# 3 Learning from Networked Innovation: Developing a Designerly Approach to Innovation Systems

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These days, innovation and collaboration are two sides of the same coin. Due to the almost exponential speed of technological developments (Brynjolfssson & McAfee, 2013), the ambition among many organizations (both profit and non-profit) to connect innovation processes to so-called ‘Grand Societal Challenges’[1] (Lund Declaration) and the wide-scale availability of information, businesses need to use each other’s knowledge, expertise, experience and networks more intensively to market new products, services and systems (networked innovation). It is important for innovating organizations to understand the direction of technological developments in relation to societal relations and the way they organize shared innovation processes. Because a traditional closed linear approach to innovation is no longer viable, there is growing attention to ‘designerly’ approaches to innovation that are characterized by human-centeredness, an important role for the behavior and use of people, future-oriented interactive innovation processes, and an intensive exchange of information, knowledge and expertise between innovative organizations working together in networks (See Brown, 2008, among others). Although, at management and organizational level, this approach to innovation has been developed fairly well, at the ‘higher’ levels of innovation systems and technology development, there is still work to be done, which is surprising because these areas have traditionally been characterized by innovative collaboration and the non-linearity of technological developments.

The connection between these three levels (technology development, system, and organization) results in the argument that, to better understand and explain how organizations work together when it comes to innovation, the three levels need to be linked to each other conceptually (see, also, Nooteboom, 2005, p. 13), with a focus, in this study, on innovation systems and organization/management). To connect these two levels, we use the Cyclical Innovation Model (CIM) (Berkhout, 2000), which we consider eminently suitable for establishing the connection, because the model has ‘designerly’ features: it is based on the cyclical relationships between different actors (both businesses and institutional organizations) and focuses on technology development, social transitions, and product and service development.

Because CIM is actor-oriented, which means it is leaning towards the management perspective, we will start by examining how CIM can be complemented with a typical innovation system model, the functions of innovation systems approach (Hekkert et al., 2007). Next, the focus will be on ‘making’ CIM dynamic, because many innovation systems involving collaboration have a static perspective and examine the ‘state of collaboration’ rather than its development.

*1: In 2009, the Grand Societal Challenges were expressed in the so-called Lund Declaration: global warming, tightening supplies of energy, water and food, aging societies, public health, pandemics and security.*

This contribution addresses the following five questions:

1. How can CIM and the functions of innovation systems approach complement each other and be applied to the different innovation systems? (paragraph 2)

2. How do different innovation systems develop over time and what guidelines can be formulated to manage innovation systems? (paragraph 3)

To make innovation systems even more 'designerly', we will also address the following questions:

3. How can various actors be positioned within the innovation system?

4. How is the connection between the strategy of a company and the innovative activities within the innovation system realized?

5. What is the role and what are the (new) competences of a 'innovation system champion' within an innovation system?

All innovation projects in our study had an important common factor: they depended on the commitment of a person who is convinced of the benefits of networked innovation. This is the core actor of an innovation project within a company as well as the link towards external stakeholders. Equivalent to the leading role in traditional innovation projects, we call him the networked innovation champion. Typically, he will be a middle manager from R&D and, considering the various challenges he has to face, champion is a really deserved title. This chapter is dedicated to him/her. We hope that the lessons learned by his predecessors whom we describe here may help him/her to avoid some of the pitfalls in a difficult innovation journey.

# Content

# 1. Three levels of innovation

Science approach collaboration and innovation from three levels: science and technology studies (STS), the innovation system approach and innovation management.

### 1.1. Science and Technology Studies

The STS have their origin in the question how technology develops and how it affects society. Some argue that technology develops in an autonomous way and has a direct impact. This approach is known as technological determinism: "... the position that material forces, and especially the properties of available technologies, determine social events" (Sismondo, 2004, p.79). Others emphasize that technological developments always take place within a social context, that they need to meet certain needs in order to be accepted, and that those needs are often socially constructed. Sismondo (2004, p.64) suggests the following, somewhat abstract formulation: "... that science and technology are social, that they are active, and that they not take nature as it comes". A third group of scientists emphasizes that technology develops within certain networks, in which specific actors make certain decisions that have a major impact on the course of a given technology. According to this Actor-Network Theory (ANT), the actors can also be non-human[2] : "... the actors of ANT are heterogeneous in that they include both human and non-human actors, with no important distinction between them. Both humans and non-humans have interests that need to be accommodated, and that can be managed and used. Electrons, elections, and everything in between are fair game in the building of networks (Sismondo, 2004, p.65). It is especially this third perspective in which it is emphasized that (technological) innovation processes consist of shared activities of different types of organizations, and that institutions affect the behavior of these organizations.

A common thread in all three of these STS theories is that analysis mostly takes place at a 'macro' level. In other words, technology and society are examined, and the way they are connected. This does not mean, however, that technology is treated as black box. STS literature contains numerous case studies that take a close look at the development of technological innovations and aspects (including standards), and their impact on social relations (like the social position of women). Another common thread is that technology is viewed as the most important unit of analysis, despite the opinion that the social context is very important to technological development.

### 1.2. Innovation systems

The second level is that of innovation systems, which, according to Hekkert et al. (2007, p. 414), is "... a heuristic attempt, developed to analyse all societal subsystems, actors, and institutions contributing in one way or another, directly or indirectly, intentionally or not, to the emergence or production of innovation. Carlsson et al. (2002) emphasize the variety of innovation systems (IS) and draws a distinction based on the physical or geographical dimensions, time, the performance of an innovation system and its function. Although Carlsson et al. (20020) argue that each innovation system consists of components (the operating parts of the innovation system), relationships (links between the components) and attributes (the properties of the components and their relations) (ibid. p. 234), there are many different innovation system theories available: input/output analysis, development blocks, National Innovation Systems, Porter's 'diamond', sectoral innovation systems, local innovation systems, technological systems, 'Triple Helix', the functions of innovation systems approach (see paragraph 2), Large Technical Systems, Multi-level perspective and, last but not least, the Cyclic Innovation Model (see paragraph 2).

IS studies are often used as input for government policy with regard to technological developments or, more specifically, innovation or science policy, the question

*2: Examples of non-human actors are rules and values that affect the course of the innovation system, for instance, the value and duration of subsidies to citizens who purchase solar panels affects the state of affairs surrounding solar technology. The nature of the technology in question also plays a role. Technologies that are controversial, for instance gene technology, attract different stakeholders than technologies that are more socially acceptable.*

being which role the government can or should play in managing or facilitating technological developments that are important to the direction and quality of the Dutch innovation systems or certain sectors.

**1.3. Innovation management**

The third level is the management (or organizational) perspective, which focuses on the governance and organization of innovation processes. Innovation processes consist of, among other things, activities like R&D, technology transfer, knowledge management, market research, futures research, technology intelligence, and product development. As such, innovation management focuses primarily on how these activities ought to be shaped in each phase. For example, with regard to market research, a decision will have to be made on whether to consult only the lead users, or to carry out a broader market research. Innovation processes can be carried out in different ways, and the context of the innovation process in question (the type of innovation, organization, sector, culture, etc.) has a strong influence (Ortt & Van der Duin, 2008). An important development in innovation management is the shift from 'closed' innovation (in which an organization carries out the innovation process on its own) towards 'open' innovation (in which various organizations work together) (Chesbrough, 2003, and others).

**1.4. Similarities and differences**

There is a reason that the three levels discussed above are distinguished: they all focus on a different perspective of innovation. STS focuses on the way knowledge and technology are produced in relation to societal relations, while the IS perspective mainly looks at the development of specific technologies and how technology development is affected by certain conditions of the innovation system. Innovation management, on the other hand, adopts an organizational perspective and examines how a business can transfer technology into new products and services. Another difference is that STS is primarily philosophical in nature and that the results of IS studies focus very much on feeding government policy, while innovation management is more prescriptive and operational in nature. In addition, innovation management does not see technology development as a goal, but as a means to realize innovation, which is the realized, implemented, and marketed application of technology. Technology is not necessarily the most important input for innovation that it is in many IS theories. The management perspective increasingly emphasizes the non-physical, 'soft' success factors of innovation, like the contribution of potential customers, the intended business model, the working conditions that allow employees to display innovative behavior ('social innovation'), and the look-and-feel of the innovation itself. Finally, the STS and innovation management levels pay a lot of attention to the – important – role of actors in innovation. The management perspective thus focuses on the micro level and sees technology development not as a goal in itself, but as a means, and it focuses on the actors involved in innovation.

Naturally, there are also similarities between the levels or elements where they come together. First of all, they all recognize that innovation is no longer a stand-alone activity, but a distributed process in which the division of the activities involved depends on, among other things, the specific competences of the actors and the institutional context of the innovation system. Secondly, innovation is no longer viewed merely as a linear process, but as a complex, interactive and sometimes even chaotic process in which the complex relationships between technological, economic and social factors determine the success of an innovation. The final, and most important, similarity is that the three levels are connected, and that, we would argue, knowledge from all three levels is needed for the successful development of most innovations, and in particular radical and/or system innovations. For instance, it is important to know what the social opinions are on a given technology and how this technology affects society. Also, it is relevant to know which social institutions influence the relationships of innovating organizations, and it has to be clear, for instance, which business model is best suited for the innovation under development.

## 2. Connecting innovation management and innovation systems

Because STS, innovation systems and innovation management scientists examine the same subject, namely innovation (see paragraph 1), there are also similarities in their approach to innovation (see paragraph 1.4), and we will establish a theoretical and conceptual link between the management and systems levels, because, in these two levels, the organization is the most important unit of analysis and because the Agentschap.nl project, 'A designerly approach to networked innovation' focuses on these two levels.

First of all, we can ascertain that the systems approach is an approach used in management science in which the manager is expected to be able to look beyond the boundaries of his own organization and pay attention to other actors and institutions that may be important to the organization. The relationship between the organization and its environment is also an important factor in distinguishing two management approaches. On the one hand, there is Michael Porter's perspective, based on the structure-conduct-performance principle, in which the profitability of a sector is fixed and the quality of the strategic positioning of an organization determines how large the share is it can take from competitors, suppliers and customers. Simply put, this is an example of 'outside-in' thinking and strategic actions and reasoning are a kind of chess game in which the organization has to anticipate constantly what its potential opponents will do. On there hand, there is the entrepreneurial perspective, which argues that an enterprise should not pay too much attention to what its environment does or thinks. It is more important for the organization itself to determine its goals and decide how it intends to reach those goals. This approach is based on the organization's own strengths, and its ambitions need to be aligned with those strengths. Because, in the latter management approach, the organization's environment is considered less relevant, we consider the former approach to be more suitable for connecting management and systems.

Secondly, it is important for innovation not just to be the result of invisible societal and economic institutions, which may play an important role at macro level, but which do not always explain why organizations make certain decisions at micro level and act in certain ways with regard to innovation. There has to be an actor perspective and the main explanation of the course of an innovation is less determined by the nature of the technology or the role or political color of institutions, but it is explained largely by the action repertoire of an organization and the strategic interaction between the various innovation actors. In short, innovation is a human affair.

A model that takes the organization's environment into account, as well as incorporating an actor perspective, is a good candidate for connecting the systems level and the management level of innovative collaboration. The Cyclic Innovation Model meets both these criteria, making it an excellent candidate for the job. According to the CIM, innovation is an inherently cyclical process, in which different actors constantly develop and exchange information and knowledge (Berkhout, 2000).

This means that innovation is not only triggered by science or technology push, but can also be inspired by market and society pull, or be a combination of the two. Within CIM, the different actors of an innovation system are cyclically connected through different types of knowledge cycles (Figure 1):

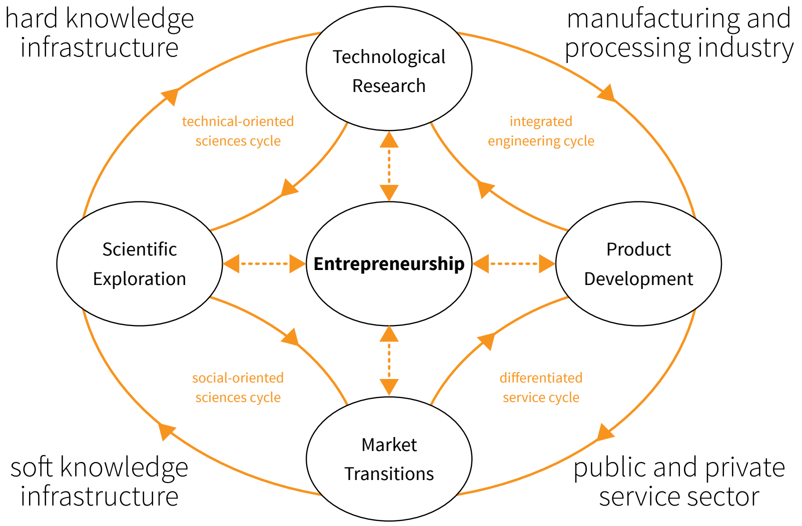


*Figure 1: Visualization of CIM*

CIM shows who are involved with the innovation and what the environment is of the various actors, and the cyclical nature of the mutual knowledge relationships makes sure that the actors of CIM are cyclically connected. However, although CIM does have an 'environment component', it focuses to a far lesser extent on the environment of the innovation system. A model that can be used to complement CIM is the functions of innovation systems (FIS) approach, which argues that a well-functioning innovation system meets seven criteria ('functions') (Hekkert et al., 2007):

**Function 1: Entrepreneurial activities**
Without entrepreneurs, there would be no innovation and the innovation system would not even exist.

**Function 2: Knowledge development (learning)**
New knowledge needs to be developed if solutions to the identified problems are to be provided, i.e., the development of a new technology, in which the development of scientific and technological knowledge is crucial.

**Function 3: Knowledge diffusion through networks**
The essential characteristic of networks is the exchange of information.

**Function 4: Guidance of the search**
The activities within the innovation system that can have a positive effect on the visibility and clarity of specific (future) needs among technology users.

**Function 5: Market formation**
Because new technologies often have difficulties competing with embedded technologies, it is important to create protected spaces for new technologies.

**Function 6: Resource mobilization**
Resources, both in terms of finance and human capital, are necessary as basic input for all the activities within the innovation system.

**Function 7: Creating legitimacy/counteracting resistance to change**
To develop a new technology well, it must become part of an incumbent regime, or even overthrow it.

*Table 1: The seven functions of the 'functions of innovation systems approach' (Hekkert et al., 2007)*

For the purpose of this contribution, it would go too far to discuss both CIM and FIS at great length. Suffice it to say that Functions 6 and 7 are important additions by FIS to CIM. Function 6 is important because CIM pays relatively little attention to the financial and other resources that are needed to start up the innovation process. CIM focuses primarily on the knowledge development process. Function 7 is a valuable addition to CIM because CIM pays little to no attention to the institutional context of the actors involved in the innovation system. CIM primarily describes what the actors do and decide in terms of innovation, not why they do what they do, what their motivation is and how they relate to competing innovation systems.

It can be concluded that innovation management models and innovation systems theories can be connected, provided an actor perspective is adopted, the systemic nature of innovation is included explicitly and the environment of innovation systems is taken into account. Innovation management models often do adopt an actor perspective, but they pay less attention to the system perspective and to the environment, while innovation systems models tend to focus above all on the latter two aspects. By adding the two FIS functions to the CIM model, the two perspectives are united.

# 3. Making innovation systems dynamic

If innovations are the result of the deliberate decisions and actions of actors, and if the essence of an innovation process is that it increases our knowledge, the process is dynamic in nature, and should be viewed as a movie rather than a photograph. Of course, every innovation process is dynamic in nature, but, due to the openness and iterative nature of innovation systems, any analysis needs to capture the increased dynamics. It is quite common for innovation systems to consist of changing configurations of actors and for the goals and possible outcomes to be variable, largely as a result of changes in those configurations. Therefore, one should be cautious with regard to the conclusions of the analysis of a given state of an innovation system.

The question that emerges is what kind of dynamics an innovation system can have. Van de Ven and Le Poole (1997) distinguish four types of changes:

1. Life-cycle;
2. Teleological;
3. Dialectic;

4. Evolution.

The first type of change (development) means that the innovation system has its own logic and develops autonomously without paying much attention to outside influences. The second development means that the innovation system has a certain goal and moves towards that goal. This does not happen in a vacuum and there is certainly room for (positive and negative) outside influences, that the actors try to take on board as best they can. The dialectic development is based on contradictions within the innovation system and between the innovation system and its environment. The progress of the innovation system is determined by the ability to conquer and reconcile these contradictions. The evolutionary development, which, like the two previous types, is based on the relationship between the innovation system and its environment, focuses primarily on competition between systems and their elements, giving rise to a lot of variation.

This division into development types can be used to describe the inherently dynamic nature of innovation systems, even though that is often done in retrospect, as shown by many historical case studies involving disruptive technologies and by evaluation studies regarding national or sectoral innovation policy. Although it is hard to predict what the future course of an innovation system will be (otherwise, it would not be very innovative), it is also hard to say in advance what the development type of a certain innovation system will be. However, this uncertainty is related, above all, to the content or outcome of the innovation process (system). It is possible to agree on what the level of ambition should be. Are the ambition levels high and do they involve radical innovation, or are they modest and do they involve incremental innovation?[3] For the development of a management perspective, it is important, then, to determine as quickly as possible what type of development is involved. The life-cycle development relates poorly to innovation system management, because the innovation process is difficult to influence and goes its own course. There is little room for steering or intervention. In the case of the teleological development, on the other hand, there is certainly room for management, for example by defining an inspiring vision of the future (goal) for the innovation system and by actively managing its external relationships. The latter aspect also plays a role in the dialectic and evolutionary development types, although, in the case of the dialectic type, (the management of) internal relationships also play a significant role. In the case of the teleological type, management to a large extent involves coordinating the activities by pointing them all toward the same goal, while, in the case of the dialectic type, it involves primarily matching the various forms of expertise, roles and interests, and, in the case of the evolutionary type, innovation system management is designed to make sure that the system responds to the changing environment in time. This once more emphasizes the inherently uncertain nature of innovation: neither the content nor the process are in any way predetermined.

# 4. The position of actors in the innovation system

Although it is increasingly necessary to organize innovation processes in networks, that does not mean that it makes innovation any easier. On the contrary, because these innovation networks consist of actors that vary enormously in

*3: To be honest, for the development of an incremental innovation, setting up an actual innovation system is rather excessive, because it requires little in terms of (external) actors, which means there is no real innovation system.*

terms of, among other things, organizational structure, business type and innovation management style, setting up and managing these networks is a very complex and time-consuming affair. It is often claimed that the time-to-market is becoming ever shorter, but that does mean we need to accept that claim as gospel. It may well be that the diffusion time of new products and services is become ever shorter, but that is not the same as claiming that the time-to-innovation is becoming increasingly shorter as well. So, despite the necessity of networked innovation in a more dynamic and competitive business landscape, innovation as such is not becoming any easier for companies. In the past, vertical value chains ensured that companies always knew where they stood in relation to each other. Networked innovation means that the position of a company is no longer determined by its role as customer or supplier, but by the role or function it plays within the overall network. To illustrate the complexity of networked innovation, we show the innovation network, and the actors involved, in the Dutch energy market:

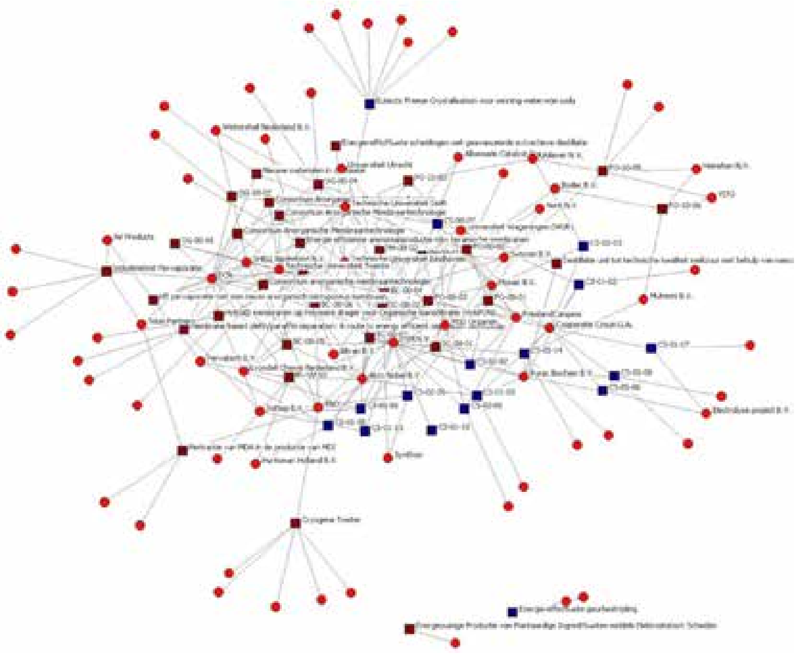

*Figure 2: The network of energy-related actors involved with the top-industry Energy*

Although the structure and the actors involved in this network may be depicted accurately in Figure 2, it is unlikely that any of the actors will learn a lot from looking at the network, while the complexity (some might argue chaos) involved may lead us to conclude that speeding up the innovation processes within this network are unlikely to be easy at all.

It is important for the efficiency and effectiveness of an innovation network to have a clear overview of who occupies which position, how the actors relate to one another and what the mutual dependencies are in the network.

### *Case: Zodiac-Driessen*

*It became clear from interviews at Zodiac-Driessen that the positioning of actors in the innovation network is not unimportant. Airbus, the central and (therefore) most important actor in the network, asked Zodiac-Driessen to take on the role of systems integrator of most of Airbus' suppliers. The request was highly operationally motivated, because Airbus does not consider the systems integrator-related activities to be strategic in nature. As a result, Zodiac-Driessen was more or less forced to take on this role, because otherwise, it would have lost Airbus as a customer. Zodiac-Driessen not only started playing a determining role with regard to the suppliers, but also in relation to Airbus, because its dependence on Airbus became very high.*

*It is, therefore, not only a matter of who is positioned closer to the end-user, but also who depends on whom and who adds the most value (from the point of view of the end-user). In the Zodiac-Driessen case, Airbus (according to Zodiac-Driessen) thought it had made a clever move by outsourcing the operationally speaking difficult role of systems integrator, and in the process freeing itself from that burden and strengthening its strategic position by only doing business with one party. However, Zodiac-Driessen was of the opinion that it had strengthened its position in relation to Airbus compared to the competition. The company believed the dependency was now virtually reversed. From a market with one customer and multiple suppliers, it had become a market with one customer and one supplier (the systems integrator). Of course, the possibility exists that airlines (the immediate customers of Airbus) may skip Zodiac-Driessen, but, in trying to do so, they would encounter resistance at Airbus, and Zodiac-Driessen would be able to compensate and fall back on its original market share, which was the market share before it became Airbus' systems integrator.*

### *Example: CNN and A2000*

*It is important to realize that the perspective of actors in the innovation network is highly subjective. That is to say that every actor in the network has a different perspective of the network and assumes a different relationship with regard to other actors. Sometimes, that can cause problems, as it did in the 1990's in the TV sector between A2000 (now: UPC) and CNN. A2000 assumed that CNN should pay them for transmitting their content, because CNN would be unable to broadcast its programs with the A2000's infrastructure. CNN, on the other hand, argued that that infrastructure would be worth preciously little without high-quality content, and A2000 should thank and be willing to pay CNN for its content.*

The increasing complexity of innovation networks increases the need for structure and clarity, even though the vagueness of the network as a result of its complexity can be a strategic weapon for the organizations involved. That is to say that being able to position oneself within the network in a clever way has become a new weapon, in addition to unique capabilities, resources and knowledge, in building a competitive position. This is not about economies of scope, but about occupying a position within the network that allows a company to benefit optimally from the added value created by the network.

# 5. The strategic level of the innovation system

Within an innovation system, different companies need to perform different roles. That is not just a matter of developing new capabilities or skills, it also questions the core business and very nature of a company. The operational level of an innovation system, the actual innovative activities of the various companies, need to be closely linked to their strategy. The changing position within the innovation system needs to be aligned with the strategy of the company involved. Preferably, defining the strategy of a company precedes its choice of innovation system. In addition, networked innovation by definition means that various companies not only share their knowledge and information, but their strategic orientation as well. For successful networked innovation, this also means that the strategic component ("what is the future for which we are innovating together?") needs to be taken into account when designing and developing the network.

Developing and implementing a strategic vision within a single organization is in itself difficult, never mind when the company is part of a network consisting of multiple organizations. In addition, different types of networks are bound to have different approaches to developing their vision. For example, in a very diverse network in which different stakeholders and actors have different opinions about the desired trajectory, the vision for the future will have to be inspiring rather than overly specific. The focus will have to be more on the innovation and/or trajectory than on the intended goal. It is important to maintain the mutual knowledge relationships and the specific outcome, that is to say the goal of the innovation system, will primarily emerge during the innovation process rather than being defined in advance. When there is more or less general agreement regarding the goal of the innovation system, the innovation system will need to be managed to a lesser extent. In other words, the focus will be more on the efficiency and effectiveness of the innovation processes than on the specific results, because it may be assumed that the results will be in line with the predefined goal.

The role of foresight can also vary per type of innovation network. It can be limited to providing information about new developments, or to updating and refining existing roadmaps. Again, the level of consensus appears to be important. For the joint development of a vision for the future, providing and sharing (new) information about (possible) future developments is important, while in the case of an existing consensus about the future goal, information regarding the various alternative ways toward that goal is essential.

What is also important for vision development within a network is the extent to which people can be open with each other. Sharing the right information in time is an aspect of this, so it is important to determine how open a given network is. In his famous book Open Innovation, Henry Chesbrough indicates that, under certain circumstances, open innovation is not a good idea. He argues that open innovation makes sense when a given industry is largely based on external ideas, when labor mobility is high, when there are many active venture capitalists financing numerous start-ups and when universities play an important role (Chesbrough, 2003, p. xxvii). In other words, open innovation is a good strategy in an industry that is indeed 'open'. In a closed industry, the opposite tends to be the case: while open industry requires an 'open' industry, closed innovation thrives in a 'closed' industry. Apparently, Chesbrough adopts a contingency approach to innovation management: an organization has the right innovation strategy if it matches that strategy to the industry in which it operates.

So, the openness in question may refer to the openness of the innovation process itself and to that of the industry in which the organization operates, as the Dutch Defense Intelligence and Security Service (DISS) case shows. The DISS operates in the intelligence industry, in which, after

9/11, the duty to share information has become more important in tracking down (potential) terrorist activities. This creates the contradiction that the innovation process has to be more open while at the same time being carried out within a closed environment. This contradiction is to a large extent 'solved' by the realization that the level of openness of an innovation needs to be looked at not only from an organizational perspective, but from a project perspective as well. That means that, although most of the innovation processes of an organization may be closed (resulting in 'closed innovation'), certain innovation processes can (and will) be open.

The figure below shows the relationships between open/closed innovation processes and open/closed industries:

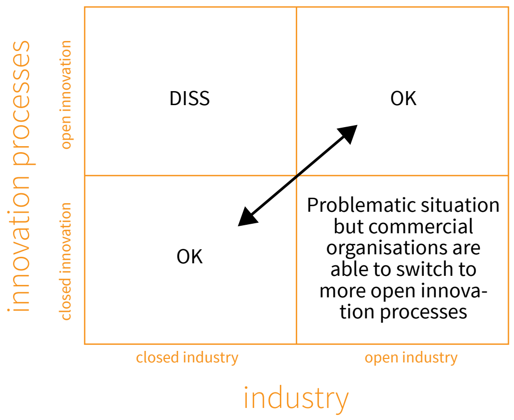


*Figure 3: Open and closed innovation in an open and closed industry*

There are four possible combinations:

1. An open process in an open industry.
2. A closed process in a closed industry.
3. An open process in a closed industry.
4. A closed process in an open industry.

The bottom left and top right quadrants are contingent upon each other, although closed innovation in a closed industry is becoming increasingly rare in the modern innovation landscape. The top left and bottom right quadrants are more interesting to explore, because organizations who find themselves in this situation need to reconcile the conflicting issues arising from the difference between their way of innovating and that of the industry in which they operate. Chesbrough describes the bottom right quadrant as a difficult situation that companies need to escape as soon as possible, because the overall innovation landscape has become more open.

The top left quadrant is not contingent either so that is also not an ideal situation. The transition from closed innovation towards open innovation is, in principle, a relatively easy one for commercial organizations, because the formal, legal and organizational restrictions they face are limited and they are under pressure to stay or become innovative, whereas organizations in the public sector (such as the DISS) usually operate in a more restricted environment and cannot easily switch to a different mode of innovation.

# 6. From 'strategic product champion' to 'innovation system champion'

The success of an innovation process does not only depend on the choice and/or quality of the methods and tools that are used during this process or the specific structure of the innovation system. The human factor is equally important, in that it is ultimately a matter of making sure the right people are involved in the innovation process. An important concept in this regard is the concept of 'product (or innovation) champion'. The idea is that an innovation process will benefit greatly from having someone who is involved in the entire process and who possesses all the (technical and marketing) aspects and skills needed to 'sell' the innovation idea process. More specifically, we are referring to the following qualities (Schon, 1963):

- Identifies with the innovation idea
- Has enough authority and a good position
- Knows about and is interested in: technology, marketing, production, finance

Rising (2013) adds to this:
- Knows the customers
- Accepts overall responsibility
- Is prepared to make tough decisions
- Defends his team
- Is able to communicate with everyone
- Is also able to say 'no'
- Keeps his promises
- Is a good facilitator
- Has a constant eye on the market

In other words, the product champion is a jack of all trades, a homo universalis, the ideal son in law, with the combined intelligence of Einstein, Edison and Louis Pasteur, the entrepreneurial skills of Bill Gates and the innovative talent of Leonardo da Vinci, all united in one person … Needless to say, such a person does not exist, which means it is important to secure all these qualities in the team that carries out the innovation process. When we take a more abstract look at all these qualities, we see that they involve process skills and knowledge, and we draw a distinction between those that are more managerial in nature and those that are more innovative, and between knowledge that is more technological in nature and knowledge that is more market-related, which, when combined, produce the following figure:

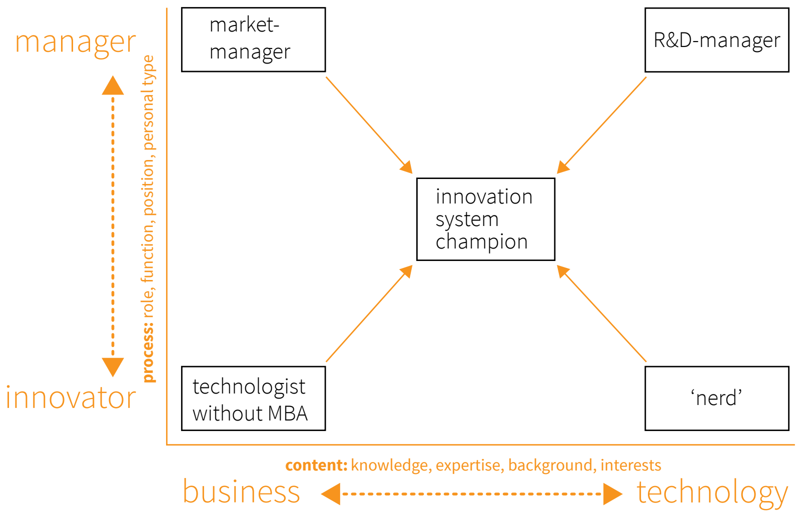


*Figure 4: Different knowledge-related and process-related roles in the innovation process*

Figure 4 shows that there can be various roles in the innovation process. It is easy to imagine that all the roles are necessary for a successful innovation project and it can also be imagined that bringing these roles together is essential and that, given the increasing complexity of (technological) innovation, coordinating all these roles is more and more a job for the product champion.

Networked innovation has expanded the required qualifications of the product champion. He or she not only needs to master the skills listed above, but also has to be able to communicate with companies in other industries and convince his or her colleagues of the importance and requirements of networked innovation. After all, a networked innovation process is a distributed innovation process, in which the roles are no longer assigned to the same people in the same organization, but to other organizations, sometimes organizations operating in different industries. This makes the job of the product champion even more challenging. He or she not only has to be able to switch between the various department in his or her own organization, but also be able to speak the language of other organizations in the innovation network. The additional qualifications are:

- Insight into value networks and value systems in which the organization plays a part.
- Not only insight into the needs of potential end-uses, but also into business models.
- The ability to assess the strategic consequences of collaboration with other organizations.
- The ability to look at innovation from an abstract perspective and look beyond the (mere) strategic interests of his or her own organization: what is societal value of the innovation and what are the possible interests of other parties?

The product champion who is able to add these skills to his or her repertoire will become a genuine ‘innovation system champion’, or someone who not only has the necessary organizational awareness but also a structured view of the overall innovation system, who is able to establish and maintain contact with parties operating in different industries and who understands and is able to explain the value of the organization to his or her own organization. However, like the traditional product champion, all these qualities will not be united in a single person, which means that the qualities will have to be present within the team.

# 7. Concluding remarks

Networked innovation has been receiving considerable attention, not just in practice but in science as well, albeit it shattered across a number of different subject areas. To understand the nature and development of networked innovation, integration would be a good thing. Management scientists can benefit from the role of institutions and the importance of technological development in networked innovation, while innovation system scientists would benefit from integrating more of an actor perspective in their models.

To understand networked innovation even better from a designerly approach, more attention would have to be paid to the various ways in which a network can develop. A static perspective on networked innovation does not do justice to their dynamic and (consequently) uncertain nature.

Finally, the emergence of networked innovation means that we will have to take a more nuanced look at what open innovation is and if it is indeed at odds with closed innovation. Also, there has to be more attention to the new interpretation of the role and qualifications of the product champion we currently find in innovation systems and who, to a large extent, has left the parent organization behind.

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