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Mutual Learning Exercise on Knowledge Valorisation: Networks and Processes

Topic 4 Discussion Paper

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Mutual Learning Exercise on Knowledge Valorisation: Networks and Processes

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Directorate-General for Research and Innovation

Directorate A — ERA & Innovation

Unit A.1 — Semester & Country Intelligence

Contact (Horizon Europe PSF coordination team):

Magda De CARLI, Head of Unit A.1

Stéphane VANKALCK, PSF Head of Sector, Unit A.1

Annamaria ZONNO, MLE Coordinator of the PSF MLE on Knowledge Valorisation, Unit A.1

Email Magda.DE-CARLI@ec.europa.eu

Stephane.VANKALCK@ec.europa.eu

Annamaria.ZONNO111@ec.europa.eu

RTD-PUBLICATIONS@ec.europa.eu

European Commission

B-1049 Brussels

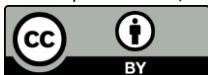
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Mutual Learning Exercise on Knowledge Valorisation: Networks and Processes

Discussion paper

Prepared by the Independent Expert:

Ellen Enkel

With support from:

With support from:

Katiuska Cruz

Ugo Dino Fonda

Stefanie Kalff-Lena

Mostafa Moonir Shawrav

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NETWORKS AND OPEN INNOVATION PROCESSES FOR KNOWLEDGE VALORISATION

1. Introduction

1.1. Scope of the topic

Knowledge Valorisation (KV) is one of the key objectives of the European Union's (EU) research and innovation (R&I) policy. It aims to create social and economic value from knowledge by linking different areas and sectors and by transforming data, know-how and research results into sustainable products, services, solutions, and knowledge-based policies that benefit society. Boosting knowledge valorisation is essential to deliver new responses to the challenges and opportunities currently faced by the EU, in particular the twin climate and digital transition but also general security, social and economic issues, and the competitiveness of the EU.

The MLE aims to help Member States and Associated Countries to improve their policies and public support for knowledge uptake and deployment, putting the focus on skills, intersectoral cooperation and incentive systems. The MLE should provide all ERA countries with a toolbox of good practices, measures and programmes that support the translation of research results and knowledge into value for society and the economy and support interoperability and diversification of research and innovation careers.¹ This Discussion Paper presents the background for discussion on the upcoming MLE workshop in Helsinki, Finland on Topic Four: Networks and Processes.

1.2. Purpose of the Discussion Paper

The purpose of this Discussion Paper is to set the scene by defining networks and process to valorise knowledge as well as help to analyse best practices to be seen in the workshop. The Paper also aims to identify the still open questions for policymakers about how best to build up and support networks best suited to countries' knowledge needs.

Starting with the existing knowledge about factors influencing networks performance, the Paper discusses different network structures, processes, and actors to reach various knowledge valorisation goals. The Paper exemplifies those networks by analysing best practices from the EC knowledge valorisation repository² and concludes with challenges and open questions that should be addressed and discussed in the upcoming MLE workshop in Helsinki, Finland (November 2023).

¹<https://op.europa.eu/en/publication-detail/-/publication/4851605e-cead-11ed-a05c-01aa75ed71a1/language-en/format-PDF/source-292745254>

²<https://ec.europa.eu/research-and-innovation/en/research-area/industrial-research-and-innovation/eu-valorisation-policy/knowledge-valorisation-platform/repository>

2. Networks for Knowledge Valorisation

2.1. General definition

According to the Palgrave Encyclopedia of Strategic Management (2018, p. 843ff) a knowledge network is an organisational form with which to support knowledge sharing and creation within and across an organisation's boundaries. It is comprised of a group of key experts who are the custodians of a well-defined knowledge domain that is important for the achievement of the network goal and the attainment of business benefits. This group of people, entities or organisations capture, share existing and/or create new valuable knowledge. This can be done, for example, by collecting relevant documents and summarising them to extract new knowledge, by transferring implicit knowledge into new implicit knowledge, by storytelling or the use of metaphors or by codifying know-how into documents in order to distribute them electronically (Nonaka and Takeuchi, 1995).

Additionally, a knowledge network can combine actors to valorise knowledge more effectively than a single organisation or actor could do. "Knowledge valorisation is the process of creating social and economic value from knowledge by linking different areas and sectors and by transforming data, know-how and research results into sustainable products, services, solutions and knowledge-based policies that benefit society. Boosting knowledge valorisation is essential to deliver more efficiently new solutions for building a greener, cleaner, and healthier future."³

Knowledge networks are influenced by their environment, such as the managerial and governmental system in which they are acting and the surrounding culture; they conduct knowledge processes such as capturing, sharing, and creating knowledge; and they are supported by tools such as information and communication tools as well as meeting time and physical/ virtual rooms. Knowledge networks differ from project groups or task forces by their organisational structure, contractual arrangements, a jointly agreed mission statement, but ultimately by their unlimited time frame. Per definition, the knowledge networks work on topics that need constant new knowledge creation e.g., due to technical advances or new legal requirements. Networks could lead to creating a regional ecosystem around a certain technology or creating more sustainable solutions for industries e.g., non-emission transportation of goods. Many best practices of a large variety of networks and approaches can be found in the knowledge valorisation database of the European Commission⁴.

³https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/eu-valorisation-policy/knowledge-valorisation-platform/guiding-principles-knowledge-valorisation-implementing-codes-practice_en#what-are-the-guiding-principles-and-codes-of-practice

⁴<https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/eu-valorisation-policy/knowledge-valorisation-platform>

2.2. Network Typologies based on the Knowledge Creation Processes

Nonaka and Takeuchi (1995) describe four core processes to create new knowledge (see Figure 1) by combining either tacit/implicit knowledge or explicit/codified knowledge. These processes can be done separately or in sequence (indicated by the spiral in Figure 1) until the desired knowledge outcome is reached. The processes can be done individually (individual learning, indicated as I in the below figure) or as a group/network (indicated by G) or a whole organisation (organisational learning, indicated as O). The supporting structure or environment (indicated as E, e.g., funding of infrastructure or personnel) can be a policy instrument, a region with its specific cultural setting or even an ecosystem with additional networks influencing each other.

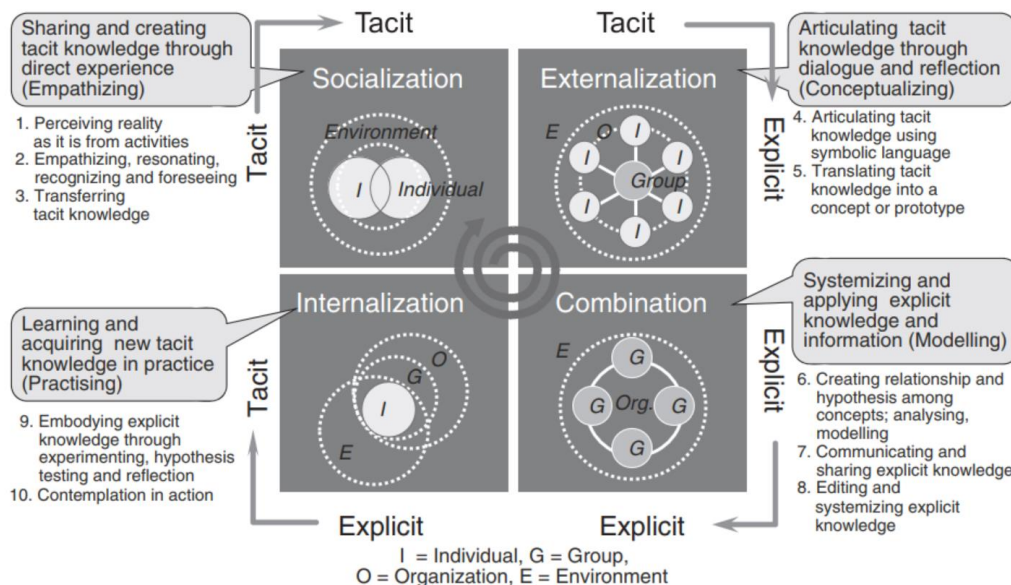


Figure 1. SECI Model of Knowledge Creating Processes (Nonaka and Takeuchi 2014, p. 858)

Back et al. (2005) used the SECI process model to develop blueprints for knowledge networks, where each of the processes is central for one network structure found within or across organisations. Based on those simplified blueprints, much more complex network structures can emerge e.g., national networks connecting regional networks or connecting networks with different knowledge outcomes (e.g., to create a national portfolio of networks needed to drive economic growth and target ecological challenges). From a policy perspective, in order to better understand which network is needed to create a desired outcome, we could use the blueprints as a typology. For example, a platform collecting, combining and analysing data to identify researchers, companies or entrepreneurs as collaboration partners (e.g., see ScoutingScience⁵) or codified knowledge as patents, tools or best practices (e.g., the Knowledge Valorisation Repository itself⁶, the Horizon Result

⁵<https://ec.europa.eu/research-and-innovation/en/research-area/industrial-research-and-innovation/eu-valorisation-policy/knowledge-valorisation-platform/repository/scoutingscience-ai-based-tech-transfer-scouting>

⁶<https://ec.europa.eu/research-and-innovation/en/research-area/industrial-research-and-innovation/eu-valorisation-policy/knowledge-valorisation-platform/repository>

Platform⁷ or the Regional Innovation Matchmaking Platform – RIMAP⁸) basically applies the **combination** knowledge creation process. Whereas a network based on **socialisation** would focus on bringing (diverse) people and organisations together in workshops and seminars as well as in a joint project setting (e.g., Innovation Matters Austria⁹ or ODIN platform¹⁰).

There are many more typologies for networks in literature. However, in this Paper, we will focus on differentiating networks according to the initiating organisation and actors (academia, industry, or multi-stakeholder networks) involved as the policy instruments and supporting mechanisms differ in each of them. **Academic networks** connect academic researchers to accelerate academic knowledge valorisation (e.g., by supporting student founders in academic accelerators or incubators, creating living labs for faster validation of research results in real environments, fostering the social application of knowledge, or connecting individual research labs to share infrastructure, individuals, and knowledge to accelerate innovation or connecting regional researchers in national or international networks). **Industry networks** connect corporate researchers and companies to accelerate the commercialisation of industrial knowledge in the form of, for example, joint ventures and new businesses within the partner organisations, start-ups or spinoffs, connecting different industries, connecting smaller and larger companies with different capabilities, infrastructure and skills (e.g., in open campus concepts to accelerate innovation and commercialisation). **Collaboration between industry and academia**, for example in a private-public partnership try to combine at least two different stakeholders, academia and industry, in order to build upon the different knowledge, infrastructures and capabilities of both. Whereas **multi-stakeholder networks** combine more than those two stakeholders but also entrepreneurs, politics and civil society to target bigger challenges at national or regional level.

As mentioned above, in order to create social and economic value, networks can comprise of actors, organisations and entities from different business areas, academic disciplines and sectors. The network partners are selected according to their organisation's or individual's knowledge and are supported by knowledge processes to share, combine and/or commercialise the new knowledge created. The new knowledge gained can also be valorised to create new services and products, standards and policies, business models and new startup businesses, etc. The setup or structure of the network (see SECI model above), and the selection of the network partners based on their knowledge, differ according to the incremental or disruptive results aimed for (see next chapter). As highlighted by the European Commission, boosting knowledge valorisation through networks is essential to better respond to the global climate, energy and health crises, for the benefit of the environment, society and the economy¹¹. Networks build a key element for efficient knowledge valorisation as they can connect the important R&I ecosystem actors including

⁷<https://ec.europa.eu/research-and-innovation/en/research-area/industrial-research-and-innovation/eu-valorisation-policy/knowledge-valorisation-platform/repository/horizon-results-platform>

⁸<https://ec.europa.eu/research-and-innovation/en/research-area/industrial-research-and-innovation/eu-valorisation-policy/knowledge-valorisation-platform/repository/regional-innovation-matchmaking-platform-rimap>

⁹Taken from the knowledge valorisation repository <https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/eu-valorisation-policy/knowledge-valorisation-platform>, further information on the network <https://www.wtz-ost.at/schwerpunkte/innovationmatters/>

¹⁰<https://ec.europa.eu/research-and-innovation/en/research-area/industrial-research-and-innovation/eu-valorisation-policy/knowledge-valorisation-platform/repository/odin-open-innovation-science-platform>

¹¹European Commission, Directorate-General for Research and Innovation, Guiding principles for knowledge valorisation – Council recommendation, Publications Office of the European Union, 2022, <https://data.europa.eu/doi/10.2777/380118>

citizens, and the public and private sector to co-create solutions focusing on use and re-use of knowledge.

3. Knowledge Processes in Networks

3.1. Combining the right network partner to valorise knowledge

According to Schumpeter (1934, p. 65) **innovation is mostly the recombination of existing knowledge**. If the knowledge assets recombined are common knowledge, incremental innovation is most likely the outcome. If the recombined knowledge assets are different, for example coming from different domains, industries, sectors, etc., the innovative outcome is most likely radical.

Nootebloom (1999; Nooteboom et al., 2007) and colleagues explain this phenomenon with their concept of **cognitive distance**. The more distant two knowledge assets are, the higher the novelty in outcome but the more difficult it is to understand and integrate the distant knowledge. When organisations or individuals learn new knowledge, they try to connect the new to already existing knowledge. For example, when a company learns about a new technology the engineer tries to connect the new learnings with his existing knowledge about technology development in order to understand and use this knowledge in the future. For the engineer the new knowledge had an optimal cognitive distance to learn from as to his prior experience and knowledge in the area. A person or organisation without prior knowledge in this area of technology development, equals higher cognitive distance, faces a lot of challenges to understand the new knowledge and consequentially, apply it in the future. We can not only learn from other individuals but also from organisations. If said engineer visits a research facility and observes their engineering process, he or she will understand and learn, if a person without prior knowledge of this or related areas of knowledge observes the processes, he or she will not understand what is going on and how to apply the observed knowledge to their own organisation as the cognitive distance of the knowledge presented is too high.

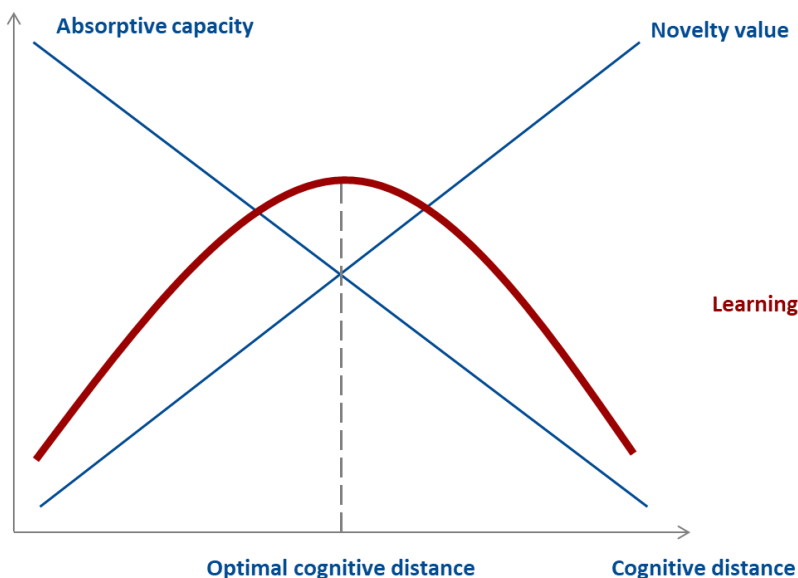


Figure 2. The relationship between cognitive distant knowledge, novelty of learning and absorptive capacity of an organisation or individual

Therefore, cognitive distance of knowledge is closely connected to the novelty of learning but also to the individual or organisational capability to absorb new knowledge (see Figure 2). There is an inverted U-shaped effect of cognitive distance on innovation performance: in the first instance, as cognitive distance increases, it has a positive effect on the novelty value of knowledge. However, when cognitive distance reaches a certain degree, the effect on the novelty value reduces as too much diversity hinders efficient absorption. Thus, organisations need to ensure that distant knowledge, once accessed, can also be adequately absorbed. Sometimes intermediaries can bridge the knowledge gap in order to help the organisation and their individuals to understand the new knowledge (Enkel and Heil, 2014; see Thematic Report on Intermediaries for more information).

In this Discussion Paper we primarily focus on **multi-stakeholder networks** where cognitive distance of knowledge is a given due to different backgrounds, academic or industry knowledge as well as different goals and perspectives. However, taking this into account, the risk related to knowledge valorisation in multi-stakeholder networks due to the variety of members knowledge and agendas might be higher than more homogeneous networks but the gain in novelty of knowledge and consequently innovation will be higher too. Therefore, we need to understand from a policy perspective which framework conditions, supporting mechanisms, funding schemes or skills are best suited to foster multi-stakeholder networks and increase the likelihood of valuable knowledge creation and application in a commercialised form of new products, services, businesses as well as social applications of knowledge and even excellency clusters. Understanding knowledge absorption and learning will help policymakers to decide how best to support those networks. In our MLE workshop in Helsinki we will therefore take a closer look at two multi-stakeholder networks, the Vasa energy cluster and the Aalto university network, to analyse and discuss which framework conditions, incentives and other supporting mechanisms are in place to build up and maintain these networks.

Absorptive capacity theory explains how we learn and by doing so create new knowledge. Absorptive capacity is an organisational and individual ability to evaluate, assimilate and commercialise knowledge that originates outside the organisation. Cohen and Levinthal (1989, 1990) popularised the concept with their model describing R&D as having dual roles as a source of innovation and as a means of enhancing the firm's ability to learn and therefore, engage in open innovation activities. This popular theory explains knowledge flows across organisations and individuals and therefore, explains how knowledge flows between partners in networks and if they are able to learn from each other. Consequently, the sub-processes of absorptive capacity help us to identify the right network partners and explain the processes within the network.

In order to gain new knowledge or learn from an organisation or individual we first have to **recognise** the knowledge as valuable for us. In Figure 3 below there are several examples of how the subprocesses can be supported with organisational or network activities (see Figure 3 adapted from Lichtenthaler, 2009; Cummings & Teng, 2003; Jaworski & Kohli, 1993). The initiator of the network must recognise organisations and individuals with valuable knowledge. In order not to miss valuable but too distant knowledge that the initiator therefore doesn't recognise as valuable, the integration of an intermediary with a wider range of knowledge would be beneficial.

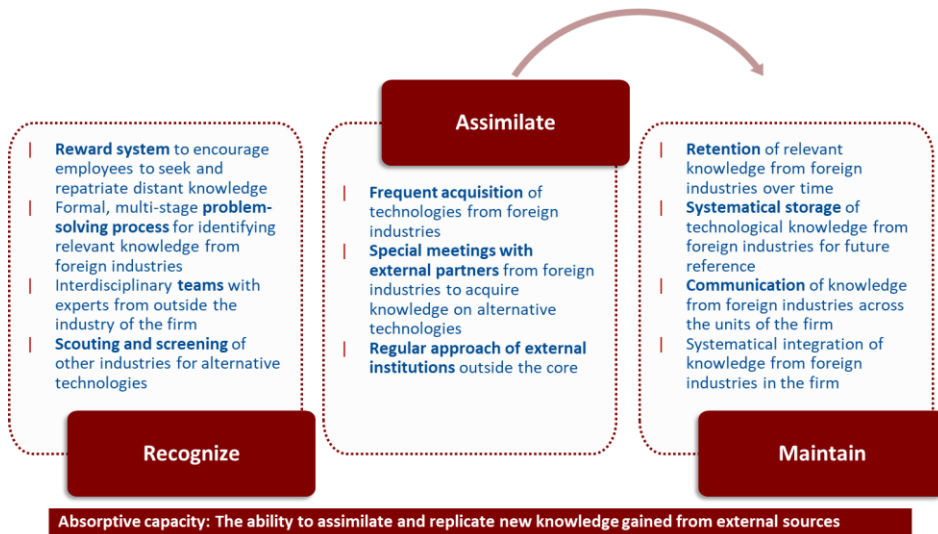


Figure 3. Potential Absorptive Capacity Sub-processes to identify and access external knowledge

On the next step, the **assimilation** of knowledge from the different network partners is facilitated by knowledge transfer processes in meetings or exchange of documents, personal or similar needs. Knowledge is often not codified in an explicit form of documents or artifacts but often **maintains** implicit know-how within the heads of the people (Nonaka and Takeuchi 1995). Therefore, personal interaction in workshops, learning by doing exercises or joining working groups are better means to access this valuable implicit knowledge. As the network exists outside of each member organisation’s structure, the knowledge gained needs to be **transferred** back into the main organisation or to other members not participating in the knowledge-creating activity (see Figure 3). Often, the gained knowledge might not be needed at this moment but at a later stage, therefore storing and documenting the knowledge in order to **reactivate** and **recombine** it later is crucial for learning organisation.

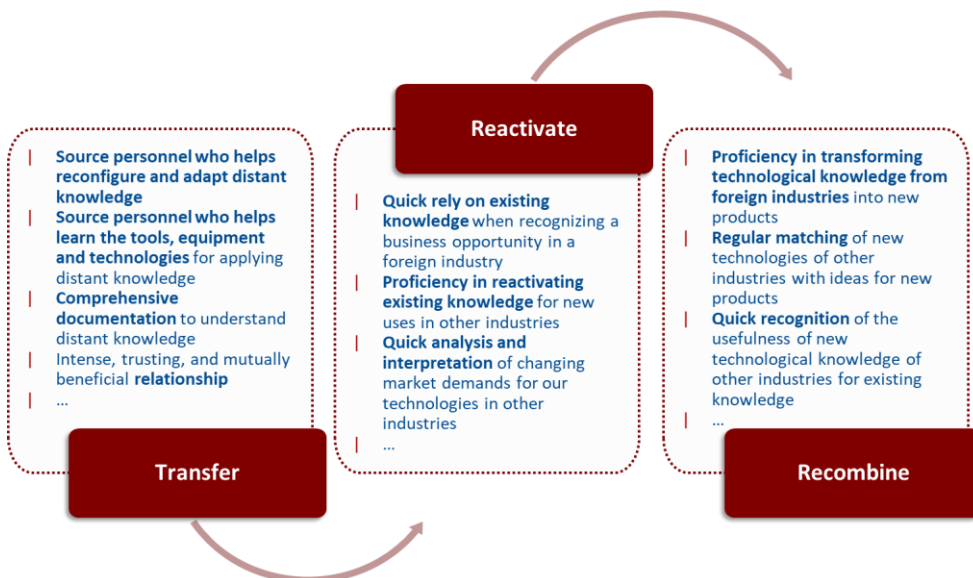


Figure 4. Realised Absorptive Capacity Sub-processes to transfer and apply external knowledge

We can assume that these sub-processes are differently taken care of in academic, civil society and industrial networks and organisations. All have different tools to identify valuable knowledge, different preferred instruments to facilitate assimilation and maintain the valuable knowledge in their networks, different framework conditions to share and collaborate in networks as well as to reactivate and recombine the knowledge at a later stage or for different goals. In order to learn more about those differences and which framework conditions are most supportive, we will study different academia, societal and industry led networks like the Business Finland Deep Tech accelerator pilot, the Tampere living lab approach, the Slush entrepreneurial ecosystem and the Forum Virium urban innovation lab at the Helsinki MLE workshop.

Open questions to be discussed in the MLE workshop should consequently focus on best practices and tools for policy makers to incentivise, promote and support networks that are able to recognise, assimilate, maintain, and transfer valuable knowledge as well as how best to reactivate and recombine valuable knowledge for later knowledge valorisation. We will discuss:

- What are the pros and cons of the different network structures (e.g., industry accelerators, living labs, academic networks, multi-stakeholder networks, etc.)?
- What conditions and support are needed to create favourable conditions for the creation of networks? What role or intervention of the public sector would be desirable?
- Is there an ideal portfolio of networks for knowledge valorisation in place in your country?

3.2. Social integration mechanisms as microfoundations for networks

To facilitate the above-described absorption of new knowledge in networks, social integration mechanisms are needed. These micro-foundations create the social structures, context, and interaction between units and are fundamental to an organisation's ability and motivation to transfer and absorb new knowledge. Those micro-foundations are **systematic communication, internal and external connectedness as well as socialisation**.

Although email, collaborative platforms, and other IT tools might seem the ideal way to transfer knowledge between network members which can be codified in a document or presentation, it must be ensured that the codified knowledge is systematically communicated to the right people at the right time, and that the email contains the right amount of information in the appropriate technical language, etc. In order to transfer non-codified, implicit knowledge, email is not enough. Implicit knowledge transfer requires frequent interaction in physical meetings (e.g., through geographical closeness and frequent meetings), mechanisms that foster trust, and a certain emotional connectedness are particularly beneficial (e.g., early IAM agreements, career benefits). Connectedness to internal or external partners improves the frequency and effectiveness of interaction (e.g., in meetings of the network, researcher exchange) and knowledge transfer, creates trust, broadens the range and sensitivity of topics discussed and naturally generates opportunities for the exchange of feedback. Finally, an understanding of the organisation, network members or context into which the external knowledge has to be absorbed and how partners interpret and react to specific actions or simple contact further facilitates the transfer of both codified and non-codified knowledge. By creating common values, common norms of communication and a background understanding, organisational socialisation fosters social integration and hence greatly benefits knowledge absorption. It might even lead to an entrepreneurial culture in which entrepreneurial practices are promoted.

Open questions to be answered at the MLE workshop in Helsinki could be around best practice tools and supportive conditions utilised in the national network examples in the area of micro-foundations of knowledge valorisation in networks.

Therefore, successful tools and practices for systematic communication of valuable knowledge within and outside of the network, internal and external connectedness of knowledge owners as well as supporting the socialisation of knowledge owners could be discussed and adapted.

3.3. Open innovation processes to support knowledge valorisation in networks

As mentioned in the expert report “Boosting Open Innovation (OI) in the European Union”¹², in its original version of OI it was defined as the purposeful outflow and inflow of knowledge into the innovation process (Chesbrough, 2003). This includes, for example, the search for new technologies outside of the firm’s R&D department, the integration of customers’ ideas, co-development with suppliers and the spin-off of new businesses not fitting the core strategy. OI is here a strategic decision of the company to increase and accelerate innovativeness and/or efficiency by using external resources. This approach to innovation management is widespread in Europe although the degree of openness varies in companies with different strategic approaches and sizes.

Open Innovation 2.0, coined by Henry Chesbrough as the evolution of open innovation processes between organisations towards including multiple stakeholders within an ecosystem, means, on the one hand, that a specific innovation cannot be seen as an isolated activity without considering the consequences for its entire economic and social environment. For instance, the invention and the extended use of smart phones have significantly changed customers’ behaviour, created by this new market and fostering new opportunities for further innovations. On the other hand, close collaboration, interaction and exchange among all stakeholders in an innovation ecosystem addressing business and social opportunities or challenges can lead to higher impact of innovations. These incorporate the development of new products, services and/or business models to address relevant socio-economic issues such as green growth, health care, nutrition, sustainable energy supply or the digital economy. Stakeholders and participants in such an ecosystem can include business entities, universities, intermediate public and private research organisations, but also governmental organisations and agencies as well as citizens, societal interest groups and entities of the financial sector. Multi-stakeholder networks can develop into ecosystems with enough reach towards the indirect, not yet network members, that will be influenced by the networks innovation activities in the future. Within such an ecosystem the relevant participants engage with each other, through multiple channels, even by the means of pooling their internal resources and equipment, including knowledge, technology, finance, people, markets, and data. These interactions can include various kinds of smaller and larger networks, industry-academia collaboration or joint ventures to name a few.

The European Commission published in their 2014 report various implications of the Open Innovation 2.0/ecosystem concept for different stakeholders and participants:

¹²European Commission, Directorate-General for Research and Innovation, Wellen, D., Vermeulen, E., Andersen, B. et al., *Boosting open innovation and knowledge transfer in the European Union – Independent expert group report on open innovation and knowledge transfer*, Publications Office, 2014, <https://data.europa.eu/doi/10.2777/72620> p 23ff

- Markets are not just spaces and places where supply and demand for goods and services meet, but they underpin the design of business models, networks, sectors and places.
- Besides traditionally serving markets, business entities will build new structures to better absorb externally developed knowledge from public and private knowledge spheres into their organisations if beneficial. They will then in addition enhance their co-creation capabilities to contribute to the development of new academic knowledge.
- Universities and PROs are not just suppliers of knowledge and talent but must be ready to grow and build structures which incorporate the needs of their users, be they businesses, the public sector, students or citizens, and implement solutions to these needs through their strategies. They thereby become real-time co-creators of new solutions alongside their basic missions of talent development and knowledge creation.
- The financial sector supporting entrepreneurship are not just suppliers of knowledge and equity to enable innovations. New models, based on improved absorption and deeper understanding of the specific opportunities and needs of businesses and entrepreneurs, can offer benefits in relation to the regions, markets, sectors and networks they operate in.
- The European Commission, as well as national and regional governments, are not just regulators or facilitators via project grants. They must become more active, enabling co-players in the innovation ecosystem by, for example, also acting as convenors of intellectual property platforms (addressed below) and as buyers and investors via fiscal incentives, such as through public procurement, innovation vouchers and tax credits and by creating a market environment conducive to firm growth and internationalisation.

As said in the beginning of this Discussion Paper, boosting knowledge valorisation through networks is essential to better respond to the global climate, energy and health crises, for the benefit of the environment, society and the economy¹³. Multi-stakeholder networks can especially connect the important R&I ecosystem actors including citizens, the public and private sector to co-create solutions focusing on use and re-use of knowledge as they gain access to unique knowledge outside of the sector, scientific field or industry in order to valorise knowledge leading to disruptive innovation. Therefore, they might have the most direct influence on a country's wealth and property, whereas more local or regional oriented academic or industry networks will most likely have an indirect or long-term influence on a country's knowledge valorisation based wealth and growth.

Open questions to be answered at the MLE workshop in Helsinki could be:

- How do you create framework conditions to **establish open innovation processes in networks** in key academic and industrial organisations where there is a purposeful inflow and outflow of knowledge to be valorised, and value creation and knowledge ownership remains within the respective organisations?
- How can we create and maintain societal actor networks, living labs, etc. to advance and accelerate social innovation? How can governments and private organisations collaborate effectively to drive innovation and address societal challenges?
- How can we create ecosystems (open innovation 2.0) to better respond to the global and national climate, energy, and health crises without the long-term dependency on governmental funding?
- Do we need to link successful national multi-stakeholder networks and ecosystems on an international level to profit from knowledge exchange and enable knowledge valorisation for the European Union? How?

¹³European Commission, Directorate-General for Research and Innovation, Guiding principles for knowledge valorisation – Council recommendation, Publications Office of the European Union, 2022, <https://data.europa.eu/doi/10.2777/380118>

4. Conclusion

Networks are organisational forms to support knowledge sharing and creation because networks can combine actors to valorise knowledge more effectively than a single organisation can. As there are different forms of valorised knowledge, there are several typologies of networks according to the organisation and actors involved. Networks can be based on socialisation, externalisation, combination or internalisation processes to create new valuable knowledge. Multi-stakeholder networks can connect the R&I ecosystem actors including citizens, the public and private sector to co-create solutions to benefit society and can grow into ecosystems which extend the influence of a single network to a larger area of influence on direct network members and indirect influencers (e.g., government or society). Networks are influenced by their environment, including the governmental system in which they are acting. Understanding the important role of networks for knowledge valorisation and which facilitating conditions are best suited for all stakeholders involved, will help us to discuss during the Helsinki MLE workshop how policymakers can support and foster the success of networks.

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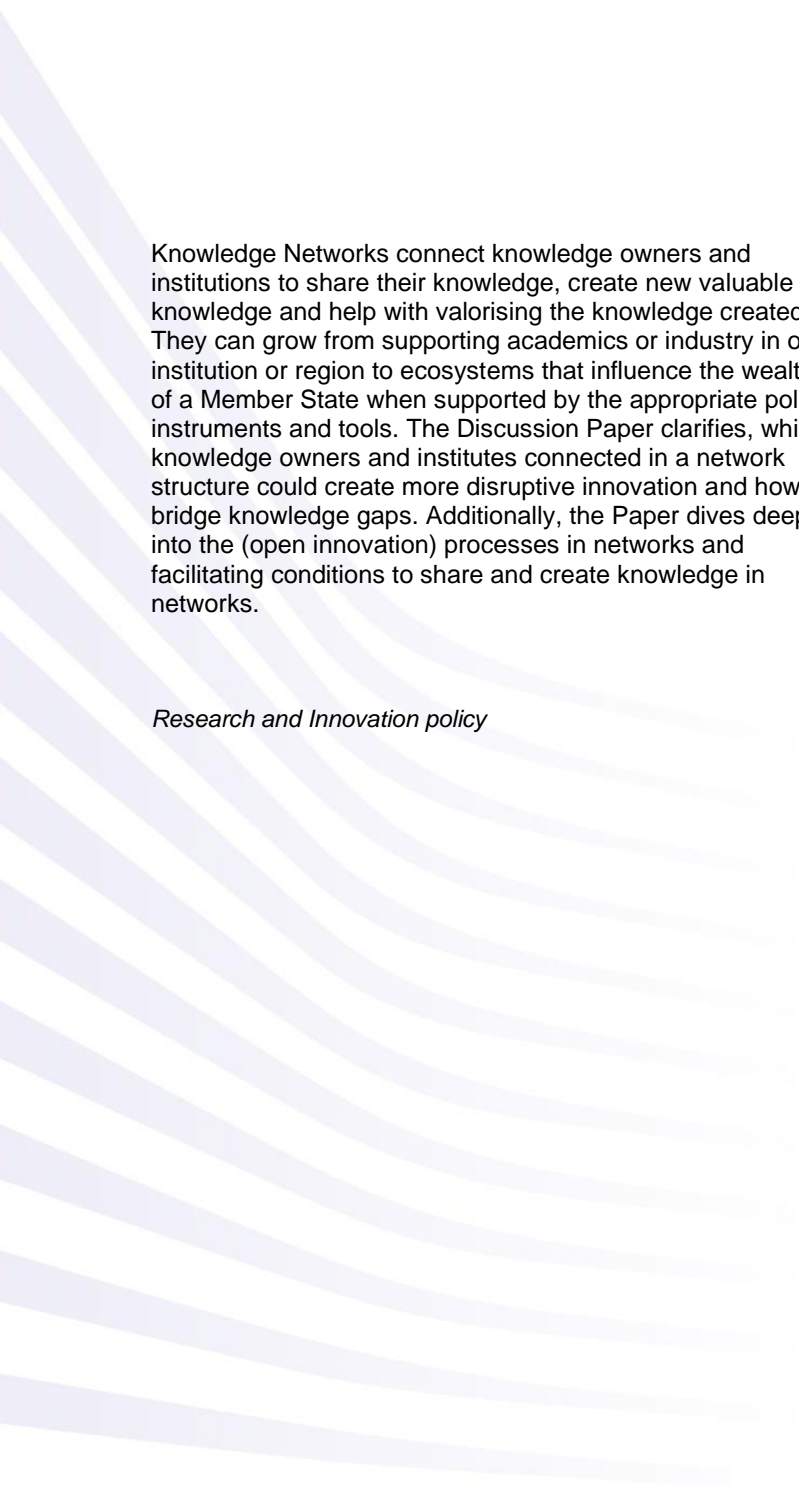
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Knowledge Networks connect knowledge owners and institutions to share their knowledge, create new valuable knowledge and help with valorising the knowledge created. They can grow from supporting academics or industry in one institution or region to ecosystems that influence the wealth of a Member State when supported by the appropriate policy instruments and tools. The Discussion Paper clarifies, which knowledge owners and institutes connected in a network structure could create more disruptive innovation and how to bridge knowledge gaps. Additionally, the Paper dives deeper into the (open innovation) processes in networks and facilitating conditions to share and create knowledge in networks.

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