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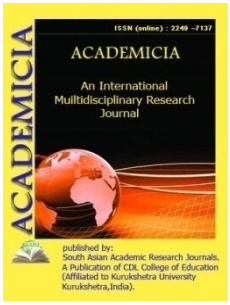

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A REVIEW ON NETWORKING AND INNOVATION

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ABSTRACT

The significance of corporate networking for innovativeness has been highlighted in recent competitiveness research. Until recently, there was a lack of understanding of the mechanics of this connection. This article provides a comprehensive assessment of evidence that links a firm's networking behavior to its ability to innovate. Risk sharing, gaining access to new markets and technologies, speeding products to market, pooling complementary skills, safeguarding property rights when complete or contingent contracts are not possible, and acting as a key vehicle for obtaining access to external knowledge are among the main benefits of networking identified in the literature. The data also shows that companies that do not collaborate and do not officially or informally share information restrict their knowledge base in the long run, reducing their capacity to engage into exchange partnerships. National innovation systems, in terms of the way they influence networking activity, play a significant role in the spread of innovations on an institutional level. The data presented in the article suggests that network connections between suppliers, consumers, and intermediaries such as professional and trade organizations have a significant impact on innovation and productivity. Inter-firm conflict, displacement, lack of scale, external disruption, and a lack of infrastructure are all reasons why networks fail. There are many gaps in the literature that need to be addressed, according to the study. For example, further research on the link between networking and other types of innovation, such as process and organizational innovation, is required. In the same way, we need a deeper knowledge of network dynamics and configurations, as well as the involvement of third parties like professional and trade organizations. Our research emphasizes the importance of multidisciplinary research in these fields.

KEYWORDS: *Innovation, Networking, Business Networking*

1. INTRODUCTION

The systematic study that yielded the results reported in this article was driven by a desire to determine the degree to which UK businesses participate in networking activities in order to improve their creative potential. The review's specific goals are to:

- Determine the nature of the connection between networking and innovation.
- Compare and contrast the extent and effect of networking activity in the UK with that of competitor nations' companies.
- Examine instances and research on business-to-business network failure.
- Develop insights that will guide policies targeted at promoting business-to-business networking, which will lead to increased creative capacity and productivity.
- For the Economic and Social Research Council's (ESRC) study priorities board, identify topics for future research.

Inter-organizational networking is essential for the development of creative capacity in companies, according to the Porter Report. The study is less clear on the degree to which UK businesses participate in networking and how this engagement translates into creative results. Porter's research, for example, finds that the UK underperforms major rivals in this area but offers no data to back up the assertion. The review's goal is to thoroughly examine the facts in light of the Department of Trade and Industry's (DTI) mandate: Is it possible for UK companies to effectively network with other businesses in order to promote innovation? Following consultation, it was decided that the study should focus on business-to-business networking; the degree to which networking leads to creative results; and include some instances of network failure in the construction and maintenance. The authors provide a subset of the systematic review's results in this article, as well as the overall research base that has looked at the connection between innovation and networking across nations and industries. The approach we use to perform this particular review is outlined in the next section[1]–[4].

1.1. The Evidence Base

A subset of the systematic review findings on the connection between networking and companies' tendency to innovate is provided in this article. The nature of the entire evidence base utilized for the research is described in detail here. The technique provided was used to conduct the systematic review. Using the search strings generated, 628 articles were discovered in the first stage of the review by scanning the citation indexes of ABI Proquest, Science Direct, and Web of Science.

The findings indicate that networking and creativity are researched in a variety of social science disciplines. Economic and regional geography, organizational behavior, sociology, operations management, political economy, entrepreneurship and small company, technology management, marketing, and strategic management are some of the topics covered. The major journals that contributed to the review show which areas of research have the most to say about the topic. Research Policy, Journal of Business Venturing, Regional Studies, Technovation, and

International Journal of Technology Management were the top five journals in terms of coverage of this subject in the review. Aside from these publications, the review included papers from additional 47. It's worth noting that major US management publications were underrepresented among the 325 papers identified before the articles were graded.

The American Journal of Management, for example, only published one article, the American Management Review only published one, and the Administrative Science Quarterly only published two. It's probably not a good idea to speculate on why this happens. One explanation for the under-representation is that the bulk of management studies have focused on organizational behavior, entrepreneurship, or supply chain management. Organization Studies contains nine papers, the Journal of Business Venturing has 33, and Management Science has five, while the mainstream British Journal of Management has just one.

The character of the articles examined for this research is shown by doing a keyword analysis. Innovations, Research and Development, Small Business, Alliances, Regions, Technology Change, Statistical Analysis, Business Networking, Organization Theory, and Product Development are the top 10 terms in the study (in order of significance).

The papers that are evaluated are also analyzed in terms of the nations that are mentioned in the research. According to this study, 36 articles contain empirical data based on the United Kingdom, 35 on the United States, 42 on other European nations (Germany has the most other European countries included in the review, with 14 studies), 11 on Asian countries (Japan 11), and three on other countries (Australia, Brazil and Israel). The number of research focused on the United Kingdom is very high, indicating that UK scholars have contributed significantly to the field. However, despite being filtered to a lower number using quality criteria, the overall amount of articles focused on the UK remains rather low in terms of total numbers (36 out of 127 papers).

A thematic analysis was created after the NVIVO analysis of the A-list citations (stage 8). Table 3 summarizes the findings of the theme analysis. A significant percentage of the papers examined in the thematic review focused on company level (micro) variables, such as how networks are managed and function in reality (57.7 percent). The macro or networking architecture that may support networking activity is examined in a lesser percentage of the evidence (42.3 percent). When the year of publication is taken into account, it becomes apparent that this research topic and evidence base are relatively new. For example, our search identified 93 articles on the topic from 1999 to 2003, but just four papers from 1981 to 1986. The number of citations on networking and innovation increased between 1981 and 2003, according to the study. The low number of papers published between 1981 and 1986 may be attributed to a lack of coverage in citation databases. However, the statistics may also indicate that this is a relatively young field of study, with little published work over this time span.

In conclusion, a few important conclusions may be stated about the total sample of evidence utilized in this study. To begin with, the study's evidence base is dominated by a focus on technology and emerging technology sectors. Second, the evidence is mostly focused on the United Kingdom, the United States, and Germany, with a little bias toward the years 1995–2003. Finally, due to the small number of studies that have been conducted, the study to date lacks considerable depth. The study is also fragmented since it spans a vast number of authors,

publications, and social science fields. The primary conclusion derived from the sample utilized in this systematic literature analysis is that if the evidence base is to be enhanced and extended, the topic area may need some priority by a ‘critical mass' of academics over a lengthy period of time.

The following is our analysis of the general connection between innovation and networking, which is based on a subset of empirical data obtained from the systematic literature review. This connection is discussed in more detail in the next section. We then show a diagram that depicts this connection. This diagram serves as a framework for the study that follows, in which we look at the roles of the many parties that make up the networking interface and infrastructure. We wrap off our investigation by looking at evidence of network limits in innovation processes and network breakdown. To wrap up the article, we discuss several key topics for future research and briefly discuss policy implications based on the current evidence base[5]–[8].

1.2. Overview of the Innovation and Networking Relationship:

The work in this research takes into account the DTI's focus on effective exploitation of innovative ideas. Product, process, and organizational innovations all have a role in the successful commercialization of a novel concept. As a result, the research uses the DTI's wide definition: Innovation is defined as the effective conversion of ideas into new goods, processes, services, or business practices. It is a key process for attaining the two complimentary corporate objectives of performance and growth, which will help narrow the productivity gap.

As a result, the research believes that innovation encompasses both the creation and use of new goods, processes, services, and business practices. Companies see a growing need to cooperate with other firms, both officially and informally, as products become more modular and information is dispersed across organizations. Indeed, the center of innovation is increasingly the network in which a business is embedded, rather than the person or the organization. Many scientific and technical achievements are the result of many contributions from many players operating in networks, and the standards required for a technology to operate across marketplaces are becoming more reliant on networks of companies.

The biotechnology industry in the United Kingdom is an excellent example of the beneficial connection between networking and innovation. Collaboration is generally recognized as a crucial element of the biotechnology sector when it comes to invention. The sector is supported by a constantly developing, complex knowledge base, and the skills and capabilities required to bring a scientific discovery in biotechnology to market are dispersed among a variety of big and small companies. While the biotech business exemplifies the significance of networking for innovation, the study emphasizes the need to network as a precondition for innovation across the majority of industries. Firms in a wide variety of sectors have been shown to benefit substantially from networking behavior in terms of innovation output and competitiveness. Service industries1, primary industries2, manufacturing industries3, and high-tech industries4 are examples of industries where networking has had an effect on innovation.

1.3. Network Formation and Configuration Overview:

The first is concerned with companies' resource needs, and how they are encouraged to establish network connections with other firms in order to get access to technical and/or commercial

resources that they lack. The availability of chances to establish connections is not seen as a restriction from this viewpoint. The second contends that chances to establish connections likely to mirror previous inter-firm relationship patterns. As a result, a company's capacity to form network connections with other companies is determined by its current relationships and network capability.

Social institutions have an impact on the relative ease with which business-to-business networks develop. These institutions may create the cultural circumstances and infrastructure for networking, as well as serve as brokers and intermediates in network creation, according to empirical data. The development of the infrastructure needed to support the creation of business-to-business networks is shaped by institutions such as the legal system, banking and finance system, labor market structure, education system, and political system.

In terms of which kinds of companies benefit from networking, it has been discovered that networking is helpful not just too established firms but also to entrepreneurs. Because interpersonal and inter-organizational connections allow actors to get access to a range of resources owned by other players, networking may improve the success rate of entrepreneurial efforts. Network relationships, for example, are believed to offer emotional support for entrepreneurs who take risks, and this, in turn, is expected to increase the desire to stay in company.

Several additional studies have shown that successful entrepreneurs utilize networks to acquire ideas and collect information and advice on a regular basis. Other ways to get into important talent and market knowledge include connections with venture capitalists and professional service groups. Alliances allow businesses to get access to resources, which is especially useful when time is of the importance. Small company owners may use networks to connect to R&D that is contracted out by bigger companies, to participate in collaborative R&D ventures, and to establish marketing and manufacturing connections[9], [10].

1.4. Networking Infrastructure and Networking Interface Interrelationships:

Recent research on ‘innovation systems' has shown that when there is a knowledge flow across systems, innovation happens more effectively (for example, between different industries, between regions or between science and industry). The significance of variety of connections in networks has been demonstrated to have an effect on innovativeness based on this research. The importance of varied partners for empirical research on innovation, as well as the findings of this study, are reinforced by technology networks in the Spanish automotive industry and work on tiny high-tech companies in the United Kingdom. These studies indicate that numerous players both within and outside the company impact innovation, and that the most significant partners are from the business sector - consumers come first (33.5 percent of companies), followed by suppliers (21.9 percent of firms). Firms' willingness to collaborate outside of these "direct" connections is similarly restricted, according to studies on partnering. Only 8.9% of businesses, for example, collaborate with colleges. Research in Germany, on the other hand, reveals substantial national variations in terms of engagement with research institutions and universities, as well as the significance of scientific partners in certain industries.

According to studies, tying marketing and technical efforts together early in the innovation process allows goods to be created with a complete understanding of the customer's requirements. Furthermore, putting too much focus on technical quality or marketing may lead to over-engineered or over-priced inventions. Customers' network connections are considered essential because:

- Dialogue between important business customers and suppliers enables companies to not only learn about current requirements, but also to identify future ones ahead of the competition.
- Customers who are involved in the early phases of product development will help to create ideas.
- Involving customers in the innovation process lowers the chance of failure.
- The inventor learns from the consumer about the product's probable commercial potential.

2. DISCUSSION

The overwhelming majority of the data examined is very favorable in terms of the usefulness of B2B networks and their effect on the innovation process. However, no comprehensive study of this topic would be complete without a focus on why networks fail or the reasons that hinder successful networking behavior. Networks seem to have issues for a number of reasons. These issues may emerge as a result of relocation, or they could be caused by inter-firm dispute, a lack of size, external disturbance, or a lack of infrastructure.

Networks may last a long time and continue to develop. As a result, they go through times of disagreement amongst partners, which may and often does lead to the network's collapse. Although networks may face internal conflict, they can also face displacement and conflict from other networks. For example, investigates how small and medium-sized businesses in a Japanese area of traditional ceramics manufacture have adapted to high-technology uses. He shows how, in new Japanese sectors, external connections to networks have put the survival of creative networks in an old industrial area in jeopardy.

Every network has rules of engagement that limit the behavior of the participants. The network's governance mechanisms and the infrastructure (especially industrial culture) in which the network is embedded control these regulations. For example, the pharmaceutical business has an industrial culture that encourages more open and networked innovation, while the defense industry has moved toward tighter and more concentrated networks due to the sensitivity of the technology. Although the influence of networking on innovation performance seems to be clear, some research indicate that big companies can innovate more successfully. Shows that failure in Silicon Valley is related to networks of small businesses failing to capitalize on the revenues that may be earned when ideas reach maturity. After the original invention has been created, networks of small businesses have been proven to be unable to get the resources and scale to properly market the innovation. As a result, they are unable to maximize profits from the opportunity. A study of high-tech firms in the deep south of the United States found that clustering of related industries is facilitated by a lack of appropriately configured laboratory and office space at the intermediate stage of business growth, which necessitates information sharing

and cooperative behavior. The study's businesses' growth was severely hampered by a lack of essential networking mediation entities.

3. CONCLUSION

This assessment of the evidence base on the connection between networking and innovation identifies many areas in which further study is needed. The connection between networking and various kinds of creativity is the first apparent gap in the research (e.g. process and organizational innovation). Too far, product innovations have been the primary focus of research across disciplines. While process and organizational innovation are more challenging to analyze by their very nature, the kinds of networking activity that occurs throughout the creation, dissemination, and implementation of process and organizational innovation need significant consideration. Then it may be able to compare networking activity and configurations across these various kinds of innovation and draw meaningful conclusions about the differences. More broadly, network dynamics and network configurations are likely to be the most important topic for future study. According to the data, there is a lot of uncertainty and dispute in the literature about the best network topologies for effective innovation. While networking configurations are obviously influenced by variables such as industry and kind of innovation (radical vs. gradual; product vs. process), much more study is needed in this area. Recognizing that networks are fundamentally dynamic, a longitudinal approach to study may be beneficial.

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