced in wine-tourism establishments by linking into wine cluster activity already established in the region.

Chapter VIII: From Networks to Clusters and Back Again: A Decade of Unsatisfied Policy Aspiration in New Zealand, Martin Perry. This chapter provides a thorough critique of Government programs aimed at encouraging cluster development in New Zealand since the 1990s. Several of these programs were inspired by the work of Michael Porter. The first involved joint action groups of larger firms working together to develop export markets. The second involved formal alliances between small firms, and was inspired by Danish experiences. The third, The Cluster Development Program, provides support to groups of businesses located in the same region. He queries whether there is any justification for policy intervention in this area, arguing that we have jumped too quickly from a few particular experiences to a universal belief in the capacity for concentration to generate growth, and that we have moved too quickly from claims of business advantage to calls for cluster promotion. The current program has been implemented through a series of ‘cluster musters’ where businesses in local regions are encouraged to search out their own specializations to promote local growth. It is argued that the limits to achieving benefits from cluster developments in New Zealand arise from the lack of suppliers in the country due to small size, constraints on which organizations can be members, dependence on publicly funded facilitators, lack of leading firms, absence of clusters in areas with concentrations of economic activity, and the need for national rather than regional links between firms in small economies.

Chapter IX: The Analysis of Tourism Cluster Development in Istanbul: A Longitudinal Study in Sultanahmet District (Old Town), Aslıhan Nasir, Melih Bulu and Hakki Eraslan. This chapter provides a detailed discussion of an attempt to establish a cluster by improving linkages between firms in the tourism sector in the ‘old town’ historical tourism precinct in Istanbul, Turkey. It provides an overview of the tourism industry in Turkey, with visitor numbers now recovering after the effects of the Iraq war. This cluster promotion attempt was also inspired by the work of Michael Porter and implemented by a non-governmental organisation of private business leaders. It identified this sector as being one where Turkey had an international competitive advantage. Data was initially collected in 2001, with the firms
again interviewed in 2005, and linkages mapped in both time periods. In between the two surveys, a local development committee was established to encourage cluster relationships, which initiated new products, undertook common marketing activities, provided training and education to employees and established IT services. Revenue and employment in the firms increased as did the intensity of the relationships between members as trust improved.

Chapter X: Uppsala BIO – The Life Science Initiative: Experiences of and Reflections on Starting a Regional Competitiveness Initiative, Robin Teigland, Daniel Hallencreutz and Per Lundequist. This Chapter provides a detailed discussion of an attempt to establish a collaborative institution involving academia, industry and government to encourage growth and employment in the biotechnology industry in the Uppsala region of Sweden. The project is relatively new, but is being evaluated by the local university, which collected baseline data in 2004. The objectives of the institution were to encourage more innovation to be commercialized within the local area and to improve the supply of investment funds and specialized, skilled labour for local firms. Its main strategies were to promote product-orientated biotech research, to strengthen the regional innovation system, to ensure a supply of relevant skills in the region, and to improve the region’s image in order to attract investment. The barriers affecting biotechnology development in Uppsala were felt to come from the maturity of the local environment, which was already characterised by strong networks and interaction among actors. It was felt this could be leading to rigidity and thus one of the objectives was to open up these networks to new actors. While there was significant innovation occurring, the extent of local commercialization was low. Thus a strategy to ensure this intellectual property was commercialized locally was needed. A follow-up study is scheduled for 2006 to assess how effective the institution has been in achieving its goals.

Chapter XI: Clustering, Collaborative Networks and Collaborative Commerce in Small and Medium Enterprises, Michelle Rowe and Janice Burn. The benefits which smaller firms obtain from collaboration are impacted by e-commerce, which can reduce the significance of geography, globalises the labour market, increase connections between enterprises and lead to the establishment of virtual companies. Clustering can benefit users of ICT by reducing the amount of investment and other resources needed to implement the new technologies. However, they also reduce the significance of geography and fosters inter-regional collaborations, which significantly impacts on the traditional concept of clusters as involving geographic proximity as the means of achieving relationships and trust between firms. Collaborative or e-commerce relationships involve a soft network of firms pursuing joint benefits which would not accrue if they operated alone. They still require trust and commitment, but not necessarily proximity, and a willingness to share information without acting opportunistically. This chapter reports the results of a study of drivers/enablers and inhibitors to the adoption of e-commerce by small and medium enterprises in Australia. A number of factors associated with the adoption of e-commerce were identified. It was felt that the lack of these characteristics in SME entrepreneurs and a low level of awareness of its benefits explained the low rate of adoption in Australia.

Chapter XII: The Role of Small Business Strategic Alliances in Small/Medium Enterprises (SMEs), Robert MacGregor and Lejla Vrazalic. This chapter provides a summary of the benefits and disadvantages to SMEs in adopting E-commerce, as well as identifying the criteria for adoption and its barriers based on a review of the literature, incorporating both adopting and non-adopting firms. It reviews the literature on strategic alliances and SMEs, which involve both financial and social relationships. This study looks at the role of strategic alliances in adopting E-commerce by SMEs in Sweden using factor analysis to
compare the behaviour of firms in alliances versus those who are not. It was found that all firms predominantly adopted E-commerce for marketing and internal business objectives. The main barriers against adoption were organisational if firms were not in alliances, while members of alliances mainly identified technical barriers. The main benefits for all firms from adoption were increased efficiency, reduced costs and improved inventory control. The disadvantages of adoption were predominantly organizational, increased day-to-day demands on workload, and also for alliance members, technical issues. The results from this study do not support the hypothesis that small business strategic alliances reduce technological concerns due to sharing skills and experience.

Chapter XIII: E-Business Standardization in the Automotive Sector: Role and Situation of SMEs, Martina Gerst and Kai Jakobs. This chapter extends the argument that using ICT, particularly e-business systems, facilitates the creation of network relationships in a supply chain by looking at the significance of agreed standards as part of the functioning of those supply relationships. It looks at the situation within the automotive supply chain where large OEMs create networks of suppliers which are typically SMEs. Standards are usually set by the OEM and without them collaboration is not possible. However, if the SME supplies a number of OEMs, each with different standards, the process becomes very inefficient. Standards are usually enforced through inter-organisational systems, which reduce coordination and transaction costs, but also improve communication and information flows. Standards can be based on international agreements among stakeholders or by establishing a sector specific electronic marketplace. The paper provides a number of examples of these two approaches applied in the European automotive industry. To date, SMEs have had little involvement in the process and it is suggested that setting up SME regional user groups may improve their participation by informing and educating them as to the process through websites, etc. and that they might ultimately represent the interests of small firms in negotiations over standards and other business issues.

Conclusion

This book contains applied studies of clusters across a range of industries that operate in a number of countries and written by analysts from a variety of disciplines such as economics, marketing, management, and information systems. The first aspect that strikes the reader is the commonality of approaches across these disciplines, drawing on a standard knowledge base of concepts, analytical frameworks, and methodologies. Cluster analysis at both the theoretical and applied levels is truly interdisciplinary and lacks the ideological barriers often found in other areas of business studies, which prevents analysts from different disciplines working together on common problems. This finding is positive for the future development of this area of study and indicates that our understanding of clusters will continue to develop rapidly in both conceptual and applied terms.

In applied studies, there is a particular interest in the questions of what type of intervention can or should be used to promote clusters and how it can be implemented most effectively. The argument that clusters contribute to industrial and regional development is well established at the conceptual level and has been demonstrated in a number of well-known cases such as Silicon Valley in the U.S., Toyota City in Japan, and the industrial districts in northeastern Italy. In this book, Efendioglu provides another example of the biotechnol-
ogy sector in California. The current question addressed by several chapters in this book is whether these success stories can be duplicated elsewhere, and, if so, how.

Our authors look at interventions in terms of government programs, government-business partnerships, private sector association programs, and big-business initiatives. Overall, they conclude that clusters appear to arise in response to special economic environments and have developed spontaneously through natural, organic economic forces. The authors in this book conclude that it is extremely difficult to artificially recreate such conditions in order to induce the formation of clusters as a tool for regional development. This is demonstrated by the case studies presented by Efendioglu for Taiwan, McRae-Williams for Australia, Perry for New Zealand, and Rosson and McLarney for Canada.

Conceptually, it is argued that clusters provide a useful development tool for smaller economies. However, the case studies presented in this book question their relevance for small, open economies such as Australia, New Zealand, and Canada. The concept of clusters developed in large, industrialized countries with specific cultural preconditions that facilitated cooperation (Italian industrial districts) and in industries in which rapid technological change necessitated cooperation (biotechnology, information technologies). Such countries also had the advantage of a large domestic market in which new products could be developed in conjunction with customers and quick sales achieved before commencing international exports. Smaller economies do not have these preconditions, and there are only a limited number of partners available for joint production or specialist supply. They suffer from the problem of organizational thinness, as demonstrated by Rosson and McLarney and Perry, which makes it difficult to establish the client-supplier linkages identified as essential in order to achieve the business relationship model of clusters. They also need to export in order to gain economies of scale, which immediately exposes them to the full strength of international competition before having the time to develop their products, customer relationships, joint production, and trust within a domestic market first. In smaller, open economies, competition tends to dominate cooperation, limiting the natural development of clusters.

A number of authors discussed the appropriate nature of intervention to assist cluster formation. Effective intervention is not about reducing business costs via cheap loans or provision of subsidized buildings and land, even though businesses often initially expected this. It is not even essentially about the provision of technological or export support programs. Effective intervention is more about encouraging a supportive environment and building trust among local firms in order to overcome their natural tendency toward local competition. The role of government or other support agencies is to act as an honest broker where competitors safely can meet, communicate, and demonstrate their capacities. Then, opportunities for joint activities—production, marketing, sharing of labor, and so forth—can be recognized and acted upon. Trust takes time to develop, and cluster promotion programs do not show quick results. The importance of trust as a component in cluster development programs is demonstrated clearly in the project developed for the Sultanahmet region of Istanbul in Turkey. It also was highlighted in the chapter by Merrilees, Miller, and Herington. As trust developed, interfirm cooperation increased, resulting in strong improvements in revenue and employment.

The importance of regional innovation networks was another common theme in these studies, particularly those in high-technology sectors, which are represented by three studies of the biotechnology sector included in this book. Cluster relationships generally were considered less relevant to the function of generating new products but more concerned with the process of encouraging entrepreneurship and commercialization of that research. The chapter by
Teigland, Hallencreutz, and Lundequist provides an example of establishing a new institution in order to encourage closer links between business/researchers in an attempt to encourage more commercialization of innovations developed in that region within its own boundaries. This demonstrates that the innovation issue still can be a problem even in well-established regions such as Uppsala in Sweden. That study illustrates the problem of rigidities that can arise in mature regions, as discussed in Falcone (Chapter III), and provides one means of rejuvenating such districts.

Rosson and McLarney, on the other hand, address the problems of trying to establish a new cluster in the biotechnology industry in a peripheral region. They also identified a poor commercialization culture as a barrier in Halifax, Canada, and suggested developing an industry—a research center as a solution. The Uppsala BIO Institute provides an example that they could consider. Efendioglu provides a study of the successful biotechnology cluster in San Francisco, California. This study emphasizes the role of the University of San Francisco’s international business-planning competition, which attracts innovators into the region to help sustain that region as well as a natural entrepreneurial culture and also generates startup firms. This has ensured that cluster, despite being in existence since 1979, has remained in its growth phase. All of these studies emphasize the importance of research institutions and of establishing effective business/research relationships to cluster development in high-technology sectors.

Some insights into methodological issues also can be obtained from a review of the chapters in this book. The widespread use of case studies is demonstrated clearly. As clusters now are a well-established area of research, it might be expected that analytical studies would move into more rigorous statistical investigations based on broad databases. Yet, only one chapter, the one by MacGregor and Vrazalic, based on a sample of more than 300 Swedish SMEs, ventures into this methodology in a sustained manner. The other chapters provide an explanation of why case studies are still dominant.

First, it can be explained by definitional issues, as discussed by McRae-Williams. Clusters normally do not contain one simple industry sector as defined by statistical authorities. Their very nature involves synergies and interactions among firms from a variety of different sectors through joint production and in supply relationships as well as complementarities in research among organizations in different sectors, which is the keystone of innovation. Further, many clustered sectors, such as tourism, biotechnology, and information technologies, are not readily classified into standard industry codes. Thus, large secondary databases that provide the resource for most econometric analyses cannot be utilized readily in cluster analyses.

MacGregor and Vrazalic demonstrate that important issues in cluster research can be analyzed by using common statistical techniques; in this case, whether firms in clusters or alliances behave differently from those that are not. However, it also demonstrates that in order to undertake this type of analysis, researchers have to undertake original data collection involving surveys of relevant firms. This is time-consuming and expensive. Thus, statistical analyses often are restricted to instances in which such databases, generated for other purposes, fall into the hands of cluster analysts. In such cases, the data may not be collected on the definitions or coded in a way that is most appropriate to apply to cluster analysis questions.

Third, of course, many of the questions asked by cluster analysts are inherently qualitative, particularly those around the important issue of trust, and are not readily analyzed in quantitative terms. Nevertheless, it may be time for cluster analysts to venture beyond specific case
studies and to attempt to establish some of their elemental propositions on a more rigorous basis. One way in which this is occurring is by using a panel approach in which baseline data are collected at the beginning of the cluster process and then repeated after a period of time, often five years. If these data collections are undertaken rigorously, the observed changes can be traced to elements in that cluster.

As argued earlier, there is common acceptance across disciplines of the definition of clusters as a group of firms that are both located in close geographical proximity to each other and that have some forms of interaction with each other, either as customers/suppliers undertaking joint activities (production, marketing, research), exchanging information either formally in established institutions or tacitly through informal personal relationships, and/or sharing a common resource pool, including labor. However, not all studies examined relationships purely within this definition of clusters. Some used the more nebulous term groups, which simply required firms in a sector to be collocated. Groups of firms in one or similar sectors frequently are located in the same region but may not have any active interrelationships. They do, however, form the basis on which it is believed that clusters can be developed using government-sponsored intervention programs in order to facilitate relationships among these firms or by providing encouragement through financial incentives, as discussed by Perry for New Zealand. Industrial districts is an earlier term derived from the work of Alfred Marshall in England and Piore and Sabel in Italy. They are a forerunner of clusters but are more limited in that they emphasize mainly business relationships among constituent firms. The cluster concept places more explicit focus on psychological and cultural factors that are always inherent in the Italian industrial district concept and on applications to higher technology rather than traditional manufacturing industries. Thus, research, innovation, and technology transfer become more important in cluster analysis, evolving into the latter concept of an innovative or creative milieu. The final terms used in these studies are networks and strategic alliances, which are most common in the information systems studies. This is not a coincidence. These terms are well-established in the business literature on collaboration. However, unlike groups, industrial districts, clusters, and innovative milieu, they are not innately spatial. Networks and strategic alliances involve productive relationships among firms but do not require these firms to be collocated. Often, these relationships are international in scope. The development of long-distance, interfirm collaborations was facilitated by developments in information and communication technologies. Thus, the range of terms used in cluster analysis reflects an evolution of the concept over time.

Information technology strategies—e-commerce, e-business, c-commerce, as discussed in this book—challenge the specific geographical component that is essential to the economic and managerial analyses of clusters. Collocation is no longer necessary to establish relationships among firms, although trust is still essential for successful collaborations, whether virtual or personal. Whereas other disciplines make clear distinctions between clusters and other forms of collaboration such as groups or strategic alliances, arguing that clusters provide the most substantial and enduring economic development potential, IT studies return to the earlier concepts of networks and alliances. They argue that electronic communication systems allow the development of relationships with suppliers, customers, and partners that provide the same business and efficiency benefits as geographically constrained clusters but allow these to occur in an unconstrained aspatial or international context. It is argued here that IT strategies to date have not been heavily adopted by small businesses. As they become more common, it raises the question of whether they may cause an end to clusters as an economic development tool.
The second factor that is contributing to the decline of clusters is the growing significance of international competition as product and service markets inextricably become global. With markets throughout the world rapidly opening to foreign imports due to reduced tariffs and other forms of trade protection and the movement into market economics by previously centrally controlled countries, few firms, no matter how small, now are not exposed to some level of external competition, if only through the Internet. Conversely, this process is opening up new export market opportunities to firms throughout the world. International competition is having a profound effect on the industrial districts of Italy, as discussed in Falcone (chapter three). Previously stable, dense, supply-chain relationships are breaking down in the face of cheaper imports and as leading firms relocate many of their activities to low-wage foreign regions. High-technology clusters have been better able to survive under this pressure. Cluster analysts have to confront the impact of this realignment of world production systems with the technology-intensive, design-intensive, and corporate activities that remain in the industrialized world, while production moves into cheaper labor regions. Clusterlike relationships still may continue to exist among firms but at an international level facilitated by information technology. Further, the imperative of needing to be internationally competitive in terms of cost, quality, design, and customer service may be making it extremely difficult to establish new clusters outside the industrialized countries. Firms no longer may have the time to establish local interfirm and personal relationships, the essence of cluster advantages, before confronting the pressures of international competition. These items form the next agenda for cluster analysts both in theoretical and applied studies.

The question of how clusters establish, grow, and survive in competitive environments particularly has been the focus of marketing analysts. They universally look to the concept of branding as a means of differentiating clusters in different regions and those operating in particular sectors. Branding is not just image projection. It requires firms in a cluster to analyze their strengths and to identify what particular unique attributes they can offer members. Further, it requires members to accept a common framework of values, which forms the basis of developing trust among themselves, leading to the density of relationships that generate the advantages that being a member of a cluster generates. Once this branding process is established, the cluster organization then can undertake the activities that are needed in order to position its member firms in the global market and to ensure its continuing growth and regeneration within this new global market environment.

Finally, the preeminence of the work of Michael Porter in applied cluster analysis must be acknowledged. Reading these chapters, his name appears repeatedly in the literature reviews, regardless of the discipline of the author. His contribution occurs at the conceptual level with the Porter diamond and supply-chain analysis taking over from input-output analysis as the essence of the industrial complex approach to analyzing regional industrial development. The economic antecedents of this model now have been overshadowed almost completely outside that discipline. Second, his contribution has been paramount at the applied level. It has been the inspiration for numerous government and other programs aimed at encouraging clusters as the major means of regional development. The prevalence of this ideology is now so great that it is very difficult to argue, as several authors in this book do, that outside the established industrial regions, existence of groupings of firms in a sector in a region will not necessarily mean that a cluster can be developed as the basis of regional development. Perhaps this book will help to encourage a more critical evaluation of the value of clusters as a regional development policy. It highlights both the practical difficulties of this
approach and the need to rethink the position of clusters as they are increasingly exposed to international competition.