

NETWORK ENVIRONMENT ANALYSIS

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ABSTRACT

Networks are an important feature of the competitive landscape, providing access to virtual resources and influence in the external environment. This paper presents a model which has been tested based on the limited literature in this area and the author's prior research into industry network effects. The analysis of six cases examining network effects confirms the importance of 11 network factors in determining the influence of networks on an organisation's external environment. The analysis also identified eight relationships across characteristic and scope factors and seven relationships that existed within either characteristic or scope factors. This confirms the importance of network factors as a component of the external environment to be considered in strategic management, and the capacity of networks to create complex external relationships that will influence the external environment.

Keywords: International Strategic Management, Resource-based View

INTRODUCTION

Networks have become a very important feature of the competitive landscape. Increasingly, networks provide access to virtual resources [1], upon which competitive advantage is built [2-4]. An environmental analysis of networks is a critical but, as yet, poorly understood component of the strategic management of networks [5]. A network environmental analysis identifies the characteristics and scope of the networks (network factors) that will assist or hinder the success of an organisation's operations in an industry. These network factors are not necessarily market specific — they could be attached to a group of organisations that make up an industry, even though the organisations may service several markets.

LITERATURE REVIEW

The two categories of factors (characteristic and scope factors) can be represented by specific variables. The categories of factors and the variables that comprise them can be identified by examining the impact and operations of networks under conditions where psychic distance emphasises the function of the network factors [6-8]. Psychic distance in the context of networks is due to differences in cultures, knowledge, industry conditions and macro environmental conditions [9]. Within environmental contexts familiar to the organisation, networks operate in the background and their influence on an industry is often overlooked [10]. In some environments (especially political, professional and highly competitive ones), however, the impact can be very significant [11-13].

Examining these psychically distant environments suggests that characteristic factors will include trust levels, transparency, transferability (of benefits), network membership, ongoing membership requirements and attributes (such as professional qualifications) [6, 7]. Scope factors include geographical coverage, the size of network (numbers of members), areas of impact (e.g., politics, capital market access and competition), influence of the network relative to other local institutions such as government and professional associations, and longevity of the network [10, 11]. Table 1 shows the network variables identified in the literature which can affect the business environment of organisations.

Factor	Impact	Author
Trust levels	Characteristic Factor	Menzies, Chung and Orr [6] Jansson, Johanson and Ramström [7]
Transparency	“	Walters, Bhattacharjya and Chapman [14]
Transferability	“	Jansson, Johanson and Ramström [7] Lesage and Ronteau [15]
Network membership	“	Prekert and Hallén [8] Qiang and Akoorie [16]
Ongoing requirements	“	Boehe [17] Rhodes and Butler [18]
Attributions	“	Menzies, Chung and Orr [6] Jansson, Johanson and Ramström [7] Prekert and Hallén [8]
Size of network	Scope Factor	Ballinger, G., et al. [3] Qiang and Akoorie [16]
Geographical coverage	“	Cainelli, Mazzanti, and Montresor [19] Clark et al. [20] Schweizer [21]
Areas of impact	“	Orr [2]
Influence levels	“	Qiang and Akoorie [16]
Longevity	“	Valdés-Llaneza and García-Canal [22]

Table 1. Characteristic and Scope Factors Identified in the Literature

The characteristic factor of trust level can be identified as shared understanding, experiences and language [7]. The level of trust determines the influence level and longevity of the network as an environmental feature [6]. The characteristic factor of transparency is measured relative to the trust levels [14]. In networks, this is displayed by an openness of purpose and procedure. The greater the levels of trust, the more important becomes transparency and the greater the potential for variation in transparency. Transferability reflects the fact that networks usually comprise individuals [7, 15]; however, the benefits accrued from membership of a network may be held over for future withdrawal or transferred between individuals in the network, or even to individuals outside the network (although providing external entities with benefits will usually bring them into the network) [4].

Network entry membership characteristic factors represent the hurdles associated with entering a network and could include experience, resources and knowledge [8, 16]. The network entry membership factors are strongly related to the factors of attribution. Ongoing requirements are the contributions to the network required to maintain membership (such as providing benefits to other members) and for retaining the transferability of existing benefits

(such as regularly participating in network protocols, such as conferences). Attributions reflect the qualifications (both professional and personal) required for membership into networks [7]. Some networks may have low attribution requirements (such as experience in the industry), while other networks (such as professional associations) may require qualifications and other demonstrated achievements for membership eligibility. Being eligible to be a member of a network will not necessarily be sufficient for an individual to join a network; membership expectations may require the individual to make up-front contributions to the network as well (such as sharing knowledge) as part of the entry requirements [6, 8].

The scope factor of the size of the network is a critical measure of its potential to impact on the external environment of an organisation [3, 16]. Not only does the size of the network determine the amount of influence, it also determines the proportion of the industry which is influenced, as well as the amount of influence on industry features (such as customers, rivals and suppliers). The significance of the geographical coverage is dependent upon the size of the network [19]. If the network is small and has limited influence on the external environment, the impact variation resulting from the extent of its geographical coverage (the proportion of the overall industry over which the organisation has an influence) will not be great. If, however, the network is large and has a substantial geographical coverage, its impact will be greater. The areas of impact of the network (such as influence on new technology developments, regulation, industry peak bodies, suppliers and customers) will determine the type of impact that it has on the industry environment. The actual influence levels are not only affected by size and geographical coverage, but also by the influence levels of the network members [2]. For example, network members who hold high positions in the government can influence the overall impact of the network on government regulation [16]. Longevity is a network factor which is subordinate to the influence levels. Where the influence levels are high, the longevity of the influence can have a significant effect on the overall impact [22]. However, where influence levels are low, the sustainability of influences will make little difference to the industry conditions.

The discussion above demonstrates that there is a clear pattern to the impact of network factors on the external environment. This pattern can be used as a framework for the analysis of networks on the external business environment of the organisation and, thus, inform strategic management. This paper will now present a case-based analysis of the relationships that would exist between the network factors and the impact upon the business environment.

METHOD

The following model [23] summarises the relationship between characteristic and scope factors discussed above. To test these relationships, empirical data from industry networks was analysed. The limited research into the industry networks factors that influence business environments suggested that internal consistency in qualitative data collected from individual manager's perception of their network environment [24, 25]. For this reason, multiple observations regarding the network conditions for an individual organisation were utilised. Multiple perceptions of a single phenomenon are best captured through case study analysis, utilising qualitative techniques [26]. Cases for six different organisations, sourced from a large range of public domain information sources were utilised to test the relationships in Figure 1.

Data was collected from different industries to ensure that there was variation in each of the variables. It is reasonable to expect that not all factors may vary for the network conditions within a single industry. The industries were selected to ensure that the total data contained variation between each of the variables. The following six cases summarise the conditions in each of the industries.

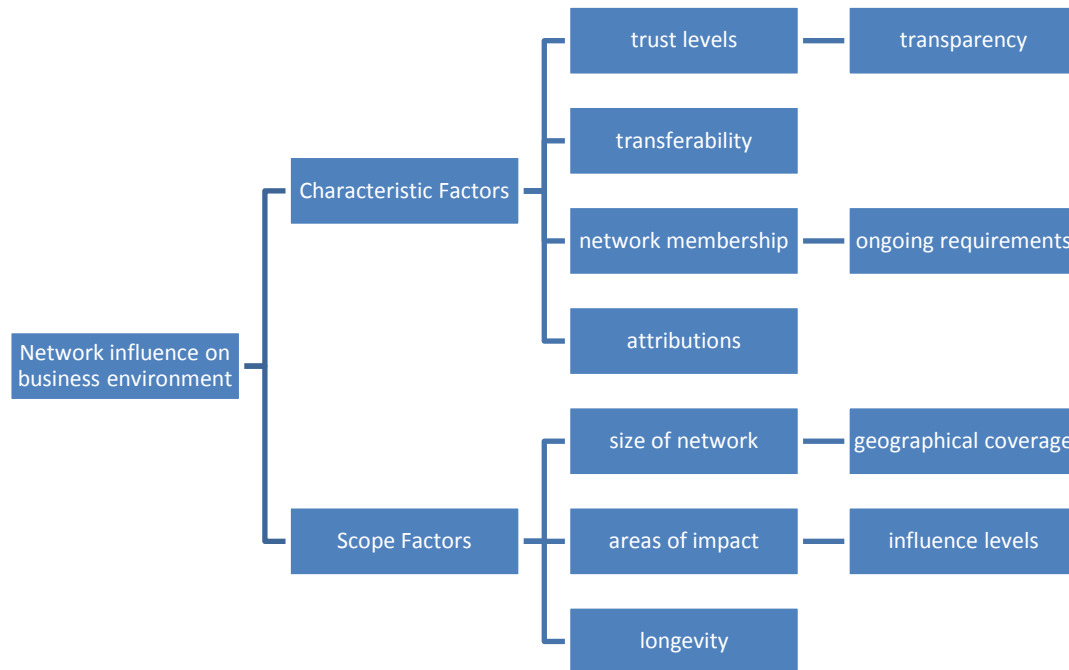


Figure 1: Hierarchy of network factors

Data for each of the cases was collected from public domain sources. Items representing each of the independent variables listed in Figure 1 were coded using NVivo. Items were categorised according to the strength of the relationship between the independent variables or the independent and dependent variable. Because cases were utilised for this analysis, the likelihood of convergence in the data for each case was strong (all data for each case reported on the same phenomenon), so only simple comparative statistics were adopted. A qualitative measure of the significance (strength) of the identified relationships, together with a measurement of the internal validity was incorporated into the analysis.

To ensure that the relationships between the variables identified were significant, only relationships that were identified as being strong, relative to the relationships between the other variables for each of the cases, were identified as significant findings. To ensure that the data was internally valid, items that were identified as being significant, also had to be identified by more than one source in each case. Medium and weak strength items were considered to indicate internal validity for items where a strong relationship was also identified. For example, if one source (case) identified a strong relationship between two independent variables and another source (case) also identified a medium strength relationship between the same variables, the relationship was considered to be significant. Simple statistics were then applied to these findings to indicate the relative strength of the relationships that were identified as significant.

CASE 1: THE BUSINESS ENVIRONMENT IN CHINA

The Chinese business environment includes many challenges, including the role of business agreements, the difficulty of pursuing intellectual property right infringements in China, government intervention, foreign company banking constraints and money transfer issues, variations in regulations and procedures between the different regions of China, corruption and weak infrastructure (in the non-coastal regions) [11].

Organisations not possessing access to sufficient business networks and local industry knowledge will find it difficult to be successful in this environment [6]. The consequences for the Chinese business environment from the networks active within include: support from Chinese government intervention, access to one of China's 16 free trade zones, and the government's support for the development of targeted industries [2]. Networks are responsible for the scale of the infrastructure projects underway in China (without which many of them would not be possible). These projects generate direct and indirect product and service demand, usually distributed through sub-networks, which are connected to the project networks [6]. China also has a complex and increasingly important role as a global market place (from which many large markets in other countries can be accessed), combining very high levels of technology and excellent local technology support, relatively low levels of rivalry because of the huge demand for many products and services, a massive workforce (though there are challenges around attracting and retaining skilled staff), excellent ports for shipping of manufactured products, dependable supplies of raw materials (for example, textiles), and a strong local capital market. Navigating and gaining access to these rapidly changing features requires informal information and third-party support of a type normally provided by networks.

CASE 2: COMPASS AIRLINES

Compass Airlines was the first low-cost airline in the Australian domestic airline industry; taking advantage of the industry's deregulation in 1990. Compass provided a no-frills travel service, priced substantially lower than the established airlines. Despite being very well received by the public, Compass failed in its first year of operations [27]. The airline's downfall was attributed to many factors, including: lack of access to infrastructure, cooperative behaviours from the major domestic airlines to counter the threat from Compass, insufficient financial resources and insufficient government support.

Critics suggested that Compass had counted too much on public goodwill and had entered the market without sufficient support to provide the necessary access to cash markets and airport infrastructure, or plans to counter the competitive response of the major domestic airlines and the low levels of government support [27]. The two major airlines in the domestic market, Ansett and Australian Airlines, both perceived the Compass threat in exactly the same way and accepted short-term losses in order to protect their long-term duopoly. Once Compass failed, both airlines gradually returned their airfares to the previous levels [27].

In 1992, Qantas bought Australian Airlines [28]. Impulse Airlines, a new entrant to the market, traded independently from 1994 until 2001, when it was bought by Qantas. Ansett was placed in administration, also in 2001, and after several attempts to save the company, it ceased passenger flights in 2002 [29].

CASE 3: THE TRADITIONAL CHINESE MEDICINE INDUSTRY

The traditional Chinese medicine (TCM) industry is a significant local industry (although small compared to other Chinese industries, and mainly comprised of small- to medium-sized producers) [30]. Unfortunately, excessive harvesting and poor horticulture has had a significant impact on China's ability to produce sufficient herbs. This challenges the long-term competitiveness of the TCM industry in China.

While China has a suitable natural environment for herb production and possesses substantial technical knowledge in this area, poor intellectual property control has led to the loss of most of the information. In addition, small- to medium-sized producers have struggled to achieve higher efficiency and quality control levels, and to make a sufficient investment in research and development, compared to the TCM industries in other countries. Both domestic and international demand conditions are very strong, due to new customer segments and the increased affluence of traditional customers. The industry has managed to keep up with the demand growth through the support of its supply chain member organisations. The incomplete network structure around this industry has meant that no allied or complementary industries exist. These conditions have kept the industry fragmented and stopped the international market developing. International competitors possess strong networks, which results in a net loss in knowledge and intellectual property from China. The Chinese government has had few opportunities to help this industry develop by encouraging its international growth or improvements in its business practices, including the introduction of quality control and standards [31] because of the lack of coordinating networks.

CASE 4: BOOST JUICE

Boost Juice is an Australian company that franchises fruit juice bars in Australia and 15 other countries. It entered Malaysia in 2009, with its first retail outlet in Kuala Lumpur and, by 2012, had 11 Malaysian franchise outlets. All Boost Juice outlets in Malaysia are located in high-end shopping centres because the volume of foot-traffic in shopping centres is high, and customers there will pay a premium for juice and other juice products. Boost Juice plans to open another 30 outlets in Malaysia within twelve months. The company's international expansion strategy is 'To become to juice, what Starbucks is to coffee' [32].

Rivalry between juice bar competitors in Malaysia is quite low and Boost Juice benefits from their combined network development of the market. The other rivals are comparable in size and economies of scale — being either a single independent juice bar or a small chain of franchises[33].

Fruit, vegetables and labour are inexpensive and readily available in Malaysia, meaning that networks extending into the supplier side are relatively unnecessary. The opportunities for customer networks are relatively limited as sales are individual (retail) and customers have high bargaining power. Competition between this industry and other beverage industries, however, is very strong. Therefore, networks within the industry are important for the promotion (e.g., promoting the health benefits of juices) and generation of opportunities (e.g., retail space) on this sector of the larger beverage market.

As this market grows, industry networks will become more complex and fragmented. As a result, the ability of the industry to compete against other segments of the beverage industry

will diminish, although its increased scale may help it attract more favourable government support.

CASE 5: COCA-COLA INDIA

Coca-Cola established its first Indian operations in 1973, but refused to comply with the foreign entity requirements of establishing a joint-venture partnership in India introduced shortly after, because of fears of the loss of its recipe [34]. In 1988, PepsiCo entered the market in a joint-venture with two other Indian beverage companies and quickly established itself as the leader in the market, taking advantage of the lack of competition from Coca-Cola and the benefits provided by the network to which the joint venture provided access[35].

The network enabled PepsiCo to take advantage of India's increasing interest in western products and culture at the time [35]. Coca-Cola re-entered the market in 1993, after the requirement of having a joint-venture partner was relaxed, however, it was too late and PepsiCo had established market leadership. India and Russia are the only major markets where Pepsi-Cola has a greater market share than Coca-Cola [36]. In 2012, PepsiCo had 5.4% of the total Indian beverage market and Coca-Cola only 3.2% [34].

CASE 6: QUEENSLAND DEPT OF NATURAL RESOURCES AND WATER

The Queensland Department of Natural Resources and Water provides water supply services to around 3 million people across Queensland. Providing services across an area this large requires the department to maintain an extensive network of suppliers and customer groups (such as business parks) [37]. To best manage this network, the department uses scenario planning to test its ability to coordinate their behaviours in response to significant environmental events. It recently examined scenarios around three equally plausible sets of conditions — sustained versus depleted natural resources, a strong versus a weak economy, combined with an informed and an involved network versus a community that was neither [37].

The scenario planning was utilised to support decisions regarding resource allocation as part of its strategic thinking. One such decision involves the implementation of more advanced electronic service delivery to make better use of the service network that the department had established. It also decided to increase its support for customer networks [37]. These actions reflected the importance of communication within critical networks.

FINDINGS

Table 2 below summarises the characteristic factors, scope factors and relationships identified in the cases. The cases indicate the existence of a strong relationship between characteristic and scope factors. The most commonly identified characteristic factors were *network membership* (identified in all 5 cases), followed by *attributions*, *ongoing requirements* and *transferability*, with *trust* being identified least frequently (4 times). The most commonly identified scope factors were *size of network* (6 times), followed by *geographical coverage* (5 times); with *longevity* and *influence levels* being identified twice and *areas of impact* only being identified once.

Network membership was most frequently identified as the basis of relationships (11 times), most frequently with *attributions* (3 times) and with *influence levels* and *ongoing requirements* twice each. Four out of the five scope factors (*geographical coverage*, *size of network*, *influence levels* and *longevity*), but not *areas of impact*, were found to be associated with network membership. Three other characteristic factors were also found to be associated with *network membership* - *attributions* (3 times), *ongoing requirements* (predicted by the model) and *trust levels* (once each). Four out of the six cases identified the predicted relationship between *size of network* and *geographical coverage*. None of the cases, however, identified the predicted relationship of *areas of impact* and *influence levels*. This may partly reflect the infrequent identification of both *areas of impact* and *influence levels* in the cases, however, their low frequency identification in the six cases also suggests a low importance level for those factors.

Table 2 also indicates seven relationships between characteristic factors, five relationships within scope factors, and eight relationships between characteristic and scope factors. Only two of the relationships were within the characteristic and scope factors (*network membership* and *ongoing requirements*, and *size of network* and *geographical coverage*), whilst two predicted relationships (*areas of impact* and *influence levels*, and *trust levels* and *transparency*) were not identified in the cases.

Case	Characteristic Factors	Scope Factors	Relationships
1	Network membership Transparency Attributions Transferability Ongoing requirements	Longevity Influence levels Size of network	Network membership - Longevity Influence levels - Longevity Network membership - Attributions Size of network - Ongoing requirements
2	Attributions Network membership Ongoing requirements	Size of network Geographical coverage	Network membership - Ongoing requirements Size of network - Geographical coverage Network membership - Attributions
3	Network membership Attributions Transferability Ongoing requirements Trust levels	Longevity Size of network Geographical coverage	Longevity - Trust levels Transferability - Ongoing requirements Network membership - Attributions
4	Network membership Attributions Transferability Ongoing requirements Trust levels	Size of network Geographical coverage	Size of network - Geographical coverage Attributions - Trust levels Transferability - Size of network
5	Network membership Transparency Transferability Trust levels	Influence levels Size of network Geographical coverage	Network membership - Influence levels Network membership - Trust levels Network membership - Influence levels Trust levels - Geographical coverage
6	Network membership Ongoing requirements Attributions Trust levels	Size of network Geographical coverage Areas of impact	Network membership - Size of network Ongoing requirements - Network membership Trust levels - Size of network Network membership - Geographical coverage Size of network - Geographical coverage

Table 2. Summary of Characteristic Factors, Scope Factors and Relationships Identified in Cases

CONCLUSION

The cases reviewed in this paper indicate that many network factors create significant environmental conditions which will influence the strategic decisions that should be made by

an organisation. The relationship between the organisational performance and the environmental conditions created by these networks had a significant impact on the performance of the organisations, as did the decisions they made.

The cases also identified a number of strong relationships between the characteristic factors and scope factors as well as within the characteristic and scope factors. Several of them were not predicted by prior research, confirming that the environmental impact of networks is still poorly understood. This paper represents a first step towards identifying the relationship between networks and the external environment from a strategic management perspective.

Network membership was identified as having the greatest number of relationships with other factors (11 times), whilst size of network and trust levels were also frequently connected with other network factors in the cases studied. This suggests they are critical areas to focus on for organisations considering the impact of complex networks on their external environment. Stand-alone factors of the size of the network, geographical coverage, attributions, ongoing requirements and transferability were all identified as significant components of a network's impact on the external environment in at least five of the six cases.

These findings suggest that an appropriate approach to identifying the impact of an organisation's external networks on its external environment would involve focusing on joining, utilising and maintaining membership of as many networks as possible. Joining external networks would also provide an opportunity to influence the network factors to create more attractive environmental conditions.

The cases provide support for the proposed relationship between characteristic and scope factors, and support the impact of the network environment on strategic thinking. Further research is required to test the causal relationship between each factor element and the network influence on the environment. A SEM analysis should be conducted for a range of industries to identify each element's relative causal relationships.

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