Chapter 11
The Role of Social Capital, Strategic Networking and Word of Mouth Communication in the Commercialisation of Innovation

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Abstract Commercialisation is the end point of the innovation management process. It needs to be recognised as being as much a social process as an economic one. Critical to the success of commercialisation is social capital, which is a nebulous and ill-defined concept, but one that has not been given sufficient recognition within the mainstream literature relating to the commercialisation of innovation. Connected with this is the role of word of mouth (WOM) communication that serves as a means of transferring information about new products and services throughout a market. This chapter examines the nature of social capital and WOM within the context of commercialisation. It argues that both have not been given sufficient attention in the role they play in the commercialisation process.

11.1 Introduction

The diffusion of innovation has been viewed as a social process (Rogers and Shoemaker 1971). This was a concept originally proposed by Tarde (1903) who viewed innovation diffusion as a process of imitation by one individual of another, with new ideas or practices passed on from the originator of the invention to the imitator and then from imitator to imitator (Kinnunen 1996). This social process of innovation sees the interrelationship between these individuals as playing a very significant role in the way new ideas and also products or processes are adopted within society and commercial markets (Rogers 1976). The success of an

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innovation is not so much its novelty or even the merits of its technological sophistication or economic value. What is critical to its success is the ability for the invention to be imitated or adopted on a significant scale and for this to be diffused as widely as possible (Grubler 2000).

The social nature of innovation diffusion highlights an important role for word of mouth (WOM) communication as a mechanism for the transfer of ideas. For firms seeking to bring a new product or service to market, the importance of WOM within their marketing communications process should not be overlooked. Opinion leaders can play a key role in facilitating the diffusion process, but key factors likely to influence their behaviour and enhance its effectiveness are the richness, strength and valency of the message, plus the credibility of the source and the brand equity of the firm that is commercialising the product or service (Mazzarol 2010). Yet attention also needs to be given to the role played by social capital in this process, which is an important foundation for the development of interpersonal and intergroup relationships that serve as the social networks through which new ideas can pass via WOM communication.

This chapter examines the interrelationship between social capital, strategic networking and word-of-mouth (WOM) communication in the commercialisation of innovation. Each of these areas has been examined in detail within other research but little has been done to draw these elements together. The chapter commences with an overview of each of these concepts and then an examination of the possible links that exist between them and the implications this has for policy, practice and future research. It contains some new work that has been undertaken in the field of WOM research in recent years and builds on the extant literature in the other fields.

11.2 Commercialisation as a Social Process

Commercialisation is the end point of invention and is where the value of the innovation—if the process is successful—can be realised. The concept of commercialisation is poorly defined and developed within the academic literature despite being one of the most important parts of the process of innovation (Adams, Bessant and Phelps 2006). It is generally recognised as a process of bringing to market new products or services, and doing so via marketing, selling or licensing of these products or services and/or their related technologies. As a process it is generally systematic, coordinated and involves both technical and business decisions that can successfully transform an innovation from a concept to a finished product or service that is actively sold within the market (Cobbenhagen 2000; McCoy et al. 2010). From a business perspective the commercialisation process must result in a profitable return to the firm's investment in an innovation (Chakravorti 2004). This ability for the firm to recover any investment in the innovation and the development of new products is why the process of commercialisation is so important (Akgun, Lynn and Byrne 2004).

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The focus of commercialisation has tended to be on the economic rather than the social aspects of the process. However, the diffusion of innovation has long been recognised as a social process involving the four key elements of: (i) the innovation; (ii) channels of communication; (iii) time; and (iv) the social system in which the diffusion occurs (Mahajan, Muller and Bass 1990). This was a key focus of the work undertaken by Rogers (1995). In fact the importance of a firm's engagement with key suppliers and lead customers as a source of new ideas and innovation has been understood for some time (von Hippel 1978, 1986). This has included the recognition of a nexus existing between the adoption and diffusion of new products and social interaction via WOM communication within consumer markets (Arndt 1967a). The role played by social networks was also highlighted by Czepiel (1974). His study of the diffusion of an innovation within steel mills highlighted the importance of viewing the diffusion, and by default the ability to commercialise an invention, as a social or "behavioural" process. An important finding within this study was that a social network between managers from the steel mills was connecting these firms together and was an important transfer system for new ideas. As one of the managers interviewed for the study commented:

> We watch what firm X does. We talk to them and find out how it might work for us. We generally do the things they do (Czepiel 1974, p. 179).

This reflects the notion of imitation as proposed by Tarde (1903) and the interpersonal nature of innovation diffusion proposed by Rogers (1995). However, Czepiel (1974) cautioned that the steel industry that he studied possessed some unique characteristics (e.g. uniformity among firms in terms of production techniques, a culture of ideas sharing). He suggested that this pattern of social networking would be less likely to emerge within more competitive and differentiated industries such as chemicals or electronics.

The characteristics of the social network are therefore as important as the presence of this network, with social structure and culture playing a key role in how effective the interpersonal channels of communication are as a medium of diffusion for innovation. In their review of the diffusion process Katz, Levin and Hamilton (1963) observed that the social structure provides the boundaries within which any diffusion of items (e.g. ideas, technologies, products, processes) will take place. They also suggested that it defines the nature of the interpersonal communication that occurs. For example, hierarchical social structures in which there are more influential or powerful individuals or groups can either facilitate or impede the diffusion of innovation. This will depend on the level of acceptance or resistance to the new ideas or practices by these more socially dominant actors.

Research by Midgley, Morrison and Roberts (1992) undertaken using simulation studies suggested that the structure of a social network between actors can have a significant impact on the process of innovation diffusion. Their study also found evidence that the establishment of new social linkages relevant to innovation were likely to take longer to form than existing links used for more routine interactions. This capacity for social structure to influence the diffusion of

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innovation not only reflects the role of WOM communication in the process, but also the importance of social capital. Communication and cooperation have been acknowledged as playing an important role in the successful commercialisation of R&D (Griffin and Hauser 1996). However, there has been less recognition of the broader role played by social capital at the firm, industry and national levels.

11.3 The Nature of Social Capital

Social capital has been a subject of academic study for decades yet it remains a somewhat poorly defined and nebulous concept (Fine 2001). Although difficult to define and measure, it deals with issues of trust, the norms of reciprocity between people and the flow of information (Woolcock 1998; Winter 2000; Adler and Kwon 2002). The concept of social capital refers to interpersonal relationships that exist within a community and their patterns and qualities (ABS 2002). For the OECD (2002) social capital relates to the formation of networks that share norms, values and understandings that help to facilitate cooperation within or amongst groups. A perspective held by Fukuyama (2001) who defines social capital as follows:

> Social capital is an instantiated informal norm that promotes co-operation between two or more individuals. The norms that constitute social capital can range from a norm of reciprocity between two friends all the way up to complex and elaborately articulated doctrines like Christianity and Confucianism (Fukuyama 2001, p. 7).

There is a distinction between social capital and physical or human capital. The nature of physical capital is generally clear. It comprises tangible assets such as property, goods and money. The concept of human capital, pioneered by Schultz (1961), relates to the development of people's skills and knowledge, usually facilitated by education and training (Becker 1975). By comparison social capital deals with the relationships and shared values that are created and used by individuals, groups or organisations to collectively solve problems (Ostrom 2009).

Social capital is both an outcome of social relations and networks, and a necessary condition for their formation (Burt 1997). It has been viewed as taking place at a variety of levels, ranging from the individual through to the group, organisation, community and finally national level (Leana and van Buren 1999). Social capital is recognised as a valuable element in the field of economic development where it is understood to represent the conditions that enable enhanced cooperation between people, it is…

> …a vital yet under-appreciated development asset, which refers to a class of assets that inhere in social relationships, such as social bonding and bridging, makes those with access to it more effective and can be enhanced for lasting effects (Chase and Christensen 2009, p. 428).

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11.3.1 The Role of Trust

An important element in the creation and sustainability of social capital is trust, which is often viewed as the "glue" that binds social networks together (Liewicki and Brinsfield 2009). Mayer, Davis and Schoorman (1995) suggested that trust between people or between organisations are built on the foundations of integrity, ability and benevolence. They defined trust in the following terms:

> The definition of trust…is the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party (Mayer et al. 1995, p. 712).

Integrity is the recognition that a commitment by two or more parties to an agreed course of action will be adhered to without the risk of one party reneging on the agreement or seeking to cheat or free ride on the other members of the social network (Johnson-George and Swap 1982; McFall 1987). The ability or competence of the actors within the social network is also important to trust. This is because it implies that the actions of any given actor will be less likely to have negative impacts on the others if all have equal or complimentary abilities (Lieberman 1981; Stikin and Roth 1993). Finally, there must also be a sense of benevolence, in which the various actors in the social network seek to do well to the others within their network rather than just personal economic or social gain (Strickland 1958; Solomon, 1960; Larzelere and Huston 1980). Trust must exist within the social network in order to help facilitate the development of social capital, and it should be reinforced by the history and culture of the network and the formal and informal rules that govern its activities (Zucker 1986). Any deterioration of trust within the social network is likely to threaten the network's ability to serve as a cohesive and effective mechanism for the diffusion of innovation (Knight 1933).

11.3.2 The Role of Networks and Structural Holes

However, while trust is necessary to create and sustain social capital it is not sufficient by itself to do this. Trust forms a sort of "reservoir" of confidence in another person or group of persons, but not one that will necessarily lead to social exchanges that are required to foster social capital (Lewicki and Brinsfield 2009). For example, people can trust their neighbours or those they work with, that they will treat them well, but they might not feel comfortable asking them for assistance. What is required for trust to work as a mechanism for social capital building is the existence of productive social networks.

Effective social networks consist of a "series of connected or tied nodes" (Narayan and Pritchett 1999). Most people exist within networks that have strong ties between them based on such things as family, professional, religious, ethnic or

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national characteristics. These relationships are based on a high degree of shared norms, values, beliefs, culture and understandings and create a high degree of similarity referred to as "homophily". Such networks are likely to be highly stable and the engagement between members more frequent. However, such homophilous networks are likely to suffer from a knowledge exchange that is isomorphic in nature. Isomorphism is a situation in which the actors in the network tend to resemble each other and this is unlikely to result in innovation due to the redundancy of the information that is circulated (Steward and Conway 1996).

For social networks to serve as mechanisms for the diffusion of innovation there is a need to create "structural holes" between otherwise homophilous groups that can allow the transfer of new information between them via a "bridge". When some individuals who serve as "gatekeepers" on these holes receive this information they have a greater opportunity to get good ideas (Burt 1992a). These gatekeepers are often influential people (e.g. managers, leaders) who have the ability to boundary span beyond their homophilous network which has strong ties, to more hetrophilous networks with higher diversity weaker social ties. However, due to the "structural hole theory" individuals who can secure new and less redundant information have a greater opportunity to identify new ideas and entrepreneurial opportunities (Burt 1992b). The relationships that exist between individuals in hetrophilous networks are weaker, but the value of the information that is exchanged across these networks is usually greater, suggesting there is a "strength of weak ties" (Granovetter 1973, 1983) phenomena.

Social networks are therefore recognised as comprising either a "bonding" or a "bridging" relationship. The first of these relates to the homophilous network with high tie strength and dense connectivity. The second is associated with the hetrophilous network with weak tie strength but the opportunity to bridge the structural holes and take advantage of less redundant information (De Carolis and Saparito 2006).

11.3.3 The Role of Reciprocity

A third element in the forces required to generate and sustain social capital is reciprocity, which is closely associated with the concept of trust. This is due to the need for there to be trust between individuals that if they do something (e.g. give information of value) they will receive reciprocal value in exchange (Nahapiet 2009). Reciprocity can be direct, indirect or spatial in nature (Nowak and Sigmund 2000). Direct reciprocity involves direct "give and get" exchanges in response to actions. Indirect or generalised reciprocity involves giving without getting a direct response from the person to who the initial information or benefit is provided (Putnam 1993). Any benefit this individual might receive is likely to return to them indirectly via the social network and might be in the form of an enhancement of their reputation within the community (Leimar and Hammerstein 2001). Spatial reciprocity relates to the proximity of the actors within the social network. For

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example, in close knit, stable communities any inappropriate behaviour by network members is generally punished by "tit-for-tat" responses (Axelrod and Hamilton 1981; Axelrod and Dion 1988; Axelrod 1997). However, where the individual is able to avoid this negative response—as is common in highly transient populations or unstable communities—it is possible for network members to misbehave via free riding or malfeasance (Nowak and Sigmund 2000). According to Granovetter (1985) the key to discouraging such misbehaviour and encouraging trust within social networks is "embeddedness" where the more individualistic and economically self-interested behaviour of an individual is constrained by their being embedded in a social network.

Social capital is therefore a complex but fundamental construct that has been examined from a range of perspectives but continues to be overlooked as a critical resource requirement in determining the success of innovation commercialisation. Part of the reason why social capital has not been given the attention that it deserves is found in Coleman's (1988) analysis of the role played by social capital in the creation of human capital. As he notes:

> Unlike other forms of capital, social capital inheres in the structure of relations between actors and among actors. It is not lodged either in the actors themselves or in physical implements of production. Because purposive organizations can be actors ("corporate actors") just as persons can, relations among corporate actors can constitute social capital for them as well (with perhaps the best-known example being the sharing of information that allows price-fixing in an industry) (Coleman 1988, p. S98).

The nature of social capital as a resource that lies between individuals, groups and organisations, owned by everyone but not easily measured or appropriated by anyone may explain why it has been overlooked. Physical capital can be readily observed and measured, and ownership rights to it can be applied. Human capital is less tangible in nature but even here there are opportunities to measure education and skills, knowledge and growth or decline of the population. Wages, employment, productivity and workforce participation are all well-established measures of human capital. By contrast social capital is not so easily measured. It exists within the social networks and relationships that take place between people and organisations. Trust, networks and reciprocity are all part of the building blocks of social capital but they are difficult to measure and are rarely found listed in the balance sheets and asset registers of business organisations.

11.4 WOM Communication in the Commercialisation Process

Interpersonal world of mouth (WOM) communication has been recognised for decades as a potentially powerful medium of promotion for new products and services (Brooks 1957; Arndt 1967a, b). It involves an informal interpersonal communication between individuals in which products or services are discussed

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and evaluated (Anderson 1998). As a process of interpersonal communication WOM requires a giver and a receiver as well as a context in which the discussion takes place. Within a consumer market environment WOM communication provides the receiver with an opportunity to reduce the risk associated with purchase due to the ability of the information to enhance their understanding of the product or service. However, for the giver to be willing to transfer information to the receiver via WOM communication they need to feel that the product or service offers value. They also may need to have a degree of social affinity with the receiver and the self-confidence that their opinion is worth giving (Mazzarol et al. 2007).

On the receiver side the overall impact of the WOM message is likely to be influenced by the perceived credibility and trustworthiness of the giver, the level of tie strength and homophily existing between the two, and the characteristics of the message itself. The vividness of the message and strength and richness of the verbal and non-verbal communication that transmits it are also likely to be important (Sweeney et al. 2008). This combination of the logical appeal of the message that is being transferred, the emotive content or appeal of the message, and the power with which it is transmitted are important to the overall effectiveness of the WOM communication (Sweeney et al. 2012).

The role of WOM communication in the commercialisation process has been recognised within the field of marketing science, with a particular focus on the capacity for WOM to help facilitate the diffusion of innovation and the adoption of new products (Mahajan and Muller 1979). It has also been recognised that WOM communication about new products and services can be both positive and negative in nature; demonstrating the importance of supportive advertising to help mitigate any negative WOM (Mahajan, Muller and Kerin 1984). There has also been a body of work designed to develop quantitative adoption and diffusion models that might be used by marketing professionals to estimate rates of market diffusion in various contingencies (Mahajan et al. 1990).

A key feature of the commercialisation process for innovations that are novel or radical in nature is the uncertainty of the market's acceptance, and the risk that this imposes on the firm seeking to make the investment. Case study research undertaken by Mason (2008) suggests that WOM can be an effective promotional tool where market environments are complex and turbulent. However, in simple and stable environments it is of less value because the information it provides is less valuable and less sought by prospective adopters. According to Williams and Buttle (2011) firms seeking to make use of WOM for marketing communications purposes need to consider "eight pillars" that form the foundation of a coherent WOM management strategy. These include: (i) the customer; (ii) the product/service; (iii) communications; (iv) the key influencer network; (v) referral networks; (vi) supplier/alliance partner networks; (vii) employee network; and (viii) organisational factors.

With respect to the social networks that are contained in this model the following explanation is provided. The "key influencer network" comprises the regulatory agencies, industry and consumer associations, trades unions and a range

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of other actors that can endorse or reject a new innovation. In some circumstances competitors can play this type of role. Managers seeking to commercialise a new innovation will need to consider such actors within this network and take steps to mitigate any risk that might be posed by them. This might include the proactive engagement and communication with these groups or the use of publicity and public relations in the event of opposition. The "referral network" comprises the loyal customers, industry partners and others in the firm's circle of contacts that can help to generate a flow of WOM referrals to feed directly into the sales activity. By contrast the "supplier/alliance partner network" comprises third-party actors such as suppliers and financial services firms (e.g. banks, venture capital firms) who can assist the innovation diffusion process by facilitating WOM communication. This network is less likely to feed directly into the sales process, but it can be effective in providing endorsement and influence in strategic terms. Finally, the "employee network" is important, particularly for service firms, as the commercialisation of this type of innovation will require the employees to play a key part in its market diffusion. While these "pillars" sound logical Williams and Buttle (2011) in summarising their findings of three large Australian case study firms noted that:

> Not one of our sample organisations had a coherent, integrated strategy for the promotion of Positive WOM. Each departmental unit interprets WOM differently. There is no clear, shared, understanding of how WOM fits into customer service, sales, marketing or communications programs, or of the value that WOM contributes to the organisation as a whole (Williams and Buttle 2011, p. 89).

These observations highlight the relative lack of systematic awareness, measurement and use of WOM communication in the marketing communications process. This is a situation common in industry despite the recognition of the importance of WOM communication for nearly 60 years (Katz and Lazarsfeld 1955). There are also benefits from WOM communication in industrial or business-to-business (B2B) markets (Godes 2012, Godes and Mayzlin 2009). However, even here systematic management is also scarce.

11.4.1 The Rise of e-WOM

The advent of online marketing and communications systems, in particular social media via Web 2.0 platforms (e.g. MySpace, YouTube, Facebook, LinkedIn, Twitter), has given rise to an emerging focus on e-WOM or online social exchanges between consumers (Coulter and Roggeveen 2012). The speed with which such online and now mobile social media can disseminate information and the potential for this to be diffused globally, makes e-WOM of particular interest to commercialisation.

A study of Japanese consumers' adoption of portable gaming platforms found that there are differences between e-WOM and conventional WOM in the diffusion

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of innovation (Kawakami et al. 2013). This study's findings suggest that conventional WOM can help to stimulate intensity and variety of product use so as to encourage product upgrades and the purchase of complementary products. However, e-WOM influences consumer decision making pre and post purchase. Prior to purchase consumers use online forums and social media to evaluate products and assess the risks of acquiring the device. Post-purchase they use these online channels to resolve usage issues and may not use e-WOM to find new uses of the innovation. This post-purchase user environment is important as a potential source of innovation diffusion because it can help or hinder the commercialisation process. As the authors of this study noted in their advice to managers seeking to make use of e-WOM:

> To harness these benefits, managers can invest in the development of Web sites (or areas within existing sites) that enables users to share their product use experiences. In addition, managers may want to develop promotional programs that encourage users to visit use-related Web sites, read content generated by other users, and add their own content to use-related Web sites (Kawakami et al. 2013, p. 27).

This distinction between e-WOM and WOM has been highlighted in earlier research (Godes and Mayzlin 2004). There is evidence that consumers' use of online information is influential to making offline decisions and so the imperative is on managers in firms seeking to commercialise their innovations to actively engage e-WOM through online news groups, forums and other social media.

Online social media offers a new and rapid mechanism for the diffusion of innovation and this has potentially beneficial impacts on the process of commercialisation. This can take the form of viral marketing campaigns (van der Lans et al. 2010), or online product reviews (Cole et al. 2011). For the adoption of new technologies recent research suggests that e-WOM can be as effective as more conventional WOM in influencing consumer purchasing decisions, particularly in the area of perceived usefulness and ease of use (Parry et al. 2012).

11.4.2 Word of Mouth in Commercialisation

Whether WOM is conducted virtually or physically it is important to the commercialisation process. For example, in a study of European biotechnology firms engaged in commercialisation, Costa et al. (2004) found that WOM communication played a key role in their success. When faced with initial resistance by consumers to the adoption of new products, the use of strong WOM communication with one firm's social network enabled this company to overcome the obstacle:

> Taking advantage of strong market knowledge and assistance from technical support and regulatory bodies and benefiting from strong word-of-mouth communication, company C quickly managed to prevail over the initial resistance of the consumers and became leader in several niches (Costa et al. 2004, p. 411).

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Other firms examined in that study were identified as having successfully used positive WOM within their networks to diffuse their innovations into the market moving beyond early adopters and innovators and onto the mainstream consumers. The creation of a "word-of-mouth effect" as a "very effective communication tool" in an otherwise restricted market was also noted by the study as a successful marketing strategy by several firms.

Another study by Chiesa and Frattini (2011) examined the application of WOM communication as a mechanism to address commercialisation problems in circumstances within high-tech markets where the initial launch of a new technology has failed. This can be a major problem in such markets where the failure of a new product or technology triggers a negative WOM response from the early adopters who may also be strong opinion leaders for late adopters within their social networks. Their study suggested that negative WOM amongst early adopters was likely to be due to factors such as the launch of a product that is not finished, but where a pre-launch promotional campaign has raised expectations. When the product is supplied it is not targeted specifically at early adopters but is shipped without many features and functions either supplied or in working condition. This is further exacerbated by pre-launch promotions that have promised enhanced features and functions (not supplied), or that suggest the new technology is an improvement on the existing technology.

By contrast where positive WOM is generated the innovation is launched in a completed state and any pre-launch announcements focus on this, and position the new product as a revolutionary technology. This also sees the new product targeted specifically at early adopters, and that it carries features and functions that are known to be of particular interest to them. In the case where the innovation needs to be integrated into an existing system, success is likely to depend on the firm's ability to develop long-term strategic partnerships with key individuals within the adopting network. The conclusions drawn by Chiesa and Frattini (2011) from their study highlighted the role that positive or negative WOM from early adopters plays in influencing late adopters:

> Whereas lack of support from the innovation's adoption network is a critical reason for failure especially for systemic innovations, a negative attitude of early adopters can determine market failure especially for radical innovations (Chiesa and Frattini 2011, p. 452).

Interestingly they also raise doubts about the validity of the well-publicised concept of there being a "chasm" between early and late adopters as originally proposed by Moore (1996). They dispute the notion that early and late adopters are highly dissimilar, and that this makes communications between them uncommon so that acceptance of a product by early adopters does not impact on late adopters. Instead they side with Rogers (2003) who suggests that Moore is wrong in proposing the existence of "chasm". Instead they suggest:

> …that the diffusion process, even within high-tech markets, is a continuous one, whereby innovations diffuse in a social system as a result of complex patterns of communications between adopters and potential adopters (Chiesa and Frattini 2011, p. 453).

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11.5 Social Capital as a Key Element in Commercialisation

Governments around the world invest substantially in publicly funded research and development (R&D), and offer incentives to industry to do the same (OECD 2010). There is evidence that the commercialisation of innovation is enhanced through inter-firm networking and clustering (Hamdouch 2009). The concept of a National Innovation System (NIS) has also emerged over the past 30 years in which the intersection of publicly funded institutions such as universities and public investment in R&D flows through to industry and enhances the overall level of innovation within a country (Lundvall 1998). At the heart of this NIS concept is the existence of networks between individuals and organisations that can help to facilitate innovation and its diffusion (Nelson 1992; Freeman 1987, 2002).

An important aspect of the NIS concept is the ability to transfer scientific research findings into patented inventions that can be commercialised through a process of technology transfer (Laredo and Mustar 2001; Van Looy et al. 2011). However, research into the successful commercialisation of university inventions is contingent on the interpersonal relationships that form between the academic researchers and the industry partners (Boehm and Hogan 2013). Trust between the researchers and industry partners playes a significant role along with the commitment of both parties to work together to see the commercialisation process through. As one study highlighted:

> Success was directly related to the degree of commitment of the scientific researchers and the commercial collaborators to achieve a deal. In the case of the failed transaction, there was an internal climate of conflict, with powerful players being antagonistic to commercial outcomes. In one of the transactions, the lead academic was responsible for championing the technology into a commercial enterprise, and in the other a number of the players had a long history of past collaboration and a firm basis of personal trust (Martin 1991, p. 369).

A further study of university-industry collaboration in applied research and commercialisation projects also highlighted the importance of strong social capital between the network partners and the consequences of not having it. This included cultural divides and poor communication between academics and their industry partners, which could only be overcome by individuals from both sides taking the necessary action to actively communicate and build trust (Berman 2008). Similar findings emerge from other studies into the same phenomena of university-industry linkages. Critical drivers of success were effective communication, understanding and trust between the individuals engaged in the collaboration (Plewa et al. 2013). As one participant in the study observed about the importance of building strong social relationships:

> I guess there's this identification…you identify that you want to work with each other. Then there's…the whole phase of determining how you work together and if you can work together (Plewa et al. 2013, p. 27).

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There are many obstacles to effective collaboration between universities and industry in the field of commercialisation. These can relate to conflicts over intellectual property (IP) rights, bureaucratic administration, equity sharing and incentives for academics to engage. However, these barriers can be mitigated through the fostering of stronger social capital between the academic and business community. Experience of collaboration, wider social networks and inter-organisational trust between all members of the collaborating network are also likely to play important roles (Bruneel et al. 2010).

As another study of university technology transfer practices by Siegel et al. (2004) found, the reasons for success or failure in the process is often the cultural divide that exists between the academic and industry communities. Where the academic community is focused on the generation of knowledge from research as a public good that needs to be published, the business community is seeking to generate commercially valuable IP that can be appropriated for profit. What was required to overcome these barriers was enhanced networking and social exchange between the two communities and the generation of social capital. These examples of universities engaged in technology transfer and commercialisation are used here to highlight the importance of social capital in the commercialisation process. However, they can equally apply to collaboration between firms seeking to commercialise new products, particularly relationships between small and large firms (Alvarez and Barney 2001).

11.5.1 Social Capital and Innovation at the National Level

In a study of the innovation system in Denmark over the period 1996–1999 Lundvall et al. (2002) found six key "lessons" that suggested why that nation had succeeded in fostering a healthy climate of innovation. First, the Danish economy was found to be "highly egalitarian" with a high per capita GNP income distribution. It also possessed a flexible labour market, but one that also provided a good level of job security for employees. A third lesson was that the Danish NIS had built its competitiveness around low-tech industry sectors where innovation was incremental rather than radical, drawing on human experience and learning rather than scientific or technological breakthrough. The formation of social networks within Denmark's NIS was found to be influenced by people and their career patterns. For example, there was an "intense interaction" between firms, but a weak interaction between firms and universities. The general conclusion from this was that if policy makers want to encourage more interaction between universities and business they must tackle the problem through the career paths of academics that are generally not provided with career-based incentives to work within industry.

Another lesson from the Danish NIS study was that the system secured significant benefits from the enhancement of human capital via education and training that encouraged people to learn and taught them how to learn. Finally, the study

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found that social capital played a significant role in the overall growth of the system. This helped to explain why the Danish economy was able to compete without a substantial high-technology sector. The key outcome of this high social capital was its ability to foster learning:

> The only way to explain the strong economic performance of Denmark and other small economies with a weak specialisation in high technology products is to take into account the social capital that makes it easier for people to learn, collaborate and trade. The most important threat to this mode of production and innovation is the growing polarisation and exclusion of those who do not fit into the learning economy. To give those a stronger learning capability and access to the networks where learning takes place is crucial for the sustainability of the learning economy (Lundvall et al. 2002, p. 219).

According to Lundvall (2007) why social capital appears to play such an important role in the fostering and diffusion of innovation at a national level is the existence of a "knowledge infrastructure" within an economy. This is comprised of the education and training system and the role it plays in facilitating the flow of ideas and the creation of a "learning economy" that requires both intellectual and social capital to sustain it. According to this view intellectual capital formation is "fundamentally dependent on social capital", and any economic development strategy that fails to recognise the importance of social capital is unsustainable.

This knowledge infrastructure is a building block of a strong innovation focused economy and it is the communication between firms and their customers that can help to generate new innovation and promote the commercialisation of new products and services (Athaide et al. 1996). This pattern of evidence was further identified in a study by the European Commission's "European Innovation Scoreboard" (EIS) (EC 2008). This examines the innovation performance of all 27 countries that are members of the European Union (EU). In an examination of the findings from the EIS the importance of social capital was highlighted:

> Social capital and knowledge flows are potential key factors in innovation performance…beyond GDP, differences in social capital and technology flows have the greatest power to explain differing levels of innovation performance (Bavec 2009, p. 24).

For innovation to be fostered within an industry or national economy there is the need to generate at least three key drivers. The first of these is "knowledge integration", which involves the ability to take knowledge or the novel configuration of existing pieces of knowledge and apply them to new purposes. The second driver is that of the "co-evolution of business and social relationships". This relates to the "embeddedness" of the firm within its social network and how willing that network is to the adoption of new ideas and innovation, plus the willingness to exchange ideas. Finally, there is the third driver of "technological development", which relates to the firm's ability to invest in R&D and its commercialisation (Corsaro et al. 2012).

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11.6 Conclusions

As outline in this chapter the process of commercialisation involves the sale and adoption of new products, processes and services generated from an investment in R&D and new product development. It is a process that will benefit from the commercialising firm having a social network that enables it to secure information and knowledge in a timely manner. This network should allow it to engage freely with lead customers, key suppliers and other network actors to exchange information and secure positive WOM. Because the diffusion of innovation is a social process, the roles played by social networks, WOM communication and social capital are important for successful commercialisation. They create what some have described as a "commercialisation net" (Aarikka-Stenroos and Sandberg 2009). This refers to the formal and informal network of relationships that are required to bring a product successfully to market.

At the firm level the existence of a strong social network and the ability to generate positive WOM communication is likely to benefit the commercialisation process. Holmlund and Tornroos (1997) note that a firm networks that operate on three layers or levels. The first is the "production network" layer, which is the vertical supply or value chain network linking suppliers to the firm and the firm to its customers. The second is the "resource network" layer that comprises the horizontal supporting network of complementary actors such as financial institutions, chambers of commerce, regulatory agencies and other businesses. Finally, the third layer is that of the "social network". This is the interpersonal relationships that its managers and employees have with other individuals across the other two networks.

Firms seeking to undertake commercialisation will need to possess strong networks at all three levels. They will need to work closely with lead customers and in some cases key suppliers to develop their new product and bring it to market. Relationships here must be based on trust and a willingness to share ideas and assist with the co-creation of the new product or service. The ability to acquire much needed resources and indirectly promote the innovation may also be enhanced if the firm has a strong resource network. However, it is the ability of each of the firm's managers, in particular the owner or senior leadership team responsible for the innovation's commercialisation, to use the social network that will be decisive. This suggests that the innovative firm needs to possess not only the physical and human capital it needs for commercialisation, but also the social capital.

At the macro level the strength of a nation's innovation system is contingent on the strength of its social capital. Without sufficient social capital to help foster information sharing, collaboration and connectivity, it will be less likely that innovation will be created and diffused. The development of social capital requires that the society recognises the mutuality that is essential to encourage collaboration and networking. It needs to foster a culture of mutual trust and reciprocity within social networks so as to provide the foundations for the creation and sustaining of social capital.

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11.6.1 Implications for Policy and Practice

Governments that seek to encourage innovation and commercialisation of inventions will miss a major component within the development of their NIS if they ignore social capital. The findings from the extant literature suggest that investment in physical and human capital is insufficient. What is required is investment in mechanisms that help build social capital. These include public goods such as education systems and the encouragement of share values and beliefs. If a nation is viewed as a large social network, there is a need to ensure that all members of the network (e.g. all citizens of the nation) feel that they can actively participate. Further, there is a need for all network participants to feel that their participation is welcome and rewarded. The marginalisation of individuals and groups within the broader society or the creation of too many isomorphic groups that cannot be bridged to other groups in the network will diminish the power of the nation's innovative capacity.

For managers and entrepreneurs engaged in innovation commercialisation within firms, the message is clear. Social capital is as important as physical and human capital. There is a need to recognise and map the social network within which the firm is embedded. Of particular interest should be how open or closed the network is to change, new ideas and innovation. The importance of developing strong social networks has been well recognised within the academic literature (Birley 1985; Ostgaard and Birley 1994). The value of social networks to the growth and performance of small firms has also been acknowledged (Komulainen 2006). However, the recognition of social capital as a critical resource alongside physical and human capital has not been so widely accepted.

Managers, particularly of small firms that typically lack sufficient resources to commercialise innovations alone, need to leverage their stocks of social capital to assist them in securing the necessary resources. Active management of social capital would involve a review of the three network layers proposed by Holmlund and Tornroos (1997), in particular the "social network" layer. How is it constructed, who has what contacts and what are the dynamics of it? Of importance here are the levels of trust and reciprocity that can be found within these networks as well as their strength and value. Know-who is often as important as know-how in the commercialisation process.

If commercialisation and the diffusion of innovation are social processes then managers need to pay more attention to the role of WOM communication and social capital in their planning and strategic thinking. What has been a focus for marketing communications researchers and sociologists should be brought into the mainstream within the strategic management, innovation and entrepreneurship literature.

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