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PAPER 1

CIM Working Paper No. 2000:01

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## **Diffusion of Organisational Innovations: An Innovation System Perspective**

### **ABSTRACT**

This paper is based on two recent developments in innovation research: the increasing interest in organisational innovations (OI) and the conceptualisation of innovation systems (IS). OI are important driving forces behind organisational performance and economic development. They may provide more efficient ways of performing and co-ordinating activities and may enhance the potential success of new technical innovations (TI). However, the factors influencing the diffusion and rejection of OI is an area requiring further study. Previous studies have indicated that forces in the national context may influence these processes, but also that there has been relatively little research relating to this possible impact. Recently, a stream of research has emerged, focusing on understanding innovation (mainly TI) in an IS perspective, which might offer promising routes for the study of OI as well. The overall purpose and main contribution of this paper is the development of an analytical framework for studies of OI, based on an IS perspective. Our first conclusion is that the IS approaches may contribute to the development of a framework for the diffusion of OI. However, the IS approaches, albeit based firmly in the field of economics, entail less developed concepts for grasping the roles of intangible institutions, such as values, norms and perceptions. The framework outlined in this study is an attempt to bridge these gaps. Inspired by institutional theory from the fields of organisational analysis in sociology and cross-cultural management, the IS concept has been elaborated, in order to include more cognitive and cultural issues.

**Keywords:** organisational innovations, diffusion, innovation system, institutions

## INTRODUCTION<sup>1</sup>

» *In this section, the purpose of this paper and the research questions addressed are presented briefly, as well as the background and importance of the broader research area, i.e. the diffusion of organisational innovations, including a discussion of the rationale for choosing an innovation system perspective as a basis for the study. Finally, the structure of the paper is outlined.*

Two recent developments in innovation research form the basis of this paper: the increasing interest in organisational innovations (OI) and the conceptualisation of innovation systems (IS).

OI are important driving forces behind organisational performance and economic development. They may provide more efficient ways of performing and co-ordinating activities and may enhance the potential success of new technical innovations (TI). As Leonard-Barton (1988) put it, successful TI often requires OI. OI may both influence and be influenced by TI and it is desirable for firms to provide a match between technology and organisation in order to make TI useful (Lund and Gjerding 1996). Innovation research has traditionally focused on products and TI. Although this primary focus still remains, an increasing interest in OI has been observed during recent years. However, there is still more to learn about which factors influence the diffusion and rejection of OI (Edquist 1997).

Earlier studies (e.g. Jarnehammar 1995, Alänge, Jacobsson and Jarnehammar 1998) have indicated that forces in the national context may influence these processes, but also that there has been relatively little research relating to this possible impact.

Recently, a stream of research focusing on understanding innovation in an IS perspective has emerged,<sup>2</sup> which might offer promising routes for the study of OI as well. So far, however, OI have been the object of much less attention than TI and are under-theorised in the IS literature (Edquist, Hommen and McKelvey 1998). Most authors using the IS approach focus on product innovations (e.g. Nelson 1993, Nelson and Rosenberg 1993, Carlsson 1995, Carlsson and Stankiewicz 1995).<sup>3</sup> To include studies of OI would indeed represent an

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<sup>1</sup> An earlier version of this paper was presented at the conference “Structures, Functions and Institutional Change in National Systems of Innovation”, organised by the Science and Technology Research Section of the German Sociological Society, July 19-20, 1999, at the Max Planck Institute for the Study of Societies in Cologne (Köln), Germany. The authors are grateful for the seminar participants’ comments.

<sup>2</sup> The IS concept appeared in the late 1980s as a result of theoretical and empirical efforts to describe how firms’ innovative performances are dependent upon the interaction between economic, technical and social institutions. This branch of research may be classified under the main headings of national innovation systems (NIS) (e.g. Lundvall 1992, Nelson 1993) and technological systems (TS) (e.g. Carlsson 1995 and 1997).

<sup>3</sup> One reason for the lack of studies on OI in the IS approaches might be the fact that TI have traditionally been regarded as the main driving force behind change and development in the economy (Edquist, Hommen and McKelvey 1998). One exception is Gjerding (1992) who did, to some extent, discuss other, non-technical, innovations (in chapter 5 in Lundvall 1992).

important basis for further theoretical and empirical development of the IS approach. Edquist, Hommen and McKelvey (1998) argue that the emergence and diffusion of OI and the interdependence between OI and TI can and ought to be studied within an IS approach.<sup>4</sup> As early as twenty years ago, Kimberly (1981) argued in favour of a holistic, system approach to studies of managerial innovations.

The overall purpose of this paper is to develop a theoretical framework for studying and understanding the diffusion of OI. A specific aim is to analyse recent IS approaches to see if and how they may be used as a basis for such a framework. Accordingly, the two main research questions addressed in this paper are as follows: What might a useful framework for studying and understanding the diffusion of OI look like? How might the IS approaches contribute to the development of this framework? The concept of institutions is central to the IS approaches and a closer focus on the role of institutions seems to be a promising avenue to follow in order for such development to proceed.

The paper is organised as follows. First, the phenomena of innovation and diffusion of innovations are introduced, with a focus on OI. This is followed by an introduction to the IS perspective. Subsequently, the main pioneering contributions to the study of how national innovation systems (NIS) and technological systems (TS) may contribute to the development of a framework for studying and understanding the diffusion of OI are discussed, with special focus on the characteristics of OI. The shortcomings are identified and analysed in conjunction with the introduction of complementary research perspectives, which, via the concept of institutions, paves the way for a broadening of the IS perspective. Finally, the cornerstones of the proposed framework are outlined and ideas for further research are presented.

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<sup>4</sup> The diffusion of OI may, of course, be determined by different factors than TI (Edquist 1997), but this concept may still be better understood from a IS perspective than from that of standard economic theory, the predictions of which of a standard diffusion pattern for any innovation in any given population of firms has been criticised for its overly restrictive assumptions (Davies 1979).

## ORGANISATIONAL INNOVATIONS AND DIFFUSION

» *In this section, the concept of innovation in general and specific characteristics of OI in particular are discussed. Furthermore, the concept of diffusion is discussed with regard to these characteristics.*

Although the pioneering work of Schumpeter (1911, 1934) introduced a broad definition of innovation,<sup>5</sup> much of the innovation literature has equated the term innovation with material artefacts, i.e. products (or TI). Despite the continued tendency to objectify the concept, contemporary innovation theorists agree that innovations can take on other forms as well, e.g. an idea, a method or a process (Slappendel 1996).<sup>6</sup>

While economists commonly view innovation as something new introduced at a market-place (e.g. Freeman 1982 and 1998),<sup>7</sup> scholars from other disciplines have used the concept in a broader sense. For example, Rogers (1995) defines innovation as “an idea, practice, or object that is perceived as new by an individual or other unit of adoption”. That is, if the idea is new to the relevant unit of adoption, it is an innovation.<sup>8</sup> This view is accepted in this paper.

One may distinguish between product and process innovations.<sup>9</sup> Product innovation relates to *which* new goods or services that are produced. Process innovation, in contrast, concerns *how* goods or services are produced in new ways.<sup>10</sup>

**Organisational innovations.** OI may be viewed as a specific case of process innovations and are referred to as new ways of organising activities, including management paradigms and techniques. They deal with organisational structures, administrative processes and the co-ordination of human resources without directly including technical elements, i.e. they are related to the management aspects of an organisation.<sup>11</sup>

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<sup>5</sup> Schumpeter (1911 and 1934:66) defined innovation as “the carrying out of new combinations”. He included the introduction of a new good or a new quality of a good, a new production method or a new way of handling a commodity commercially, the opening up of a new market, the conquest of a new source of raw material or semi-manufactured goods, and the carrying out of a new organisation of any industry, in the innovation concept.

<sup>6</sup> For instance, Dosi (1988) states that innovation essentially deals with the search for and the discovery, experimentation, development, imitation, and adoption of new products, new production processes and new organisational set-ups.

<sup>7</sup> According to Freeman (1982:7), “an innovation in the economic sense is accomplished only with the first commercial transaction involving the new product, process, system, or device, although the word is used also to describe the whole process”.

<sup>8</sup> The unit of adoption can be the world, a whole industry, a single organisation, an organisational sub-unit or an individual.

<sup>9</sup> The distinction between product and process innovations originated with Schumpeter, who defined product innovation as “the introduction of a new good ... or of a new quality of a good” and process innovation as “the introduction of a new method of production ... also ... a new way of handling a commodity commercially” (1934:66).

<sup>10</sup> This is mainly an analytical distinction. Process innovations may also find customers and may, in that sense, be regarded as products as well.

<sup>11</sup> Various quality management paradigms and practices (e.g. studied by Jarnehammar 1995) are examples of OI. Some innovations may be found in the intersection between technically and organisationally oriented process

In accordance with Jarnehammar (1995), we may state that OI are characterised by knowledge bases of a more tacit nature than those of TI, leading to greater difficulty in defining an OI. Using Rogers' terminology (1995), the observability and trialability of OI may be lower than those of TI. Thus, the costs and benefits of an OI are more difficult to assess, which may lead to pricing problems.<sup>12</sup> The market for OI may be somewhat different than for "ordinary" products and TI for other reasons as well. A supplier industry for OI does not exist in the traditional sense. Instead, management consultants, universities and industrial associations may be regarded as suppliers of OI.<sup>13</sup> Alternative modes of transfer to pure market exchange mechanisms, e.g. formal or informal networks, initiatives from so called mediating bodies (or broker organisations) or imitation of influential firms,<sup>14</sup> may be important for the diffusion of OI. Clark (1995) adds that OI typically contain dimensions that are embedded in the surrounding socio-cultural settings and socio-economic selection environments. Therefore, local search process characteristics may be more important for OI than for TI.<sup>15</sup> Tacit knowledge, embodied in top-level managers and employees, may also be transferred through peoples' movements within and between organisations. Since it is somewhat problematic to speak about a product or artefact that is sold on a market in the traditional sense, understanding the workings of the demand side (and the dynamic mechanisms that bring demand and supply together) is apparently even more important when discussing OI than TI.

The intangible nature of OI leads to the need to focus on the proper definition of the object of study when studying the diffusion of OI. The temporal aspect is also important, i.e. it is important to take the process of continuous adaptation and change during the transfer process into account. Finally, since OI evolve dynamically and unevenly over time, they ought to be examined over long time periods, including studies of their interdependence with other OI.

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innovations. The so-called ERP (Enterprise Resource Planning) solutions, which are based on recent developments in information technology, are one example.

<sup>12</sup> "However, the degree of observability and trialability depends on a number of factors. Among these are the degree of standardisation and the possibility of conducting a pilot test within a limited area. Thus, assumed diffusion barriers, such as pricing problems and difficulty in evaluating costs/benefits may be of less importance if the innovation is standardised and if it is possible to test sub-components of the innovation, i.e. if the innovation is divisible" (Alänge and Jarnehammar 1999:32).

<sup>13</sup> In a similar vein, Abrahamson (1996) refers to "the management fashion setting community", consisting of management consultants, business schools and the business press.

<sup>14</sup> Imitation is an important transfer mode and is thoroughly discussed by Abrahamson (1991 and 1996), among others, in terms of organisational fashion and managerial fads that are frequently promoted by the management fashion setting community.

<sup>15</sup> This issue is related to the interpretation, translation and shaping of the OI into the local context. It is important to emphasise this possible contextual influence since OI, in direct contrast to most TI, are seldom transferred from one setting to another without being subject to changes.

**Diffusion.** The transfer of innovations is traditionally discussed in terms of diffusion, which has been defined as “the process by which an innovation is communicated through certain channels over time among the members of a social system” (Rogers 1995).

The term is a metaphor borrowed from the field of physics, where it is basically assumed that the object being transferred remains intact during the transfer process (Clark 1995, Czarniawska and Sevón 1996). However, as previously indicated, OI are difficult to describe as distinct and unchangeable entities. They are often subject to interpretations and modifications during the transfer from one setting to another. Adopters often have to mould the innovation, in accordance with their own situation, to make them work. Thus, when applied to OI, traditional diffusion theory may be challenged. Clark (1995) argues that “the diffusion concept does not provide sufficient analytic fidelity to explain new forms of organising and their diffusion, rejection and appropriation”.<sup>16</sup>

Latour (1986, quoted in Czarniawska and Joerges 1996) contrasts the traditional diffusion model with a translation metaphor. Translation, in this sense, means more than linguistic interpretation. It includes the subject that is being translated, those involved in the translation process, through which channels the translation occurs and, most importantly, how the idea may be modified during the translation (Czarniawska and Joerges 1996).

The translation metaphor stresses the importance of the institutional context and the term ‘translation’ may pave the way for a more cognitive understanding of the concept of institutions than the term ‘diffusion’. Yet, a re-definition from diffusion to translation may be perceived of as “splitting linguistic hairs”. Therefore, we will follow the contemporary fashion by continuing to use the term ‘diffusion’ for innovation transfer processes.

As reflected in the translation metaphor, it is, in reality, difficult to distinguish between innovation, imitation and diffusion.<sup>17</sup> Therefore, especially when it comes to OI, it may be relevant to conceptualise innovation as a process that covers the original idea and its introduction on the market as well as its possible continuous adaptations during the subsequent transfer (see e.g. Lundvall 1999).

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<sup>16</sup> He argues that there is little room for in-depth analyses of the characteristics of the innovation itself and that, despite the awareness of the “social system” and “time” dimensions, the influence of the societal context receives too little attention and the temporal dimensions of the diffusion process are oversimplified. Similarly, Larsen (1997) argues that the traditional diffusion theory may only partially apply to OI, which indicates that the traditional diffusion model may be more suitable for studies of the transfer of TI than of OI.

<sup>17</sup> Some innovations are radical, i.e. they are completely new to the world, but most innovations are incremental, i.e. built upon new combinations of known elements. In fact, a great deal of the research and organisational development that takes place in organisations aims at acquiring new technology and knowledge that have been developed elsewhere (Lundvall 1999). The spreading of an innovation among various groups of users is often a process in which the original innovation is adapted to local circumstances.

## THE INNOVATION SYSTEM APPROACH

» *In this section, a short background to the emergence of the IS approaches is presented, followed by a more detailed discussion of the system concept and a brief introduction to some of the various IS approaches that have resulted from research on innovation and technological change. This is followed by a discussion of the NIS approach, primarily as theorised by Lundvall (1992), on the one hand, and the TS approach, as theorised by Carlsson (1995 and 1997), on the other hand. A special section covers the relevance of the national level of analysis, after which some implications and shortcomings of the NIS approach and the TS approach are discussed with respect to the characteristics of OI.*

**Background of the IS approach.** Traditional economic theory primarily focused on “short-run problems of optimal resource allocation within a static framework, from which technological change has usually been excluded” (Rosenberg 1986). To a large extent, it neglected the analysis of innovation as a process guided by other forms of social interaction than pure market exchange. Economists were slow at integrating technological knowledge into their analyses.<sup>18</sup> Not until the 1950s, when it was discovered that input of traditional production factors such as capital and labour only explained a fraction of the economic growth, did economists begin to incorporate technological knowledge into their studies (see e.g. Solow 1956). However, according to Carlsson (1997), the residual component, often simply referred to as the “technology factor” or “technological progress”, was not analysed in any detail and remained an unexplained exogenous factor.

The IS concept is an evolving approach to the understanding of innovation processes that aims at incorporating the technological knowledge factor into the analysis. It has emerged during the last decade as a challenge to traditional equilibrium models that regard knowledge, innovation and technological development as exogenous factors. In the IS approaches, these are treated as endogenous factors instead, thus offering a more comprehensive perspective on the dynamics of innovation and change, compared to mainstream economic theory (Carlsson 1995). The IS perspective incorporates principles of change inherited from evolutionary economics (e.g. Nelson 1987) and does not apply the notion of optimality (Edquist et al. 1998).<sup>19</sup> It is recognised that innovation is characterised by complicated interaction patterns

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<sup>18</sup> There may be several reasons that knowledge has been neglected in traditional economic analysis. Knowledge is a concept that is difficult to define and capture analytically. Furthermore, it is a commodity that is not readily exchanged on markets; rather, the more knowledge-intensive an activity is, the more the transfer occurs through non-market mechanisms. Knowledge may be a public good in that its use is seldom restricted once it is in place, but it is not free due to the often high transaction costs involved, especially for tacit knowledge (Carlsson 1997).

<sup>19</sup> The IS perspective has a background in the extensive research on technical innovation conducted in the 1970s and 1980s. One important result of this research was that it showed that innovation, in contrast to the dominant linear perception, is an evolutionary, cumulative process. In the system perspective, innovation is regarded as the



and feedback mechanisms. Innovation is seen as cumulative, non-linear collective learning and selection processes. Following evolutionary and institutional economics, explanations of evolutionary patterns of change within the IS perspective are based on the actions of actors in relation to institutions and other actors (Edquist, Hommen and McKelvey 1998).

**What is a system?** In general, a system is referred to as a set of interconnected components working towards a common objective, but there are many suggestions available in various branches of the literature for the definition of a system reflecting a wide range of philosophical perspectives.<sup>20</sup>

Basically, a system consists of components and relationships (Carlsson et al. 1999). Components are the operating elements in a system. The characteristics and behaviour of each component are dependent upon the characteristics of at least one other component in the system. The characteristics and behaviour of each component may in turn affect the characteristics and behaviour of the system as a whole. In an IS, one may distinguish between actors and institutions.<sup>21</sup> Actors may be individuals or organisations, to whom certain characteristics or capabilities may be ascribed. Various institutions influence the behaviour of the actors and the relationships between them.

The configuration of actors and institutions is constantly changing due to various feedback mechanisms. A specific system may thus differ substantially over time. These dynamic properties are among the most important attributes of an IS (Carlsson et al. 1999). Yet, as recognised by Grønning (1998 and 1998a), for instance, it appears that many current versions of the approach have succeeded better at describing the status quo of one particular IS than at analysing the mechanisms of change and evolution, i.e. the system dynamics.

In this paper, the focus is on systems approaches to the analysis of innovation. Innovations are not only determined by the actors in the system but certainly also by the relations between them (including market as well as non-market linkages). This leads us to regard the IS as more than the sum of its parts.<sup>22</sup> A description of an innovation system must therefore necessarily include more than a simple enumeration of its elements (Edquist et al. 1998).

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result of a social process over time, in which many individuals and organisations interact, rather than occurring through individual entrepreneurial activity.

<sup>20</sup> Systems theory was proposed in the 1940s by the biologist Ludwig von Bertalanffy (see e.g. Bertalanffy 1968). Rather than reducing an entity to the properties of its parts or elements, systems theory focuses on the configuration of parts and the relations between them, which connect them into a whole.

<sup>21</sup> An actor can be an individual or an organisation, e.g. business firms, universities, research institutes, policy-making bodies or banks. Institutions may be laws, social norms or cultural traditions. The distinction between organisation and institution is further elaborated on later in this paper.

<sup>22</sup> The belief that the behaviour of the whole system is completely determined by the behaviour of its parts is referred to as reductionism. The converse view is that the behaviour of the parts is determined by the whole, sometimes referred to as downward causation (see e.g. Campbell 1974). In an IS, this latter determination is not complete, which makes it possible to formulate a systems view without lapsing into either of the extremes of reductionism or holism; the whole is to some degree constrained by the parts and at the same time the parts are to some degree constrained by the whole.

**Various IS approaches.** Several IS approaches exist. In some, the main dimension of interest may be a nation or a region determining geographical boundaries of the system. In other cases, the main dimension of interest may be a specific technology or industrial sector. All approaches have a common general purpose of grasping the generation, diffusion and utilisation of technology and innovations.

One of the earliest efforts to introduce an explicit system view into the economics literature is the work of Dahmén (1950) on 'development blocs'. Dahmén's study focused on the role of entrepreneurs and he defined a development bloc as "sequences of complementarities which by way of a series of structural tensions, i.e., disequilibria, may result in a balanced situation" (Carlsson 1997:3 quoting Dahmén).<sup>23</sup>

It was not until much later that the modern IS approach entered the scientific scene. Initially, this approach was dominated by studies at the national level.<sup>24</sup> The notion of national systems has roots originating long ago,<sup>25</sup> but in its modern version, the national innovation system (NIS) perspective is a rather new idea. It was first used by Freeman (1987) and further developed in a couple of major pioneering studies published in the early 1990s by Lundvall (1992), Nelson (1993) and, subsequently, many others. Today, approximately a decade after its introduction, the concept has been developed into an analytical frame of reference used by organisations such as the OECD. In some countries it is used as a platform for the formation of national technological policy (Lundvall 1999). As defined by Freeman (1995), a NIS may be understood as "the network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies". Lundvall (1992) includes in a NIS "all parts and aspects of the economic structure and the institutional set-up affecting learning as well as searching and exploring – the production system, the marketing system and the system of finance present themselves as subsystems in which learning takes place".

In addition to system approaches defined by the national criterion, there are other approaches as well. An IS may, for example, be supranational in at least two senses; it can include a sub-part of the world, e.g. the integrated European Union, or it can be truly global in a wider sense. It can also be regional within the borders of a country. A well-known study of regional innovation systems (RIS) was performed by Saxenian (1994) on Route 128 in Massachusetts and Silicon Valley in California. Storper (1997, referred to in Lundvall 1999) studied how regional dynamics may be related to economic globalisation tendencies.

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<sup>23</sup> Another early system approach is input/output analysis as theorised by Leontief (1941). He mapped flows of goods and services among sectors in the economy at a given point in time.

<sup>24</sup> According to Smith (1996), there appear to have been two basic foundations to the national level- based approach, both based in innovation research. On the one hand, there were firm-level studies of the relationship between users and producers of technology, i.e. studies on the evolution of specialisation and how this affects interaction and learning. On the other hand, there were studies on economy-wide features of corporate behaviour and policy support programs.

Various industrial cluster approaches explore the performance of industrial sectors in terms of integration of industries and key technologies. The roles of environmental conditions and inter-industry interactions in creating dynamic industrial clusters characterised by high productivity are emphasised. The most well-known example in recent years is probably the diamond concept (Porter 1990), focusing on clusters of industries in terms of factor conditions, demand conditions, links to related industries, firm structure and rivalry.

One may, furthermore, leave the geographical dimension. Parallel to the establishment of the NIS approach and the work of Porter, IS approaches with a more technological focus have been developed, according to which technologies are not individual artefacts; instead they are integrated into what might be conceptualised as technological systems (TS). A recent study in this area concerns the evolution of factory automation technology in Sweden (Carlsson and Jacobsson 1997). A TS is specific for various technological fields; hence, this approach is technology-related rather than geographically related. A TS may be national, regional or international and several TS may exist in one country. A TS is defined as "a network of agents interacting in a specific economic/industrial area under a particular institutional infrastructure or sets of infrastructures and involved in the generation, diffusion and utilisation of technology" (Carlsson 1995).<sup>26</sup>

According to Edquist (1997), there may be considerable overlap between systems and the different approaches may complement rather than exclude one another.<sup>27</sup> Lundvall (1992:13) argues that "...a definition of the system of innovation must, to a certain degree, be kept open and flexible regarding which subsystems should be studied and which processes should be studied". In other words, the most appropriate approach depends upon the circumstances and the object of study.

**The relevance of the national level of analysis with reference to studies of OI.** The issues of determining the appropriate level of analysis and of where to draw the system boundaries, have always been debated by adherents to the IS approaches. Ever since the concept of NIS was introduced, the question of whether the nation constitutes a relevant level of analysis (e.g. Paquet 1994) has been debated and critically examined from a globalisation and regionalisation perspective (Archibugi and Michie 1995 in Lundvall 1999). It has been argued that the internationalisation of firms and globalisation of economies diminish national

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<sup>25</sup> E.g. Freeman (1995) and Lundvall (1992) refer to List (1841).

<sup>26</sup> A related approach is the sectoral innovation system (SIS) approach, suggested by Breschi and Malerba (1995). This concept introduced the idea that different industrial sectors operate under different "technological regimes" which are characterised by certain combinations of opportunity and appropriability conditions, degrees of cumulativeness of technological knowledge, and characteristics of the relevant knowledge base. The SIS approach focuses on the competitive relationships among firms, using the concept of selection environment.

<sup>27</sup> For example, sub-parts of the system may have a certain degree of inherent dynamics. Analyses of regional subsystems may contribute to the overall understanding of an NIS. National specialisation is often a result of certain regions' specialisation within specific industrial sectors.

specificity, thus weakening the coherence of the national level of analysis.<sup>28</sup> Indeed, today more and more money and technological knowledge flow across national borders. Some of the nationally controlled functions have been moved to the international level or, in some cases, to the regional level. Other perspectives have emphasised the technological dimension instead of the national dimension as the basis for the system (e.g. Carlsson 1997).

The usefulness of maintaining the nation state as the basis of analysis of innovation processes is obviously proportional to the extent to which the nation state forms a beneficial environment for communication, interactive learning and transfer of knowledge and the extent to which the national border limits such processes. Some countries may be very divided in terms of culture, language or power structure, while other countries may be more homogeneous in these respects. Thus, all nation states may not be equally coherent in forming productive environments for communication and interactive learning. In other words, they may not be equally coherent in terms of constituting an NIS.<sup>29</sup> Nevertheless, as further discussed below, several factors support the relevance of the national level in analysing the diffusion of TI and OI. As expressed by Clark (1995) "administrative innovations are heavily impregnated with the nationally specific habitus".

The nation state<sup>30</sup> seems to constitute the natural boundary of many economic activities. The world is still facing persistent differences in national economic performance. Different countries – we may simply refer to them as rich or poor – have completely different resources available for the development and distribution of innovations.

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<sup>28</sup> The fact that the use of technologies across national borders is very widespread and that there is a growing tendency among corporations towards localising research and development activities to foreign countries are primary arguments in this context.

<sup>29</sup> In addition, there might be subcultures, e.g. states in the United States, which form a natural unit of analysis, even though some federal institutions apply to all states. Similarly, the European Union has created many common formal institutions for all member states, although no one would oppose the argument that major cultural and historical differences, i.e. major institutional differences, exist between the member states.

<sup>30</sup> The concept of NIS presumes the existence of nation states. The nation state in its modern form is only two hundred years old, but it has been an important fundament for industrialisation and economic development, especially in small homogeneous states, such as the Nordic countries (Lundvall 1999). A nation state may be national both in a cultural and a political dimension. In reality, the concept of a nation is somewhat unclear. Countries differ in their degree of cultural homogeneity and political centralisation and it may be difficult to locate the borders of the true national arena. Institutional change may be a rather slow process at the national level but nation states can by no means be viewed as fixed and static environments. Just like technologies, they are continuously designed, changed, remodelled, renamed, dissembled and removed. As an analytical starting point, however, it is useful to assume countries to be fairly homogeneous in cultural and political terms. The significance of cultural norms, values and beliefs may be most easily conceptualised at the national level (see e.g. Hofstede 1980 and 1991).

In addition, several authors point out the fact that nations vary in their capacity to diffuse technology and innovations, not only due to differences in economic performance. Maurseth and Verspagen (1998) argue that the national border still is an important barrier for transfer of technological knowledge and that national specificity remains important for the capacity to produce, adopt, diffuse and use technological knowledge. Clark (1995) argues that societies generally contain a typical national variety in their forms of organising and in patterns of innovation. Similarly, Zysman (1996) argues that historically rooted institutions frame the choices of individuals and structure the behaviour of firms. Cooke et al. (1997) are of the opinion that the elements of shared culture, territory and evolved administrative organisation at the national level provide important dimensions for OI. As shown in several case studies, national institutional set-ups are quite stable over time and to a large extent different between countries; thus, learning and innovation differ between countries (Smith 1996).<sup>31</sup>

This does not mean that innovation activities in a particular country are not influenced by innovation in other countries or affected by international institutions, such as international trade agreements or patent systems. Thus, while stressing the importance of the national level, one may not assume the process of innovation to be exclusively localised inside national borders. It is important to underline the fact that the national setting should be regarded as an open, dynamic system (see e.g. Lundvall 1992, Scott 1995). Nor does this viewpoint mean that institutions might not be regional or sectoral in character. Systems may overlap in many ways. A specific firm may simultaneously be part of several different systems, be they sectoral or geographical (e.g. regional or national or global).<sup>32</sup>

However, the idea that nations are significant to the evolution and maintenance of many institutions that affect the generation and diffusion of TI and OI is part of this perspective. The institutional setting, industrial structure, public technology and innovation policies, communication and knowledge structures, demand patterns, and cultural and behavioural patterns do, in many respects, have sufficiently clear national attributes to justify the national level of analysis within the IS approach. Neither economic integration nor globalisation processes fully replace the national entity as a significant economic arena; rather, these are complementary views. Globalisation and regionalisation processes may challenge the traditional role of national innovation systems, but they do not make it less important to understand how the NIS works.

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<sup>31</sup> It may even be reasonable to assume that the relative stability of institutional set-ups and the strong element of path dependency in technological development reinforce the differences between countries.

<sup>32</sup> Sometimes a regional system of innovation may be understood basically as a national phenomenon and not only as a regional phenomenon. For example, Silicon Valley may be regarded as a specifically American phenomenon, depending on a specifically American configuration of institutions and policies, even if it is characterised by specific regional Bay Area features as well (see Rogers and Larsen 1984).

This is especially true when the object of study is an OI. According to Lundvall (1992), the national environment still plays an important role in supporting and directing innovation and learning processes, since these processes require complex communication between the parties involved. “This will especially be the case when the knowledge exchanged is tacit and difficult to codify” (Lundvall 1992: 3). OI mainly involve knowledge of a tacit nature. Competencies of a tacit nature do not flow freely across national borders. OI are likely to be more easily diffused – and interactive learning more easily developed – if the parties involved share the same or similar norms.<sup>33</sup> The meaning people attribute to organisational structures and practices varies between nations, which in turn affects the acceptance and diffusion of new managerial ideas, especially those emanating from other cultural contexts, thus seriously challenging the universality of many so-called best practice management concepts (see e.g. Kogut 1991, Alänge et al. 1996, Hamed and Miconnet 1998).

**A comparative discussion of NIS and TS in an OI perspective.** As previously indicated, OI have received much less attention than TI and are clearly under-theorised in the IS literature (Edquist, Hommen and McKelvey 1998). Hence, in order to construct a framework for studies of the diffusion of OI based on the IS approaches, further discussion of these with regard to the specific characteristics of OI is necessary. This is the objective of the following, in which the studies of NIS performed by Lundvall (1992) and Nelson (1993) and the TS approach (Carlsson 1995 and 1997) are discussed.<sup>34</sup>

**Discussion of Lundvall’s and Nelson’s approaches to the NIS concept.** Both Lundvall’s and Nelson’s studies on NIS seek to understand innovation within the national economy, conceptualising innovation in terms of evolutionary economic theory. However, while there are several similarities between the two approaches, they also demonstrate many differences.

Basically, a distinction may be made between a narrow and a broad definition of an NIS (Lundvall 1992, Smith 1996, Zysman 1996). The narrow definition, which underpins Nelson’s study, focuses on factors that can be directly associated with aspects of science and technology, i.e. on organisations and institutions that are directly involved in exploring innovative opportunities (e.g. firms, R&D units, technological institutes and universities).

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<sup>33</sup> It is not unlikely that concepts such as trust (see e.g. Fukuyama 1995) and the ability to build networks is affected by the nation state as a cultural and political entity (Johnson and Gregersen 1997). The fact that the workforce is still a very immobile production resource may be another important factor.

<sup>34</sup> These books are all edited volumes, of which colleagues of Lundvall, Nelson and Carlsson have written parts. In this paper, we have nonetheless referred mainly to the editing authors.

Nelson's study is an international comparative study, based on empirical cases of fourteen different national economies. Nelson argues that variations among nations mainly result from differences in the mix of industries and in R&D system and expenditure. The study reflects the complex historical interplay of formal institutional factors in shaping an IS. Furthermore, it reveals the great diversity of contemporary NIS, which, in Nelson's opinion, is the key to understanding innovation.<sup>35</sup>

Lundvall adopts the broader definition, in which elements outside science and technology are incorporated into the framework. According to Lundvall, a NIS is constituted by all elements and relationships, either located within or rooted inside the borders of a nation state, which interact in the generation, diffusion and use of new, economically useful, knowledge.<sup>36</sup> This broad definition reflects the importance attributed to the characteristics and effects of institutionally embedded interactive learning as a basis for innovation. It includes all parts of the economic structure and institutional set-up affecting learning, searching and exploring.

Nelson's narrow definition may be problematic with regard to OI. As stated above, there is an explicit focus on R&D activities and similar factors that can be directly associated to science and technology. However, in reality, especially with regard to OI, the direct connection between research and innovation is difficult to observe.<sup>37</sup> Hence, taking into account the tacit nature of OI, a framework that includes more intangible, non-technical aspects of innovation would be a more coherent framework for studies of OI. Lundvall's broader definition is appropriate for studies of OI, since, as mentioned previously, OI typically contain dimensions that are embedded in the surrounding socio-cultural settings and socio-economic selection environments. The explicit focus on the institutional context and interactive learning mechanisms in Lundvall's approach may match the proposed complexity of the innovation and diffusion process for OI more accurately and may thus be a good starting point for the development of our framework.<sup>38</sup> This is discussed in more detail in the following section.

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<sup>35</sup> Cooke et al. (1997) argues that this diversity is so overwhelming that it may be impossible to specify a generic model of a NIS.

<sup>36</sup> In Lundvall's opinion, the NIS is social (learning is a central feature and is a social activity) and dynamic (it is characterised by positive feedback loops and reproduction of knowledge). Within the overall framework, learning involves the creation and diffusion of both codified and tacit knowledge concerning both technical and non-technical aspects of innovation.

<sup>37</sup> It has been argued that US researchers are especially prone to adopt the narrow perspective. They often have a strict focus on the interconnection between universities, corporate research departments and technology policy. Typically emphasised institutional factors are patent laws and intellectual property rights. To some extent, this perspective reflects the fact that innovation in America is, to a comparably large extent, based on research and development at dominating, large corporations. The broader perspective has more of a European flavour and is a more theoretical and historical perspective in which much emphasis is placed on learning processes.

<sup>38</sup> Furthermore, Lundvall (1992) adopts a more theoretical point of departure, which may be helpful for our purpose, i.e. the further theoretical development of a framework for OI.

Lundvall's first point of departure is that innovation is a ubiquitous phenomenon in the modern economy. As in Schumpeter's use of innovations and new combinations as synonyms, the gradual and cumulative aspects of innovation are emphasised. In this perspective, innovation appears to be a process rather than a single event, and the distinction made in much innovation theory between invention, innovation and diffusion as separate phases<sup>39</sup> becomes blurred. Accordingly, Lundvall's perspective acknowledges the fact that an innovation may not stay the same throughout its diffusion, as is very often the case when it comes to OI.

Lundvall's second point of departure is the idea that interactive learning is fundamental to the innovation process.<sup>40</sup> According to Lundvall, the production structure and the institutional set-up are the two most important dimensions of a system of innovation, both strongly affecting processes of interactive learning and innovation. "If one should point to one specific dimension which characterises our approach, it would be the emphasis put upon interactive learning anchored in the production structure and in the linkage pattern of the system of production" (Lundvall 1992: 17).

The concept of interactive learning certainly is an important feature in the diffusion of OI. However, one may question the strong focus on the production structure and the system of production evident in the quote above. In our opinion, the large amount of tacit knowledge involved in the diffusion of OI may call for more attention to institutions (including informal ones) in general and to the cognitive aspects of these institutions in particular. Actors in a system may be influenced by the same (or similar) set of institutions, but they may perceive them and be affected by them in different ways.

Lundvall discusses six different basic dimensions of learning (primarily in relation to the role of the state): the means to learn, incentives to learn, capability to learn, access to relevant knowledge, remembering and forgetting, and the utilisation of knowledge, some of which are discussed below.

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<sup>39</sup> See e.g. Gopalakrishnan and Damanpour (1997).

<sup>40</sup> In Lundvall's opinion, the importance of collective entrepreneurship for innovation is emphasised rather than the traditional view of innovation as a result of individual entrepreneurship.



As for the means to learn, the national education and training system is of central importance in Lundvall's thinking. Education policy is a question not only of quantities of government funding, but also of the ability of the education system to change when confronted with new social and technological challenges. Concerning OI, the education system plays an important role in at least two ways. First, in order for the IS to stay competitive in the long run, the education system must be able to keep track of organisational developments in industry and other sectors, domestic as well as foreign. Second, the educational system has to take active part in the further dissemination of new knowledge to other parts of the system.

As for incentives to learn, individuals and organisations may have different reasons to engage in learning activities, e.g. pure curiosity or professional pride. Perhaps prestige may motivate certain people to learn, while others want to learn because of potential profits or risks of loss. The latter is often applicable in the case of OI; in times of crisis, many managers see no other solution than to try a new organisational idea, hoping for a quick recovery. Lundvall's idea of prestige is also apparent in the case of OI – managers need a way to distinguish their organisations (and themselves) from other organisations (and managers). At the same time, they need to appear legitimate, i.e. they want to adopt OI that are perceived as rational and modern among the community of managers.

At the individual level, wages and salaries may be designed to promote learning. When it comes to OI, this is also true, not least on the supply side. Certain OI, neatly packaged, tend to be promoted and diffused widely through the work of consultants that are attracted by high salaries and other benefits. Employees on the demand side may have the opportunity to participate in courses and other learning activities dealing with certain OI as part of their jobs. At the organisational level, tax and patent laws may affect learning activities.<sup>41</sup> In the case of OI, patents may play a minor role. Clearly, at the system level, different societies may provide different incentives for learning, reflected in the institutional set-up. Throughout history, some societies have even punished efforts aimed at seeking new and "dangerous" knowledge.

The individual's learning capability is affected by the means provided by the education and training system, and by individual learning incentives. Learning capability in an organisation is a function of its internal, interrelated networks. Learning capability at the system level, concerning OI as well as any other knowledge, depends on connectivity and interaction between organisations and individuals.

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<sup>41</sup> Lundvall argues that pecuniary incentives may be overestimated, however. Rather, co-operation between individuals and firms in various networks has become an important source of innovation.

Access to relevant knowledge is affected by access to universities and technical institutes, i.e. to the means for learning. Another important mechanism, especially concerning transfer of tacit knowledge including OI, is the establishment of network relationships, both formal (e.g. quality management member associations, such as SFK, the Swedish Association for Quality) and informal (e.g. a community of managers or a network of old schoolmates).

Finally, the focus on the national level of analysis reflects Lundvall's view that NIS differ in all basic dimensions of learning, as well as in the structure of the production system and the institutional set-up.<sup>42</sup> It is assumed that basic differences in historical experience, language and culture are reflected as "national idiosyncrasies" in a number of elements which combine to form the NIS.

**Discussion of the TS approach.** Carlsson (1997) presents four basic assumptions for the TS approach. First, the system as a whole is the unit of analysis and the main function of the system is to capture, diffuse and enhance spill-overs. Second, the dynamic properties of the system are recognised; the configuration of actors and institutions may change over time. Third, the pool of global technical opportunities has practically no boundaries. Fourth, because of bounded rationality, the choice of business opportunities is always based on limited knowledge and intuition.

The two first basic assumptions seem to apply to OI. The third assumption, that the pool of global opportunities has no boundaries, might of course be disputed when merely considering individual components of organisations, but, depending on the level of detail in the analysis, the number of new combinations might be regarded as practically endless. The fourth assumption on bounded rationality applies to the choice of OI and its potential influence on the firm's business opportunities.

As indicated by the second assumption, proponents of the TS approach have taken some further steps towards developing a theoretical framework that can grasp dynamic aspects. Carlsson (1997) presents, albeit in relatively rudimentary form, four cornerstones, which determine a system's dynamic performance: the nature of knowledge, receiver competence, connectivity, and variety creation mechanisms. These TS features may be crucial to the comprehension of OI diffusion and are discussed below.

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<sup>42</sup> Lundvall (1999) argues that if innovation systems are regarded from the broad perspective, there is reason to believe that the national system level is even more important.

The nature of knowledge in a field (e.g. the characteristics of a specific OI) may determine the potential and mechanisms for spill-overs, i.e. intentional or unintentional learning from others. Receiver competence refers to the capability to tap into the global technology set.<sup>43</sup> This concept is also relevant to OI. The relatively large extent to which an OI is tacit makes certain diffusion mechanisms that place higher demands on receiver competence more plausible. The third concept, connectivity, is highly relevant to OI. A TS with high connectivity exhibits a dense network of links among its participants. It may benefit more from spill-overs than a TS with fewer and weaker links.

Carlsson differentiates between three types of links: buyer-supplier links, the technical problem-solving network, and the informal national community network. In his opinion, the technical problem-solving network is most important and provides the core links of the TS. The question of whether or not this applies to OI as well requires further scrutiny.

Buyer-supplier links in an area in which the traditionally defined supplier industry only exists partially, mainly in the form of consultants, must be examined further. It may be important to take the capabilities, intentions and perceptions of the buyers and suppliers into consideration (see also receiver competence, above) when it comes to OI.<sup>44</sup> The technical problem-solving network may be relevant to OI as well; perhaps, however, to a lesser extent than to TI. Applied research projects such as collaborative arrangements between academic research institutions and industry are one example of such a network. Broker institutions, such as collective research institutes, also may serve as initiators, creating collaborative projects with several participants, which may be of the nature of applied research. The informal national community network, finally, can play an important role in the case of OI, as was indicated by Jarnehammar (1995).

The fourth concept, mechanisms to create variety, is needed in order to renew the system so that stagnation or an eventual collapse can be avoided. Here, linking to the discussion of networks above, it may be profitable to distinguish between local and international diffusion networks. Networks in the local arena are especially important in providing information and access to new ideas to smaller firms. This access can be mediated through other firms, functioning as brokers, typically having access to international networks. Hence, an important characteristic of a well functioning local innovation system is the existence of some locally well-connected firms or organisations which have access to the global opportunity set, in which they may identify new innovations, bring them home and diffuse them further (Johannisson 1985 and Alänge 1987), thus creating variety.

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<sup>43</sup> Carlsson (1997) emphasises the role of prime movers or leading edge firms. These may play the role of searching the global opportunity set as well as being first to use the new technology, which may also benefit other firms through different kinds of spill-over.

<sup>44</sup> Alänge and Jarnehammar (1999) show that there is often a certain time lag (as opposed to the case of TI) before the suppliers (i.e. consultants) start acting as suppliers of a new OI.

The role of multinational corporations (MNC) in finding and diffusing OI internally to different subsidiaries is well known. The MNCs have also assisted in diffusing OI to other firms in local communities (e.g. nations) where they have been active (Alänge 1987). This same broker function may also be performed by so-called collective research institutes<sup>45</sup> that are set up to monitor, adapt and diffuse new innovations with a specific focus on small and medium-sized industries. These broker organisations play an important role in the process of industrial renewal and may be viewed as an important mechanism for creating variety. However, they may also serve as a type of selection mechanism that, on the contrary, may limit variation. Just as an MNC creates corporate standards, the national brokers' adaptations of an OI to suit national needs may be viewed as a way of standardising. There is reason to assume, however, that this type of standardisation creates a platform from which further innovation can take place.<sup>46</sup> Hence, there is a dynamic interplay between standardisation and innovation.

**Implications and shortcomings of the NIS approach and the TS approach with respect to the diffusion of OI.** Our review above indicates that Lundvall's broad NIS approach may have a lot to offer as a basis for the development of a framework for the diffusion of OI. There are indications that the national level of analysis and the local search process may be more important for OI than for TI. As in the case of OI, it has been established that an innovation may not remain unaltered throughout its diffusion. The focus on institutions and interactive learning mechanisms (such as network relationships) will necessarily be especially important features of such a framework.

We may learn from the further steps that have been taken by those applying the TS approach towards a more dynamic system description. The four cornerstones which, according to Carlsson (1997), determine a system's dynamic performance – the nature of knowledge, receiver competence, connectivity, and mechanisms that create variety and facilitate the exchange of knowledge – will be included in our framework.

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<sup>45</sup> This kind of organisation is often established by state and industry in collaboration. In Sweden, the Swedish Institute of Quality (SIQ) is an example; the Fraunhofer Institute in Germany and Pera in the UK play a similar role.

<sup>46</sup> This is similar to the case of a software platform such as "DOS". While the platform may be beneficial to innovation at one point in time, it may function as a barrier at another.

There is a tendency, apparent in both the NIS approach and the TS approach, for economic explanatory factors to dominate other, "softer" elements that may influence innovation and diffusion of OI.<sup>47 48</sup> This problem may be due to the fact that the arguments concerning these system conceptualisations have evolved in isolation from system approaches in other streams of research, e.g. sociology and anthropology. Thus, learning from areas outside economics may be beneficial in order to deal with the shortcomings of the NIS approach and the TS approach. This topic is discussed in more detail in the next section.

## BEYOND ECONOMICS

» *This section contains a comparative discussion of the IS approaches and system approaches from beyond the sphere of economics, as an effort to remedy the shortcomings of the IS approaches via the concept of institutions, significant but differently handled in each approach.*

The idea of proceeding beyond the field of economics is supported by several scholars. Soskice (1993 and 1996) argues that the IS approach has been developed in something of a vacuum from system approaches applied by political scientists, industrial sociologists and political economists from the 1970s on. Zysman (1996) argues in favour of taking the institutionally embedded historical development of national technological trajectories into account when studying innovation and diffusion within a system perspective, and that an historical-institutional analytic strategy may be required to improve the IS approach. Furthermore, despite their significance for the comprehension of OI, explanatory factors such as cultural values and norms are not examined systematically either in the NIS approaches or in the TS approach (although they are theoretically included to some extent).<sup>49</sup> This indicates that there is a need to incorporate more analysis of institutions in general, and of soft,

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<sup>47</sup> For example, the basic dynamic dimensions of learning covered by Lundvall are primarily discussed in relation to the role of the state and the role of formal institutions, e.g. policies. It would be interesting to develop this line of thought and analyse the cognitive aspects of softer, informal institutions.

<sup>48</sup> Furthermore, this may also evoke the interpretation that the IS approaches place a somewhat biased emphasis on the role of the institutional forces in determining the development of innovation and diffusion in more or less pre-determined directions. But we must not forget the intentions and capabilities of the suppliers and receivers in the system and what they perceive as "rational" choices in terms of OI adoption, or how such perceptions arise through societal interaction, in turn affecting the institutional context. Institutions are not static; acknowledging this may be helpful in the process towards development of a theoretical framework that might more effectively tap into the dynamic properties of the innovation system.

<sup>49</sup> Contingency theory, which is part of the theory basis for the IS perspective, introduced the environment as an important factor and pinpointed the importance of the marketplace, the technological evolution and certain institutional factors. However, as pointed out by Clark (1995), contingency theory did not recognise the fact that markets do not exist apart from the rules and institutions that establish them, i.e. it did not fully take into account the importance of national cultural aspects.

informal institutions in particular, into the IS approaches. With this paper, we aim to contribute to such a development.

We believe that recent literature within organisational analysis, sociology and cross-cultural management, indicating the importance of the softer aspects of the institutional context, may complement the IS approach (e.g. DiMaggio and Powell 1983, Powell and DiMaggio 1991, Bartlett and Ghoshal 1993, Guillén 1994, Abrahamson 1996, Hofstede 1980 and 1991, Schneider and Barsoux 1997, and Trompenaars and Hampden-Turner 1998).

How, then, may concepts originating from disciplines other than economics be incorporated into the IS approach in a manner congruent with its theoretical foundations? In our opinion, one way might be to penetrate the role of institutions. This is a crucial concept shared by the IS approaches and system approaches based in non-economics fields.<sup>50</sup> According to Edquist, Hommen and McKelvey (1998: 109), “no integration of these traditions has yet been attempted within the IS approach”. We agree that an attempt to achieve such integration seems to be a promising avenue to follow for the further development of a useful analytical framework.

In the following, after a general introduction to the concept of institutions, a comparison is made between the meaning and use of the institution concept in the IS approaches and the discipline of sociology, respectively.

**The concept of institutions.** If all actors were perfectly rational<sup>51</sup> and if all transactions of knowledge and goods took place in pure markets,<sup>52</sup> institutional differences probably would play a limited role for innovation. In such a world, one may assume that what is rational behaviour to one actor, is so to all other actors as well. In a more complex world, in which the actors could not reasonably be assumed to have unlimited information, and in which their perceptions, capabilities and incentives are different, the rationality of the actors would be differentiated rather than homogeneous; i.e. what is rational behaviour to one actor might not be so to another actor. Typically, their behaviour would depend on contextual factors, i.e. institutional and cultural differences. In standard economics, the assumption of homogeneous rationality is rarely questioned. However, during recent years, the institutional factor has been increasingly taken into account in analyses of innovation and technological change.<sup>53</sup>

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<sup>50</sup> See for example the debate on “institutionalism” within the sociology field (DiMaggio and Powell 1983, Powell and DiMaggio 1991)

<sup>51</sup> I.e. seeking to maximise their profits and utility.

<sup>52</sup> I.e. in markets characterised by anonymous buyers and sellers that have unlimited access to information.

<sup>53</sup> Not least thanks to the work of Nelson and Winter (1982) and North (1990).

At an overall level, the institutional setting is understood as a relatively stable set of mutually agreed-upon routines (see e.g. North 1990). However, several scholars agree that the concept of institutions suffers from conceptual ambiguity (e.g. Edquist 1997, Grønning 1998 and 1998a). First, the concept of institutions is central to the IS approaches,<sup>54</sup> but scholars within the IS field define the concept differently. Second, it is not clear how the use of the institutions concept within the IS approaches relates to recent debates concerning the institutions concept in other research disciplines. Third, while the purpose of the IS approaches is to provide a framework for studying the systemic traits and dynamics of various innovation processes, it is not clear how the concept of institutions should be understood in studies of different types of innovations. In particular, possible differences in the understanding of the concept of institutions have not been systematically clarified relating to the diffusion of OI, compared to TI. The following is an attempt to address these issues.

**The institution concept in the IS approaches (as theorised by Lundvall).** First of all, a basic distinction is made between the two concepts of organisation and institution in Lundvall's IS approach, because they play different, albeit highly interdependent, roles in the innovation process. Organisations may be viewed as consciously created formal structures with an explicit purpose, in contrast to institutions which "may develop spontaneously and are often not characterised by a specific purpose" (Edquist and Johnson, 1997: 47). To put it simply, while organisations may be conceptualised as the players in a game, i.e. groups or individuals bound together to achieve certain common objectives, institutions are often seen as the "rules of the game" (North 1990: 5). The complex relationships between organisations and institutions are important, not least when it comes to the understanding of institutional change. Institutions or rules do not change themselves; change occurs through the actions of players (individuals or organisations) in interconnection with the set of rules at hand.<sup>55</sup>

There is, according to Lundvall (1992), the common perception that economies and societies are characterised by "behavioural regularities" specific to time and space. The simplest forms of such regularities are habits. Habits are developed in order for people to deal with various complex phenomena in life, by providing behavioural rules of thumb. When a habit becomes common to a larger set of people, a "social regularity", i.e. an institution, is developed.<sup>56</sup>

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<sup>54</sup> E.g. in the broader NIS perspective, information flows and learning processes are basic mechanisms that may explain the dynamics of the economy. Almost all of these flows and processes are interactive and influenced by the institutional set-up. Furthermore, the fact that innovation is a collective effort, mediated through interaction between organisations, must be emphasised. If information and learning are conceptualised as the source of innovation, it follows that innovation is shaped by institutions and institutional change (Lundvall 1992, Edquist et al. 1998 ). The existence (or absence) of institutions, as well as their character, is interpreted as potentially conducive or obstructive to innovation processes (Grønning 1998 and 1998a).

<sup>55</sup> Johnson and Gregersen (1997).

<sup>56</sup> Veblen actually defined institutions as an "outgrowth of custom" (Veblen 1919: 241, cited in Lundvall 1992: 25) and he defined customs (of thought) as "uncalculated, unreflective actions and behavior that were taken for granted" (Veblen 1919:239, cited in Edquist 1997:44).

In Lundvall (1992), a broad definition of the concept of institutions is used: “institutions are sets of customs, routines, rules, norms and laws, which regulate the relations between people and shape human interaction”.<sup>57</sup> Institutions may thus be formal (e.g.laws) as well as informal (e.g. norms and customs). They share the common feature that they affect the interactions of groups and individuals by reducing inter-relational uncertainties. Formal institutions are specified or written down. Thus, they are comparably easy to identify and communicate (Johnson and Gregersen 1997).<sup>58</sup> Informal institutions develop differently; through evolving mutual agreements among the actors involved, often affected by relations of relative power between them. Informal institutions are most often not written down and are, thus, primarily observable through behavioural patterns. The dichotomy between formal and informal institutions is important when one wants to study OI, because informal institutions may be just as important as formal institutions for comprehending them.<sup>59</sup>

According to Lundvall, institutions provide the stability that is necessary for communication, learning and innovation to take place. There are limits to how rapidly they can change; as stated by Johnson (1992 in Lundvall 1992) “inertia is a basic feature of institutions”.<sup>60</sup> At the same time, and this may initially appear to be a paradox, institutions are important for societal and technological change, by providing the stability that is necessary for change.<sup>61</sup> Institutions thus affect change and innovation both in a restricting and a facilitating way. According to Lundvall, knowledge does not exist all by itself; it must be coded into some kind of knowledge carrier – be it a human being or society as a whole – in which it must be stored over time. In a society, knowledge may be stored in many ways and, to a large extent, institutions determine how this is done. For example, rules and norms may help transfer knowledge from one generation to the next. Some of this knowledge will spur further development and accumulation of new knowledge, while other parts might hamper development. The important point is that without the help of institutions, a societal or economic system would probably not be able to accumulate knowledge at all, due to an inability to remember. The stock of knowledge does not always increase in a cumulative fashion, however. The counterpart of remembering, i.e. forgetting, may actually be equally important for the possible development of new knowledge. Any change of a societal or techno-economical paradigm may involve the forgetting of old knowledge, but there is always the risk that the huge power of custom-based institutions may strongly block learning

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<sup>57</sup> Johnson (1992) in Lundvall (1992: 26).

<sup>58</sup> One example is the law, which is supported by the police, courts and prisons, etc. Other examples are patent laws and bank regulations.

<sup>59</sup> Furthermore, it is likely that the balance between formal and informal institutions may differ quite significantly between countries (Johnson and Gregersen 1997).

<sup>60</sup> Similarly, other researchers refer to “institutional lock-in effects” (e.g. Alänge, Jacobsson and Jarnehammar 1998).



processes. Thus, through their influence on remembering and forgetting, institutions simultaneously provide negative and positive incentives for change and innovation. Furthermore, Lundvall argues that it may be analytically useful to distinguish between the impact of institutional factors on different levels of aggregation, i.e. factors affecting individuals and the communication inside individual organisations vs. factors affecting the interaction between organisations or vs. factors affecting the whole organisational sphere at the system level.

**Comparative discussion of the use of the institution concept in the IS approaches and in organisational analysis in sociology.** Parallel to the emergence of the IS approaches, there has also been a debate within other research disciplines on how institutions should be conceptualised and analysed. This debate is hardly mentioned in the IS literature (Grønning 1998a). In an attempt to bridge this gap, the use of the concept of institutions in the IS approaches and in organisational analysis in sociology (henceforth referred to as sociology) (e.g. Powell and DiMaggio 1991, Scott 1995, Selznick 1996)<sup>62</sup> will be compared in the following.

Within the field of sociology, a discussion has evolved around “new” vs. “old” institutionalism (see e.g. Powell and DiMaggio 1991). According to Grønning (1998a), there have been two main issues in this debate. First, as within the IS literature, there is a movement from a somewhat unresolved situation to a more clearly defined relationship between rules (institutions) and players (organisations). Second, there is a juxtaposition of approaches focusing on normative or regulative aspects of institutions (old institutionalism) on the one side and approaches focusing on cognitive aspects of institutions (new institutionalism) on the other. Some theorists have, in an effort to assess the shared common ground of both the old and new approaches, produced very broad definitions of the institutions concept, including cognitive as well as normative and regulative aspects. “Institutions consist of cognitive, normative, and regulative structures and activities that provide stability and meaning to social behaviour. Institutions are transported by various carriers – cultures, structures, and routines – and they operate at multiple levels of jurisdiction” (Scott 1995a: 33, cited in Grønning 1998a).

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<sup>61</sup> Often innovations, in an incremental fashion, follow established technological trajectories, but radical innovations may also be dependent upon institutions since institutionalised thought patterns may act as a time and resource saving device that liberates resources for the necessary creativity.

<sup>62</sup> Any effort to map the use of the institutions concept in other streams of research and to compare this with the use of the concept in the IS approaches is a huge task. The aim here is to assess the basic similarities and differences. Instead of discussing the relationship between the two disciplines in general terms, we focus on the concept of institutions.

In comparison, the IS approaches seem to define institutions in a somewhat more restricted way. As mentioned earlier, NIS literature defines institutions as “sets of customs, routines, rules, norms and laws, which regulate the relations between people and shape human interaction”.<sup>63</sup> Thus, proponents of the NIS approaches may be said to mainly understand institutions in a regulative way. Indeed, this understanding of the institutions concept contains terms such as “norms”, but the emphasis is on how existing institutions regulate and shape human interaction, rather than on how these institutions may change or on how they came into being (Grønning 1998 and 1998a).

The TS approach may be said to regard the institutions concept as a mixture of normative and regulative aspects (Grønning 1998a). Carlsson and Stankiewicz (1995:45, our emphasis) define institutions as “the *normative* structures which promote stable patterns of social interactions/transactions necessary for the performance of vital societal functions”. They continue by stating that the institutional infrastructure in a TS is defined as “a set of institutional arrangements (both regimes and organizations) which, directly or indirectly, support, stimulate and *regulate* the process of innovation and diffusion of technology” (Carlsson and Stankiewicz 1995:45, our emphasis).

It may be interesting at this point to note that although Nelson and Winter (1982) strongly emphasised the concept of routines in their development of evolutionary theory, including cognitive aspects of institutions (for example, individuals’ interpretation of messages, such as knowledge of organisational ideas), thus providing an important foundation for the development of the IS approaches, these cognitive aspects have not been in focus in the later development and descriptions of the IS approaches.<sup>64</sup>

**Our conception of institutions, with regard to OI.** When addressing the question of how the institutions concept should be defined within our framework, we first adhere to the conceptual division between institutions and organisations as is common both in the IS approaches and in the sociological field. Second, conceptualising institutions only as rules and regulations may raise a few problems. It is assumed in much economic research that rules and behaviour are synonymous. But the existence of a set of rules does not necessarily determine people’s behaviour. Ostrom (1986, in IDS 1999), for example, is of the opinion that rules prescribe a “room for manoeuvre”, i.e. behaviour is stipulated, rather than fully determined, by rules. Hence, separating and clarifying the relationship between institutional rules

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<sup>63</sup> Johnson (1992), in Lundvall (1992: 26).

<sup>64</sup> The lack of explicit focus may be due to the authors having taken the cognitive aspects for granted. There are some rare exceptions, however. With regard to TS, for example, there is a contribution from Granberg (1997) in Carlsson (1997) entitled “Mapping the Cognitive and Institutional Structures of an Evolving Advanced-Materials Field: The Case of Powder Technology”. The focus here, however, is more on the emergence of a so-called cognitive field, than on cognitive aspects, according to our definition. A cognitive field is established through the development of a common understanding of a certain field of knowledge among a set of interconnected actors. Our definition of cognitive aspects leans more towards the invisible institutional factors that affect the behaviour (and

(“espoused rules”) and the actual behaviour of people or organisations (“rules in use”)<sup>65</sup> may provide a better understanding of the dynamics of the innovation process and the diffusion of OI. For instance, this might help to shed some light on the role of power positions within the system and on the very different meanings different institutions may attribute to different actors, in turn affecting their perceptions and incentives. These issues clearly affect communication patterns within and across systems and may thus be important underlying factors for the explanation of innovation processes and diffusion of OI.<sup>66</sup>

Borrowing from the sociological side and in accordance with Grønning (1998), it may be concluded that a shift from a regulative and normative understanding of institutions to a more explicit focus on the cognitive aspects of institutions as well may help to capture the mechanisms behind system dynamics.<sup>67</sup> This leads us to view institutions not as the “espoused rules” (the explicit meaning of the rules), but more as “rules in use” (how they are interpreted and put into practice).

Rather than existing as a fixed framework of rules, institutions are constantly made and remade through peoples’ and organisations’ behaviour and practices. Thus, over time, institutional change occurs.<sup>68</sup> This view, supported by Schön (interview 1997), is, as shown above, more commonly associated with sociological approaches (Grønning 1998 and 1998a, Giddens 1984 in IDS 1999).

A final observation: the evolution of both formal and informal institutions can be influenced by power relationships between the actors involved and the resulting institutions may better satisfy the needs of one party than of another, “weaker” party. This means that institutions are not necessarily neutral, or optimal for the system as a whole.

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the perceptions, capacities and incentives) of individuals (or organisations) or of a group of individuals (or organisations) when they are part of a knowledge exchange process.

<sup>65</sup> In analogy with Argyris and Schön (1996), “espoused theories” vs. “theories in use”.

<sup>66</sup> It may help to grasp issues concerning the transfer of managerial fads and fashions, i.e. why and how technically inefficient OI are often diffused and efficient OI often rejected.

<sup>67</sup> However, a full transfer to a purely cognitive focus is not recommendable for methodological and explanatory reasons.

<sup>68</sup> However, owing to the inertia stemming from the embeddedness of informal institutions (such as underlying cultural basic assumptions), institutional change in a society or an innovation system may be a slow, path-dependent process, even if formal institutions, such as laws and political regimes, may change more quickly (North 1990).

## TOWARDS A FRAMEWORK

» *In this section, some important knowledge exchange mechanisms and other institutionally embedded factors that affect the diffusion of OI are discussed.*

OI may be conceptualised as organisational solutions aiming at solving perceived organisational problems or opportunities. Various intra-organisational and external pressures or opportunities influence the diffusion of OI (i.e. perceptions of organisational problems and opportunities, as well as the exchange of organisational knowledge between those in need of and providers of organisational solutions). These are discussed in more detail in the following, where we take a look at some of the mechanisms that affect the mutual interdependence between demand and supply.

An emerging crisis or periods of uncertainty, such as changes in the intra-organisational structure or intensified international competition, often act as a wake-up call for managers to initiate search activities for new OI. Changes in the intra-organisational structure may, for instance, be of a techno-economical or political nature, changes in organisational size and complexity or changes in the assortment or quality of products manufactured or services provided. Changes in the hierarchical structure of authority within the organisation are other examples.<sup>69</sup> External pressures and opportunities affecting the demand for OI may result from increased competition among organisations in a certain industry. They may also result from changes in the relational links between an organisation and its suppliers and customers. Another important mechanism at the inter-organisational level may be the transfer of tacit knowledge through movements between organisations of skilled key personnel who may take on the role of internal “champions”, eagerly promoting certain ideas at the organisational level.

Managers and organisations often search for (or come across) and adopt what various suppliers of organisational knowledge (i.e. management intellectuals and professionals such as business scholars and management consultants) offer in terms of new organisational solutions or they imitate the behaviour of other organisations, domestic or foreign, that are perceived as successful role models. It is important to recognise the cognitive institutional forces in this context. The dominant pre-existing mentality of the members of the managers’ community in a country or business area may make them prefer and implement certain OI and

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<sup>69</sup> The adoption of new OI may be a means to handle structural conflicts between divergent interests on the part of managers and groups of employees. Challenges to managerial authority have often led to the introduction of new OI that justify its existence.

reject others.<sup>70</sup> Common views once prevalent at the business school, the dominant norms of the national culture or even religious beliefs might affect the shaping of manager mentality.

The workings of the supply side are heavily interconnected with the workings of the demand side, e.g. via managerial mentality. From an American perspective, Abrahamson (1996) refers to the supply side as “the management fashion setting community”, as described earlier, consisting of management consultants, business schools and the business press. Management fashion setting is defined as the social process that repeatedly redefines managers’ collective conceptions of what is rational and legitimate concerning the management of organisations. For organisations to appear “correctly” managed, managers must appear to be rational by adopting (or appearing to adopt) OI that are collectively perceived to be rational and legitimate ways of managing organisations. Therefore, the supply side not only provides customised solutions to single clients facing a particular organisational problem, but also promotes especially packaged solutions that are claimed to help solve a wide range of problems in a wide range of organisations.<sup>71</sup>

It is interesting to note the apparent conflict between the need for managers and organisations to be different from one another and the need for them to resemble others in organisational and strategic dimensions (and that the pool of OI may address both of these needs). By deviating, organisations may reduce competition and by conforming they demonstrate their legitimacy. Thus, an organisation faces a trade-off between deviating and conforming. Managers and organisations may adopt new OI in order to cope with increased competition or to distinguish themselves from lower-reputed organisations. At the same time, organisations must appear legitimate, to adapt to what is considered to be “good” and “tasteful” in the world of organisations and the community of managers.<sup>72</sup>

It is not only the interaction between managers and suppliers in the search and adoption phases that are important for the success of an OI. Significantly, the employees may respond in various ways to the implementation of new OI (individually or supported by labour unions). They may support, oppose or ignore attempts to introduce new ideas, for various reasons. The management of an organisation is often an arena for intra-organisational disputes between individuals and different professional groups with various worldviews and interests. The relative power and influence of different professions in each country may contribute in various ways to the diffusion and implementation of OI. Other explanations may be formulated in cultural terms. Organisations often claim to have a strong, homogeneous

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<sup>70</sup> A mentality may be perceived as an enduring mode of thought characteristic of an individual or a certain group of individuals or organisations. A mentality is based upon implicit, non-reflective and subjective assumptions of how things work.

<sup>71</sup> There is often extensive marketing of many organisational concepts, e.g. through commercial campaigns, conferences and articles in the business press. As indicated earlier, the universality of these so-called best practice management concepts is dubious.

<sup>72</sup> See also discussion by Deephouse (1999).

organisational culture. But employees bring with them certain cultural norms and basic assumptions from the institutional context outside the organisational sphere (perhaps most easily conceptualised at the national level) and OI, as previously stated, may be heavily impregnated with nationally specific customs. The cultural distance between the adopting organisation and the OI to be implemented may affect its reception.<sup>73</sup>

Various pressures and opportunities that affect the diffusion of OI, similar to those found at the inter-organisational level, may also be found at the macro-economic level in terms of international and political competition or co-operation among nation states (in turn affecting what happens at the organisational level). For example, if natural resources are scarce in a country, this may increase interest in searching for new powerful strategies and organisational solutions. Long-term macro-economic fluctuations between periods of expansion and contraction could create sudden demands for different types of OI (Abrahamson 1996). For example, when a nation state is under pressure or when it faces tough economic times, a common response is to initiate a wide search among more successful countries for OI to imitate and promote in nation-wide programs. Hence, governments can be important actors in the diffusion of OI.<sup>74</sup> Sometimes an OI may be initiated as part of a programme of national recovery or modernisation. In some cases, powerful state-initiated research and training institutes and technology broker organisations may promote and diffuse new OI, for example via conferences or through the establishment of learning networks geared towards small and medium-sized companies. Compared to large corporations, small companies tend to have less resources (e.g. in terms of skilled personnel or money for hiring consultants) to search for and implement new OI. The government may also influence the diffusion of OI through the establishment of laws, policy regulations and taxes and, of course, by conveying a certain political ideological order favouring specific aspects of business and work organisation.

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<sup>73</sup> Hamed and Miconnet (1998), Miconnet and Alänge (2000).

<sup>74</sup> This is still the case, primarily at the national level, but initiatives at the supra-national and regional level may also be influential.

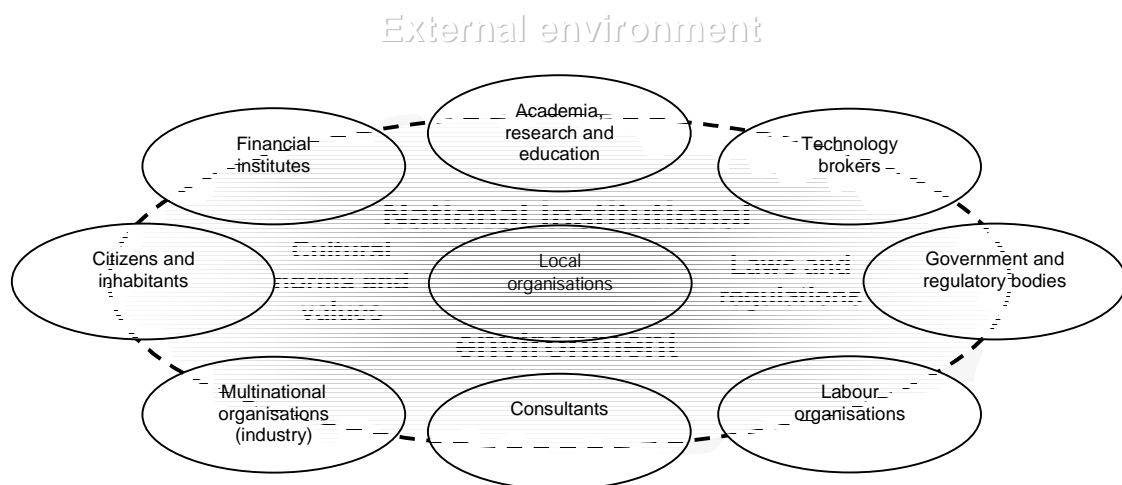
## THE FRAMEWORK

» *The purpose of this paper is to develop an analytical framework for studying the diffusion of OI. Drawing upon the main findings in the previous discussion, the cornerstones of the proposed framework are outlined in this section.*

Our framework has been inspired by several sources adopting an institutional perspective. The framework has its basic roots in the NIS approach (primarily as theorised in Lundvall 1992), but it has also been inspired by the TS approach (Carlsson 1997) and by approaches originating from outside the economic sphere (primarily organisational analysis in sociology, but also the cross-cultural management field, e.g. Powell and DiMaggio 1991, Guillén 1994 and Abrahamson 1996).

The point of departure is the acknowledged tenet that the development and diffusion of OI over time is affected by the mutual interdependence between the intentions of the actors and the institutional setting that frame their actions.<sup>75</sup>

A schematic picture of selected central actors and institutions in a national setting that may influence the diffusion of OI is presented in Figure 1.



**Figure 1** – Framework illustration 1: A schematic outline of selected actors and institutions.

<sup>75</sup> The development and diffusion of innovations have been understood in various ways, by various scholars. At one end of the continuum, almost invisible institutional forces determine the development in predetermined directions and the role of actors is negligible. At the other end of the continuum, actors can fully control the development through rational choices of continuously improving organisational solutions. Hence, the role of actors becomes central. Neither of these approaches seems to exist in the real world. Instead, our perspective is intermediary in nature. It is also assumed that actors do learn as time passes, and thus, that the actors' actions and behaviour (and changes in these parameters) are important.

Organisations of various kinds, such as firms (ranging from large multinational corporations to small local enterprises), universities and academic institutions, research institutes, innovation brokers such as technology and management consultants, government and other policy making and regulatory bodies, financial institutes such as banks and venture capitalists, media in general and the business press in particular, are examples of important actors. Actors may also be individuals, e.g. champions within organisations or key individuals moving between organisations in the system, thus playing different roles over time. Since a description of an IS must necessarily include more than a simple enumeration of its elements (Edquist et al. 1998), not only the various components but also the various mechanisms of interconnection are of importance.

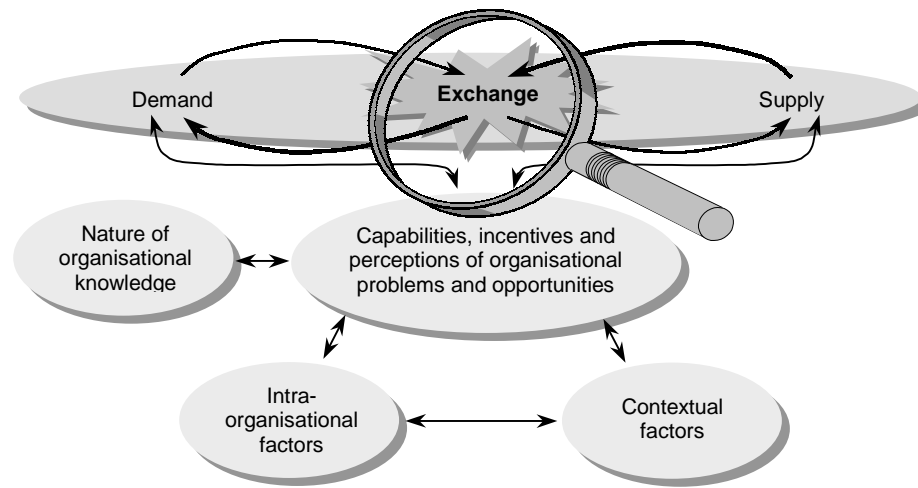
Regarding institutions, borrowing from sociology, we propose that the normative and cognitive aspects of institutions be taken into account more, as a complement to the predominantly normative and regulative aspects of contemporary IS approaches. Not only formal institutions such as various regulations and laws may be taken into account, but also softer institutions such as norms, cultural values and peoples' underlying assumptions, since they affect the perceptions, capabilities and incentives of people involved in the knowledge transfer process. Here, the interplay between organisational and national culture is of interest. Important exchange mechanisms (factors affecting interactive learning) may be market as well as non-market exchange, e.g. user–supplier relationships, individual movements between organisational actors, conferences, or various types of networks between companies or organisations.

OI may be conceptualised as organisational solutions aiming at solving perceived organisational problems.<sup>76</sup> Any effort to understand the diffusion of OI must take into account both the special workings of the supply side, i.e. the behaviour of providers of organisational solutions, and the demand side, i.e. the behaviour of managers and organisations eager to find solutions to perceived organisational problems, as well as the complex learning mechanisms that bring supply and demand together. A schematic picture of this dynamic is shown in Figure 2.

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<sup>76</sup> In some cases, they may create new problems as they attempt to solve older ones.





**Figure 2** – Framework illustration 2: Towards an understanding of the dynamic exchange mechanisms involved in the diffusion of OI.

The specific characteristics of OI – including difficulties in defining, assessing and pricing them due to the tacit nature of the knowledge bases involved – makes the introduction of factors such as capabilities, incentives and perceptions of those involved in the diffusion process into the framework especially important.<sup>77</sup> An OI is seldom transferred from one setting to another without changes and an almost ubiquitous number of various incremental adaptations of the original idea may be possible.<sup>78</sup> Hence, exchange mechanisms other than pure market relations may be of special importance to OI.

The identification of an organisational problem or opportunity may result from the perceived presence of one or a number of conditions that are influenced by either intra-organisational or contextual factors or a combination of both. Furthermore the intra-organisational milieu is conditioned by contextual factors (and vice versa) in many ways. Therefore, it is important to include mechanisms that mediate between factors at the intra-organisational and contextual level in the framework.<sup>79</sup>

Organisations are embedded in specific institutional contexts (they operate in dissimilar countries, industrial branches and time periods) and their behaviour is affected by various institutional factors operating at different system levels. These institutional factors, in turn, influence the perceptions of and create different incentives for individuals in the organisation. Managers and various groups of employees in organisations perceive, search for and respond to OI in various ways. They may have different abilities to identify organisational problems

<sup>77</sup> However, the degree of standardisation of the OI affects the possibility to define, assess and price the innovation, as does the extent to which it is possible to test the OI in pilot applications.

<sup>78</sup> I.e. the typical development of an OI over time does not follow the linear pattern of invention, innovation and subsequent diffusion. Instead, the process is more complex and involves iterations and continuous innovation.

<sup>79</sup> Concerning intra-organisational factors, one may make the further analytical distinction between factors at the individual level and the organisational level. Contextual factors may also be of different “magnitude”; some may

and opportunities, different incentives to engage in search activities and different abilities to understand, discuss, take on, adapt and implement new organisational ideas.

Even if a supplier industry may not exist in the traditional sense, certain actors in the system may be viewed as suppliers of OI.<sup>80</sup> They are affected by the same kind of institutional forces as organisations in need of organisational solutions; however, they may perceive them somewhat differently. The institutional forces affect their perceptions of organisational problems and opportunities, and, in turn, their incentives and capabilities to scan for, generate and promote possible solutions as well as their sensitivity to specific demand conditions.

The innovation and diffusion process of OI may be seen as an institutionally embedded, iterative knowledge exchange (or learning) process between organisations in need of solutions to organisational problems and opportunities, and suppliers of organisational solutions. It includes the whole range of considerations outlined above, from the identification of organisational problems and opportunities to the search for, generation of, promotion of and response to organisational solutions. In this perspective, the common distinction between invention, innovation and diffusion as separate phases becomes blurred.<sup>81</sup> It also includes the interdependence and effects of competing and complementary OI.<sup>82</sup>

The ideas outlined in Figure 1 and 2 constitute the cornerstones of our framework. Our framework is different from the IS approaches in that we place more emphasis on the cognitive aspects of softer, informal institutions and on how they affect the complex learning and knowledge exchange mechanisms involved in the diffusion process (including the perceptions and incentives of the actors involved), that bring together the supply side (i.e. the behaviour of providers of organisational solutions), and the demand side, (i.e. the behaviour of managers and organisations eager to find solutions to perceived organisational problems). We also aim at integrating different system levels, from the network of interacting organisations and the influence of institutional and contextual factors to the perceptions and incentives of the individual.

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be found in direct inter-organisational relations and others operate in a more indirect way at the overall system level.

<sup>80</sup> E.g. management consultants, universities and industrial associations.

<sup>81</sup> One advantage to the above line of thinking is that it incorporates possible appearances of organisational problems to which there is no perfect solution, as well as the diffusion of an OI, not because it is the best possible solution, but because it was considered legitimate or just because it was available at the time.

<sup>82</sup> When studying an OI, it is important to be aware of the possible interdependence between the specific characteristics of the OI at hand and other, co-existing OI that address similar organisational issues.

Finally, in the proposed framework, we heavily stress the importance of acknowledging the dynamic aspects of the system. In accordance with this, the time dimension is of crucial importance. In general, studies using a system approach tend to be rather static. Efforts so far have mainly, in a rather static fashion, studied particular IS at certain pre-defined points in time. Events occurring between observations, i.e. during the dynamic transformation of the system, are studied to a lesser extent. We strongly believe that studies over time are needed to overcome this weakness when using the proposed framework. Furthermore, the dynamic interplay between a specific system and its environment is important. The primary focus in this framework is on the national arena, since, as stated before, OI may be heavily impregnated with the nationally specific habitus. However, it is important to keep the framework open, realising that developments occurring outside the particular arena at hand may often be of interest to the object of study.<sup>83</sup>

Finally, the analytical and explanatory power of the framework may be higher if comparative studies are made. For example, two different objects of study (i.e. OI) may be studied in one arena, or the diffusion of the same OI may be studied in two different arenas.

## **CONCLUSIONS AND FURTHER IMPLICATIONS**

» *In this section, the main findings are recapitulated and some further research implications are elaborated upon.*

The main contribution of this paper is the development of an analytical framework for studies of organisational innovations, based on an innovation system perspective. The presented framework is based on the national innovation system approach by Lundvall (1992) and his colleagues, and it has also benefited from insights developed within the technological systems approach by Carlsson (1997) and his colleagues. The concept of institutions is of central importance to the study. Inspired by institutional theory from the fields of organisational analysis in sociology and cross-cultural management, the concept has been further elaborated to include more cognitive and cultural issues.

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<sup>83</sup> Established systems are continuously affected by developments in their surroundings, which must be taken into consideration. What may be a well functioning system today may be less efficient tomorrow. A contemporary example is the Japanese innovation system that was regarded for a long time as an ideal system in many ways, but that has recently proved to have many problems.

The very attempt to analyse the innovation system approaches to see if and how they may be suitable for studies of the diffusion of organisational innovations, may be regarded as a contribution in itself, since organisational innovations have so far, in comparison to technical innovations, been a relatively neglected object of study within the innovation system approaches.

This paper may primarily be of interest to academia, i.e. to researchers of innovation and change, in general, and to scholars using an innovation systems approach, in particular. The paper may also be of potential interest to practising managers and innovation policy makers, as a thought model for analysing and understanding the creation and diffusion of organisational innovations.

There are several directions that can be taken in further research. First, there is an obvious need for empirical validation of the framework. This might initially be achieved in a one-case study of one national innovation system, the purpose of which would be to explore if the proposed analytical framework is a good tool for analysing the diffusion of an organisational innovation in a national context.<sup>84</sup> Eventually, though, the framework must be validated in a comparative cross-national study, in order to investigate its ability to include and discriminate between different factors, which are relevant from a cross-cultural perspective.

A second issue demanding more attention is how the dynamic properties of the framework may be grasped and represented over time, since studies using a system approach often tend to be rather static.<sup>85</sup>

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<sup>84</sup> As previously indicated, quality management paradigms and practices may be regarded as an important form of OI. Accordingly, the intention is that the next research step will include an empirical application of the framework in a study of the development and diffusion of quality management practices in Sweden.

<sup>85</sup> A promising attempt to overcome this weakness is made by Frankelius (1999).

## REFERENCES

- Abrahamson, Eric (1991): "Managerial Fads and Fashions: the Diffusion and Rejection of Innovations", *Academy of Management Review*, Vol. 16, No. 3, pp. 586-612
- Abrahamson, Eric (1996): "Technical and Aesthetic Fashion", in Czarniawska, B. and G. Sevón, Eds. (1996): *Translating Organizational Change*, Berlin and New York: Walter de Gruyter
- Alänge, Sverker (1987): *Acquisition of Capabilities through International Technology Transfer: The Case of Small Scale Industrialization in Tanzania*, doctoral dissertation, Göteborg: Chalmers University of Technology
- Alänge, Sverker, Sanjay Siragowni and Lionel Bousquet (1996): "Can Management Tools be Adopted Across National Borders or Do They Need to be Adapted to Local Environments?", CIM Working Papers, No. WP 1996:03
- Alänge, Sverker and Annika Jarnehammar (1995): "Determinants of the Diffusion of Organisational Innovations - the case of TQM", Dept. of Industrial Management and Economics, Göteborg: Chalmers University of Technology
- Alänge, Sverker and Annika Jarnehammar (1999), "Diffusion of Organisational Innovations – An empirical test of an analytical framework", Dept. of Industrial Dynamics, Chalmers University of Technology, Göteborg
- Alänge, Sverker, Staffan Jacobsson and Annika Jarnehammar (1998): "Some "Some Aspects of an Analytical Framework for Studying the Diffusion of Organizational Innovations", *Technology Analysis & Strategic Management*, Vol. 10, No. 1
- Archibugi, D. and J. Michie (1995): "The globalisation of technology: a new taxonomy", *Cambridge Journal of Economics*, Vol. 19, No. 1
- Argyris, Chris and Donald D. Schön (1996): *Organizational Learning II: Theory, Method, and Practice*, Reading, MA: Addison-Wesley
- Ayala, F. J. and T. Dobzhansky eds. (1974): *Studies in the philosophy of biology*, London: Macmillan
- Bartlett, Christopher A. and Sumantra Ghoshal (1993): *Managing Across Borders: The Transnational Solution*, Cambridge: Harvard Business Press
- Bertalanffy, Ludwig von (1968): *General Systems Theory: Foundations, Development, Applications*, New York
- Breschi, Stefano and Franco Malerba (1995): "Sectorial Innovation Systems: Technological Regimes, Schumpeterian Dynamics and Spatial Boundaries", in: Edquist (1997): *Systems of Innovation: Technologies, Institutions and Organizations*, London and Washington: Pinter
- Campbell, Donald T. (1974). "'Downward causation' in hierarchically organized biological systems" pp. 179-186 in Ayala, F. J. and T. Dobzhansky eds. (1974): *Studies in the philosophy of biology*, London: Macmillan  
[http://www.ed.uiuc.edu/facstaff/g-cziko/stb/refs\\_c.html#camd74b](http://www.ed.uiuc.edu/facstaff/g-cziko/stb/refs_c.html#camd74b)
- Carlsson, Bo, ed. (1995): *Technological Systems and Economic Performance: The Case of Factory Automation*, Dordrecht: Kluwer Academic Publishers
- Carlsson, Bo, ed. (1997): *Technological Systems and Industrial Dynamics*, Boston: Kluwer Academic Publishers
- Carlsson, Bo and Rikard Stankiewicz (1995): "On the Nature, Function and Composition of Technological Systems", in: Carlsson, B. ed. (1995): *Technological Systems and Economic Performance: The Case of Factory Automation*, Dordrecht: Kluwer Academic Publishers
- Carlsson, Bo and Staffan Jacobsson (1997): "The Technological System for Factory Automation", in: Carlsson, B. ed. (1997): *Technological Systems and Industrial Dynamics*, Dordrecht: Kluwer Academic Publishers
- Carlsson, Bo, Staffan Jacobsson, Magnus Holmén and Annika Rickne (1999): "Innovation Systems: Analytical and Methodological Issues", Working Paper, preliminary draft, April 1999

- Clark, Peter (1995): "Appropriating American and Japanese Templates of Administrative Innovations", for European Management and Organization Transitions (EMOT) in Barcelona January 1995, Great Britain: Aston University
- Cooke, P., M. G. Uranga and G. Etxebarria (1997): "Regional Innovation Systems: Institutional and Organisational Dimensions", *Research Policy*, No. 26, 1997, pp. 475-491
- Czarniawska, Barbara and Bernward Joerges (1996): "Travels of Ideas", in Czarniawska, B. and G. Sevón, eds. (1996): *Translating Organizational Change*, Berlin and New York: Walter de Gruyter
- Czarniawska, Barbara and Guje Sevón, eds. (1996): *Translating Organizational Change*, Berlin and New York: Walter de Gruyter
- Dahmén, Erik (1950): *Svensk industriell förtagarverksamhet*, Stockholm: Industriens Utredningsinstitut
- Davies, S. (1979): *The Diffusion of Process Innovations*, Cambridge: Cambridge University Press
- Deephouse, David L. (1999): "To be different, or to be the same? It is a question (and theory) of strategic balance", *Strategic Management Journal*, Vol. 20, No. 2, pp. 147-166
- DiMaggio, Paul J. and Powell, Walter W. (1983): "The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields", *American Sociological Review*, No. 48, pp. 147-160
- Dosi, Giovanni (1988): *Technical Change and Economic Theory*, London: Pinter
- Edquist, Charles (1997): *Systems of Innovation: Technologies, Institutions and Organizations*, London and Washington: Pinter
- Edquist, Charles and Björn Johnson (1997): "Institutions and Organizations in Systems of Innovation", in: Edquist, Charles (1997): *Systems of Innovation: Technologies, Institutions and Organizations*, London and Washington: Pinter
- Edquist Charles, Leif Hommen and Maureen McKelvey (1998): "Innovations and Employment in a Systems of Innovation Perspective", Innovation Systems and European Integration (ISE), research project funded by the Targeted Socio-Economic Research (TSER) program of the European Commission (DG XII) under the Fourth Framework Program, European Commission (Contract no. SOE1-CT95-1004, DG XII SOLS), coordinated by Charles Edquist
- Edquist, Charles, Leif Hommen, Björn Johnson, Tarmo Lemola, Franco Malerba, Thomas Reiss and Keith Smith (i.e. Edquist et al.) (1998): "The ISE Policy Statement – The Innovation Policy Implications of the 'Innovation Systems and European Integration' (ISE) Research Project", research project funded by the Targeted Socio-Economic Research (TSER) program of the European Commission (DG XII) under the Fourth Framework Program, European Commission (Contract no. SOE1-CT95-1004, DGXII SOLS), coordinated by Charles Edquist
- Fagerberg, J., Guerreri, P. and B. Verspagen, eds. (1998): *The economic challenges for Europe: adapting to innovation-based growth*, London: Edward Elgar
- Frankelius, Per (1999): *Företagande över tid – Kontextuellt perspektiv och visuellt beskrivningspråk*, JIBS Dissertation Series, No.5, Jönköping: Internationella Handelshögskolan
- Freeman, Chris (1987): *Technology policy and economic performance: Lessons from Japan*, London. Pinter Publications
- Freeman, Chris (1982): *The Economics of Industrial innovation*, 2<sup>nd</sup> edition, Cambridge: MIT Press
- Freeman, Chris (1988): "Japan: A National System of Innovation?", in Dosi et al., Eds. (1988): *Technical Change and Economic Theory*, London: Francis Pinter
- Freeman, Chris (1995): "The 'National System of Innovation' in Historical Perspective", *Cambridge Journal of Economics*, No. 19 pp. 5-24
- Fukuyama (1995): *Trust: The Social Virtues and the Creation of Prosperity*, New York: The Free Press

- Giddens, A. (1984): *The Constitution of Society: Outline of the Theory of Structuration*, Oxford: Polity Press, in IDS, Institute of Development Studies (1999): "Institutions and environmental entitlements", UK: IDS, Sussex, <http://www.ids.ac.uk/eldis/envids/dp/instit.html>
- Gjerding, Allan Næs (1992): "Work Organization and the Innovation design Dilemma", chapter 5 in Lundvall, Bengt-Åke (1992): *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*, London: Pinter
- Gopalakrishnan, S. and F. Damanpour (1997): "A Review of Innovation Research in Economics, Sociology and Technology Management", *Omega, International Journal of Management Science*, Vol. 25, No. 1, pp. 15-28
- Granberg (1997): "Mapping the Cognitive and Institutional Structures of an Evolving advanced-Materials Field: The Case of Powder Technology", chapter 7 in Carlsson, Bo, ed. (1997): *Technological Systems and Industrial Dynamics*, Boston: Kluwer Academic Publishers
- Grønning, Terje (1998): "Changes within the Japanese system of innovation: A preliminary framework for a qualitative analysis of some basic traits", paper to the seminar Rethinking the institutions governing innovation in the new era of internationalization, organised by the research project CDIS: Comparative Dynamics of Innovation Systems: Implications for S&T and Other Policies funded by DG XII's TSER II-programme. Kleivstua, Norway, June 20-23, 1998
- Grønning, Terje (1998a): "The concept of innovations within systems of innovation approaches", paper to the Thorstein Veblen Conference on Institutional Analysis of the Economy Today: Conceptual Cores, Analytical Approaches and challenges to Institutional Analysis, Oslo, June 18-19, 1998
- Guillén, Mauro F (1994): *Models of Management: Work, Authority and Organization in a Comparative Perspective*, Chicago: University of Chicago Press
- Hamed, Karim and Pascal Miconnet (1998): *Global Diffusion of Best Practices. An Analysis of the Impact of National Cultures at Ericsson Radio Systems AB*, MoP thesis 98:6, Göteborg: Chalmers University of Technology
- Hofstede, Geert (1980): *Culture's Consequences: International Differences in Work-Related Values*, Newbury Park: Sage Publications
- Hofstede, Geert (1991): *Cultures and Organizations: Software of the Mind*, London: McGraw-Hill
- IDS, Institute of Development Studies (1999): "Institutions and environmental entitlements", UK: IDS, Sussex, <http://www.ids.ac.uk/eldis/envids/dp/instit.html>
- Jarnehammar, Annika (1995): *Towards a Framework for Analysing the Diffusion of Organisational Innovations*, Göteborg: Chalmers University of Technology
- Johannisson, Bengt (1985): "Business and Local Community: Swedish experiences in bottom-up planning for local industrial development", *Report 1985:4*, University of Östersund, Östersund
- Johnson, B. (1992): "Institutional Learning", in Lundvall, B.-Å., ed. (1992): *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*, London: Pinter
- Johnson, Björn and Birgitte Gregersen (1997): "European Integration and National Systems of Innovation", Innovation Systems and European Integration (ISE), research project funded by the Targeted Socio-Economic Research (TSER) program of the European Commission (DG XII) under the Fourth Framework Program, European Commission (Contract no. SOE1-CT95-1004, DG XII SOLS), coordinated by Charles Edquist
- Kimberly, John R. (1981): "Managerial Innovation", in Nystroem, P.C. and W.H. Starbuck Eds. (1981): *Handbook of Organisational Design*, New York: Oxford University Press
- Kogut, Bruce (1991): "Country Capabilities and the Permeability of Borders", *Strategic Management Journal*, Vol. 12, pp. 33-47

- Landau, R. and N. Rosenberg, Eds. (1986): *The Positive Sum Strategy: Harnessing Technology for Economic Growth*, Washington D.C.: National Academy Press
- Larsen, T. J. (1997): "Diffusion Theory as the Basis for Understanding Information Technology Related Change: True or False?", Position Statement presented at WG8.6 '97 (Ambleside), DIGIT '97 (Atlanta), and IRMA '98 (Boston),  
<http://www.bi.no/dep2/infomgt/research/tor-innovation/pr-diffusion.htm>
- Latour, Bruno (1986): "The Powers of Association", in Law, John, ed. (1986): *Power, Action and Belief*, London: Routledge
- Law, John, ed. (1986): *Power, Action and Belief*, London: Routledge
- Leonard-Barton, Dorothy (1988): "Implementation as Mutual Adaptation of Technology and Organisation", *Research Policy*, No. 17, pp. 251-267
- Leontief, W. W. (1941): *The Structure of American Economy 1919-1929*, Cambridge: Harvard University Press
- Lillrank, Paul (1995): "The Transfer of Management Innovations from Japan", *Organization Studies*, 16/6, pp. 971-989
- List, F. (1841): *Das Nationale System der Politischen Ökonomie*, translated and published in English under the title *The National System of Political Economy*, London: Longman
- Lund, Reinhard and Allan Næs Gjerding (1996): "The flexible company: Innovation, work organisation and human resource management", DRUID Working Paper No. 96-17, Aalborg: Department of Business Studies
- Lundvall, Bengt-Åke (1992): *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*, London: Pinter
- Lundvall, B-Å. (1999): *Det danske innovationssystem – et forskningsbaseret debatoplæg om innovationspolitiske udfordringer og handlemuligheder*, DISKO-projektet: Sammenfattende rapport, Copenhagen: Erhvervsudviklingsrådet, (in Danish)
- Maurseth, P. B. and B. Verspagen (1998): "Europe: One ore more innovation systems?", in Fagerberg, J., Guerreri, P. and B. Verspagen, eds. (1998): *The economic challenges for Europe: adapting to innovation-based growth*, London: Edward Elgar
- Miconnet, Pascal and Sverker Alänge (2000): "Soft Institutions and the Diffusion of Management Innovations across Borders", presented at the Seventh Conference of the International Society for the Study of Work and Organizational Values (ISSWOW), Work Values and Organizational Behavior - Toward the New Millennium, June 25-28, 2000, in Jerusalem
- Nelson, Richard R. (1987): *Understanding Technical Change as an Evolutionary Process*, Holland: Elsevier
- Nelson, Richard R. (1993): *National Innovation Systems - A Comparative Analysis*, New York and Oxford: Oxford University Press
- Nelson, Richard R. and Nathan Rosenberg (1993): "In Search of a Useful Theory of Innovation", in Nelson, R. (1993): *National Innovation Systems - A Comparative Analysis*, New York and Oxford: Oxford University Press
- Nelson, Richard R. and Sidney Winter (1982): *An Evolutionary Theory of Economic Change*, Cambridge: Harvard University Press
- North, Douglass C. (1990): *Institutions, Institutional Change and Economic Performance*, New York: Cambridge University Press
- Nystroem, P.C. and W.H. Starbuck eds. (1981): *Handbook of Organisational Design*, New York: Oxford University Press
- Ostrom, E. (1986): "An agenda for the study of institutions", *Public Choice*, No. 48, pp. 3–25, in IDS, Institute of Development Studies (1999): "Institutions and environmental entitlements", UK: IDS, Sussex,  
<http://www.ids.ac.uk/eldis/envids/dp/instit.html>



- Paquet, Gilles (1994): "Technonationalism and Meso Innovation Systems", draft of a discussion paper prepared for the Trinational Institute on Innovation, Competitiveness and Sustainability organized by the Center for Policy Research on Science and Technology of Simon Fraser University at Whistler, B.C. on August 14-21, 1994, (PRIME - Programme of Research in International Management and Economy, University of Ottawa), <http://iir1.uwaterloo.ca/MOTW96/summer96/GillesPaquet.html>
- Porter, Michael E. (1990): *The Competitive Advantage of Nations*, New York: The Free Press
- Powell, Walter W. and Paul J. DiMaggio (1991): *The New Institutionalism in Organizational Analysis*, Chicago: University of Chicago Press
- Rogers, Everett M. and Judith K. Larsen (1984): *Silicon Valley Fever: Growth of High-Technology Culture*, New York: Basic Books
- Rogers, Everett M. (1995): *Diffusion of Innovations*, 4<sup>th</sup> Edition, New York: The Free Press
- Rosenberg, Nathan (1986): "The Impact of Technological Innovation: A Historical View", in Landau, R. and N. Rosenberg, Eds. (1986): *The Positive Sum Strategy: Harnessing Technology for Economic Growth*, Washington D.C.: National Academy Press
- Saxenian, AnnaLee (1994): *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*, Cambridge, MA and London: Harvard University Press
- Schneider, Susan C. and Jean-Louis Barsoux (1997): *Managing Across Cultures*, Great Britain: Prentice Hall
- Schön, Donald A. (1997): interview in Boston, MA, April 1997
- Schumpeter, J. A. (1934): *The Theory of Economic Development*, Cambridge: Harvard University, Press (first German edition in 1911: *Theorie der wirtschaftlichen Entwicklung*)
- Scott, W. Richard (1995): *Organizations: Rational, Natural, and Open Systems*, 3<sup>rd</sup> Edition, New Jersey: Prentice Hall
- Scott, W. Richard (1995a): *Institutions and Organizations*, Thousand Oaks: Sage Publications
- Selznick, Philip (1996): "Institutionalism 'Old' and 'New'", *Administrative Science Quarterly*, Vol. 41, pp. 270-77
- Slappendel, Carol (1996): "Perspectives on Innovation in Organizations", *Organization Studies*, 17/1, pp. 107-129
- Smith, Keith (1996): "Systems Approaches to Innovation: Some Policy Issues", Innovation Systems and European Integration (ISE), research project funded by the Targeted Socio-Economic Research (TSER) program of the European Commission (DG XII) under the Fourth Framework Program, European Commission (Contract no. SOE1-CT95-1004, DGXII SOLS), co-ordinated by Charles Edquist
- Solow, R. M. (1956): "A Contribution to the Theory of Economic Growth", *Quarterly Journal of Economics*, Vol. 70, February 1956 p.65-94.
- Soskice, David (1993): "Innovation Strategies of Companies: A Comparative Institutional Explanation of Cross Country Differences", Berlin: Wissenschaftszentrum Berlin (WZB), incomplete draft cited with permission of the author in Zysman, J. (1996): "Nations, Institutions, and Technological Development", *Int. J. Technology Management*, Vol. 12, Nos. 5/6, Special Issue, pp. 651-678
- Soskice, David (1996): "German Technology Policy, Innovation and National Institutional Frameworks", Working Paper No. FS I 96-319, Berlin: Wissenschaftszentrum Berlin (WZB)
- Storper, Michael (1997): *The Regional World*, New York: Guilford Press
- Trompenaars, Fons and Charles Hampden-Turner (1998): *Riding the Waves of Culture: Understanding Diversity in Global Business*, 2<sup>nd</sup> Edition, New York: McGraw-Hill
- Veblen, T. (1919): *The Place of Science in Modern Civilization and Other Essays*, New York: Huebsch
- Zysman, J. (1996): "Nations, Institutions, and Technological Development", *Int. J. Technology Management*, Vol. 12, Nos. 5/6, Special Issue, pp. 651-678