19 Circulating Knowledge through Intermediary Objects in Scientific Cooperative Networks

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Abstract

Alongside texts, scientific knowledge takes many other forms, including embodied knowledge and "know-how". However, there are many other ways of circulating information and knowledge: through samples, instruments, compounds, animals, patients and phantoms. This chapter explores the diversity of circulating intermediary objects and the associated processes of preparation, logistics, reception and use, the structuring effects of community and scientific dynamics and their epistemic effects. Field research following intermediary objects reveals otherwise invisible actors and practices. It also makes it possible to study interdisciplinary research practices, including those involving non-academic actors, locally or globally.

Introduction

Alongside texts, scientific knowledge takes many other forms, including embodied knowledge and "know-how". However, there many other ways of circulating information and knowledge: through samples, instruments, compounds, animals, patients and phantoms. To study knowledge circulation (KC) between interconnected places and linkages along the paths articulating sites where knowledge is produced, transformed and used, we suggest using the concept of *intermediary object* (IO) as a research-enriching tool. The methodological idea is to follow objects of any kind as they move from one site to another. Field research following IOs reveals otherwise invisible actors and practices. Exploring the diversity of circulating IOs and the associated processes of preparation, logistics, reception and use, this approach allows studying the structuring effects of socio-scientific dynamics as well as of the epistemic effects. It helps to reveal activities, actors and processes. It also provides accounts of localities without losing sight of their connections and of contingently settled activities across organisational borders. It serves to draw the spaces constituted by translations of IOs.

The attention paid to the circulating IOs then reveals that scientific information, taking the form of written documents, only represents a part of the circulating knowledge. Monitoring IOs reveals a completely different picture of academic production, which complements studies on publications and their translation, and on digital writings.

The suggestion to follow humans and non-humans (Latour, 1987) reflected the idea that the social world could not be sustained without non-humans (Latour, 1996). Social, epistemic and scientific matters are ordered via material things. Thus, it would be relevant to grasp the force of things and to look at how social and material relations intertwine (Carlile et al., 2013; Pels et al., 2002) and how materiality renews the entry into social theory (Latour, 1999). The hypothesis that people's relationships to materiality and society are mutually dependent (Appadurai, 1986) calls for studying the artefacts and gestures involved in knowledge production, circulation and use. Thus, the approach focuses on material accomplishments, among other aspects, including acquisition and display of material, skill, crafts and technology. Kopytoff (1986) suggested studying their biography and changes in terms of versions, statuses and forms. Artefacts can be seen as testimonies, symbols or indicators of epistemic and social orientation, dissemination of

knowledge and a stage in the evolution, but they also open the way to look at associated gestures and the forces shaping knowing processes and products. Grounding the Actor-Network Theory (ANT) agnosticism (Callon, 1986; Latour, 1993; Law, 1991, 1999) with the ontological hypotheses of the hybrid character of sociotechnical collectives, and of "interobjectivity" of the social order (Latour, 1996), this approach leads to distancing oneself from modernist categories opposing science and society.

The chapter will first trace how the IO concept emerged as part of a sociology-of-science investigation spanning more than 120 scientific cooperation networks in biomedical research (Vinck, 1999; Vinck et al., 1993). We then look at a few case studies from Colombia that explore what such a focus could reveal of knowing practices at the level of emerging research networks. In the third section, we show how IOs could be theorised as a form of representation, translation, mediation and framework. In the fourth section, we briefly show how the concept applies to the study of innovation (Vinck, 2003, 2011; Vinck & Jeantet, 1995). Having showed how the concept was used, we highlight the concept's descriptive and analytical capacity when applied to a field study. We then conclude by situating the theoretical perspectives about IOs regarding closely related concepts and highlighting the empirical interest, especially for its capacity to reveal otherwise invisible actors and practices, and we suggest potential applications to common, unspecific and apparently unimportant knowledge spaces. We hypothesise that by following these IOs, it is possible to produce another picture of KC.

Scientific Cooperative Networks: The Relevance of the Intermediary Object

In the first section, we retrace the emergence of the IO concept inside a sociology-of-science investigation, the aim of which was to understand what networking means.

During the 1980s, scientific cooperative networks (SCNs) were considered a promising way to organise scientific work throughout Europe. Promoted within the framework of public research programmes, they resulted from a political decision to structure scientific work around projects and goals, favouring cooperation between research groups and potential users in industry and health. Although international formal and informal SCNs had already existed for a long time, the European Commission's involvement reflected the growing popularity of these new forms of scientific work organisation. The idea was to gain more from the collaboration than investing in big research centres, which are difficult to reorient according to the scientific and societal agenda (e.g., the emergence of a pandemic such as HIV or COVID-19).

However, what was going on inside these networks, how data and knowledge were shared and circulated inside and how this could affect research directions and efficiency remained unknown processes. It was a political and scientific belief that scientific communication, joint discussions and data circulation would enforce the European scientific endeavour. Our project was then to investigate how networks make possible not only the circulation of knowledge, but also switching their status from knowledge-tied to local scientific practices towards statements having a "universal" validity and relocated into various sites as research outcomes. How and why remained unknown.

To explore this KC, we investigated over 120 SCNs in the health field (Vinck, 1992, 1999; Vinck et al., 1993). These networks brought together 3,500 research teams, industrial companies and clinical services. Our survey characterised the actors, the agreements binding them together

and their networks' organisational form. We also considered the content of their activity, their objectives and expected results.

More Than Words and Data

The investigation revealed that networks were not only forums for discussion and the trading of ideas between researchers, with knowledge flowing through words, data and diagrams, but they were also research infrastructures due to which a huge diversity of IOs were put in motion.

In the theme-based forums bringing together researchers, KC depended both on formal and informal communications regarding ongoing research projects and questions, approaches and intermediary results, and on the circulation of the people visiting each other, performing demonstrations and questioning their colleagues on site. Therefore, embodied knowledge was KC's key component. Studying this thus implies counting how many researchers, students and technicians were moving, between which sites, how long they worked together locally and how to draw their circulation.

In other networks, the dynamics differed. In place to meet each other or to circulate people, the involved research teams negotiated a protocol aimed to master producing and circulating data files and samples. It was a question of both logistics (through which canals, transportation systems and formalities – avoiding customs' tediously long withholding of biological samples; through which conditioning to ensure these IOs' stability; and through which labelling to use to avoid their loss during the translation) and social order (which teams would send what to which other teams). Working this way, these networks performed clinical trials, gathering, comparing and aggregating much more data than they would otherwise be able to do. Once these research infrastructures were in place, they could be reused for other trials or investigation, thus creating a special space for collective scientific production.

In some cases, infrastructuring of KC depended on the design and construction of specific equipment, such as a centralised data bank or cell bank, involving a committee responsible for harmonising sample preparation and deciding on other teams' access.

In other networks, the KC space involved drawing up product specifications that all research teams had to use for their results to be comparable. Thus, they engaged design and negotiation with industrial producers to allow the entire scientific community to place group orders and to distribute products to research teams with validated projects. Without such structuring, the circulation of standardised IOs and the resulting data from the different research teams could not be compared and aggregated. In some cases, the involved teams also circulated products, samples and pieces of equipment to organise inter-comparison and protocol standardisation.

Many Types of Knowledge Materialisation

The investigation focusing on these IOs that were circulated between the network members has identified many texts (reports, technical documentation, specifications, blank and completed forms, decision-making trees, catalogues, mails, etc.) as well as computer files, biological samples (strains, DNA probes, tissue sections, etc.), reagents, instruments or pieces of instruments, animals (e.g., transgenic rats, laboratory dogs) and even phantoms (human substitute-like standard skull for hyperthermia) and patients sent to another hospital as an exemplar of a rare disease.

Researchers and technicians are embodied knowledge (living scientific archive, tacit knowledge, efficient embodied routines), but protocols, data series, samples and phantoms are also pieces of

knowledge due to their design and preparation; they materialise some aspects of a scientific approach and of expertise. Instruments are materialised theories and protocols. Thus, studying KC would take advantage of their close inspection, similar to how we could with a text, its semantics and syntax, format and traces of use (such as annotations).

A Focus of Attention for Knowledge Producers

Through interviews, labs visits and observations of scientific workshops, the researchers' focus on these IOs, their preparation, packaging, circulation, conservation and conditions of use and of destruction impressed us. In terms of time and resources, they attracted more attention than the research projects' epistemological aspects.

In fact, involved actors were looking at their slightest details, exploring their relevance and capacity to support, extend or transform (unexpected bias, new possibilities) the scientific action undertaken. They care about IOs and their equipping (Vinck, 2011) because they anticipated or experienced the scientific dynamics and their results depended on their mastery.

Following the focus of researchers' attention (asking where IOs came from, how they were circulated and what the actors did with them), we could document various practices, and even invisible actors, involved in preparing these IOs and the logistics of their circulation and conservation, associated to their use. Thus, these unseen actors (e.g., a lab assistant or big private company imposing its rules for sample circulation) and practices became part of the account of KC. Following IOs provided a better view on actors and practices otherwise difficult to pinpoint in their formal presentations of the network and their rationales, challenges and epistemological considerations.

Considering these IOs and associated practices led to observations on how they participated in structuring the research activities, harmonising researchers' practices and constituting a KC space. Their mastery was aimed at stabilising pieces of knowledge (research ideas, statements); their appearance seemed to punctuate the life of both content and social configurations.

Knowledge Circulation in and between the Global South and the Global North: Extending Research Networks

The IO concept emerged in the context of studying a European policy expecting to enforce Europe's position in a global and competitive scientific community. Benefiting many research teams in different countries, the idea was to gather them to favour synergy and avoid duplication, as well as a European integration between founding countries and newcomers, big and small countries and the north and south of Europe. Scientific networks were invented forms of international integration (Vinck, 1996). Following IOs helped to document these scientific and political dynamics going through KC.

The concept also appeared fruitful for studying Southern scientific dynamics. Through three Colombian case studies, we observed research teams engaging in scientific cooperation between institutions with scarce resources in the South and establishing partnerships with institutions in the Global North. These cases studies documented the IOs' structuring role on the dynamics of KC among different contexts, beyond the perspectives of subordinate integration (Kreimer & Meyer, 2008). In the first case, researchers from two Colombian universities (researchers from chemistry, physics, modelling and simulation in the first one, and from medicine and microbiology in the other) engaged in a joint research project to carry out the green synthesis of silver nanoparticles from plant extracts in order to take advantage of their biocidal capacity in

health applications. The second case was a research team working on molecular genetics, circulating IOs in national and international joint works. The third case was a collaboration between two Colombian universities and a French university on materials and Mössbauer spectroscopy, in which researchers from chemistry and physics develop joint projects around the synthesis and characterisation of materials.

Shaping the Intermediary Object

Articulating the work for green synthesis went through a discussion of the research questions and the confrontation of research interests and resources. Physicians and microbiologists wanted to achieve a biocidal effect with novel substances while chemists were interested in the process of green synthesis. This appeared to be a classical division of work regarding the respective expertise of the involved teams. However, the involved teams engaged in a mutual learning process, circulating information regarding their approaches, expertise and challenges. Interacting through words was not enough to build a sufficiently precise shared vision. The IOs contributed to reaching agreements on the research questions and on the way to divide and articulate the joint project. The discussion led to specifying the materials on which to work was to be done, considering the constraints related to the involved teams' research practices. Selecting the material to become the future IO has led to narrowing down the problem to be addressed. Thus, its definition entered the articulation of the research question.

On another side of the material on which to work, the selection of plant extracts depended on the capacity to generate original research (there was an absence of previous publications of their use in similar applications) and their availability, which a genetic resource protection legislation limited. Thus, the *borojó* extract met the established criteria. Further, following this object, an actor entered the network: the supplier company that complied with the legislation's requirements.

The study case of the molecular genetics team also showed a collective work around sample definition and the logistics for their circulation. To collaborate with other national research groups, they needed to collect bacteria in several of the country's cities in the same period and receive them in Bogotá. This process depended also on involving medical researchers at each site and defining a method and logistics that would keep the bacteria alive. These sample preparation methods and the logistics of shipping through a national network opened new perspectives in terms of international scientific collaboration, allowing the transportation of samples to Australia for their characterisation with more sophisticated equipment.

Shaping Knowledge Circulation through and around Samples

Developing samples of the synthesised materials went through further KC among researchers because they needed to reach agreements on the characteristics of the IOs to be circulated to favour exchange. Shaping the samples led to making visible the heterogeneity of knowledge and practices. For the chemists, sample preparation involved removing the biological component to send the "purest possible" nanoparticles to doctors and microbiologists. Furthermore, they designed samples on which the chemical characterisation was documented – an equipping work (Vinck, 2011) of the samples – but this was not revealed to the biomedical team before they performed their biological tests. Thus, they circulated "nude" IOs, from which the associated chemical knowledge remains separated. Shaping these samples has made visible the differences between disciplinary practices and their articulation. They learned how to advance interdisciplinary work. In this two-way circulation of samples, researchers explored, tested and

consolidated both the chemical synthesis and the biocidal properties. In a similar way, the biologists – in the case of the molecular genetics team – highlighted the collaboration with doctors to define interesting bacteria on which to work, showing that IOs embody a phenomenon to study; the samples incorporated potential new research questions and knowledge. In the case of materials and spectroscopy topics, samples were sent to the French laboratory to investigate corrosion, giving the French researcher the opportunity to work on a new topic.

The circulation of samples between Colombia and France regarding materials and spectroscopy topics also supports learning processes. The samples of materials synthesised in Colombia were analysed in France and, after repeated circulations, the involved teams improved the preparation method. The samples incorporated technical expertise and their circulation allowed generating learning processes.

When Instruments Lead to Extended Knowledge Circulation

Access to tools motivates some exchanges between researchers. In the case of green synthesis, a part of the work revolved around instruments. Researchers negotiated their access to robust equipment for sample characterisation identified equipment to be acquired for the synthesis and circulated information about standards the suppliers used to decide on the most suitable one. The access to instruments helped both the interdisciplinary integration and the extension of the network to another national team and a Mexican laboratory. Biological and chemical syntheses were contrasted and the results were compared to decide their translation into publication or return to the experiment.

These circulations expended networks. For the molecular genetics team, the research infrastructure in Colombia, on the one hand, allowed establishing collaborations with Mexico to receive samples from them and have a greater variety of bacteria to study. On the other hand, they took advantage of a link with a Colombian researcher who was working in a laboratory in Australia to conduct joint activities, such as internships in that country, and sending samples to be analysed with more sophisticated equipment. Following the IOs led to drawing an expanding scientific network.

Following IOs also make visible actors who would otherwise remain unseen in scientific networks. In the case of the work on materials and spectroscopy, a technical problem that Colombian laboratories faced regarding a cryostat led them to connect with a technician in the French laboratory who was an expert in vacuum technologies. A Colombian researcher visited this laboratory carrying part of the equipment in his suitcase so that the technician could repair it. This piece of equipment, in addition to embodying knowledge, unfolded new actors in scientific collaborations.

Theorising Intermediary Objects

In this section, we will show how IOs could be theorised as a form of representation, translation, mediation and framework for studying epistemic, material and social knowledge dynamics throughout the world.

Intermediary Objects as Knowledge and Knowers Representations

Besides giving access to actors and practices, IOs are also sites where representation processes occur. Intentions and meanings are inscribed in their materiality and they shape their properties. Formatting a data set, designing a piece of an instrument or packaging a biological sample result

from a state-of-the-art practice, from accumulating tacit and formal knowledge and from decisions taken regarding the scientific question to answer, the hypothesis to be explored and the elected approaches. Thus, an IO represents those who designed it and the identity they defend, their societal and scientific preoccupations, their practices, expertise, working or thinking habits and their methodological strategy, which are compromises made with colleagues that are sometimes powerful or hegemonic. Thus, the resulting IOs also reflect social and scientific norms specific to a research milieu, and interactions and negotiations between actors (researchers from different disciplines and status, providers of resources). In this respect, looking at the IO provides information about its authors and the sociotechnical conditions of its activity, about its research journey and the contingencies that arise.

Among the scientific intentions leading to producing and circulating IOs is the idea to represent a phenomenon under study. Therefore, IOs are not just a straightforward social construction because they are designed and used as reliable mouthpieces of a biological, chemical or physical phenomenon. They must channel fragments of a phenomenon to contribute to KC and production. All sides of this representational process, sociotechnical construction and phenomenon to be channelled are intertwined; IOs are associated with operative and interpretive frameworks resulting from arduous discussions between researchers and their partners. The IOs' materiality helps to stabilise collective knowledge, as far as researchers try to master them to ensure they will become vectors of both established and yet-to-be-produced knowledge. They carry actors' expectations regarding future scientific results and potential outcomes. A sample represents a potential data set, which could be translated into a scientific paper.

Intermediary Objects as Translators

IOs are a mix of intentional moves and compromises with materiality and uncontrolled shifts. Moving from the scientific intention to its materialisation engages a transformation (Latour, 1995) – for example, imposing some decision to ensure the material or formal coherence, or opening new possibilities. Thus, IOs cannot be reduced to their authors' intentions or social relations. Along the same lines, the IOs expected to represent a fragment of the phenomenon under study are transforming this phenomenon (isolating it, fixing it, etc.) (Knorr-Cetina, 1995), according to the sociotechnical practices within a research community and infrastructure. When it is materialised, something different occurs (e.g., a new vision of the object) and some shifts translate the moving knowledge (e.g., attracting the attention on unanticipated details). In the same way, realising IOs sometimes opens new perspectives, such as when a biological tissue is coloured and it reacts in unexpected ways and produces an interesting and challenging artefact. The resulting objects generate something different from the original aim. The materiality or the formalism used introduces something new to the action (Almklov, 2008), which can be opaque, leading to discussions between researchers on the way to interpret the unexpected phenomenon. Thus, we observed how researchers strongly invest in IOs to control the objects' meanings not only because they know how risky the translation process can be, but also because the exploration of their opaqueness is a source of new knowledge.

Intermediary Objects as Mediators and Operators of Change

IOs are also mediators between actors. They support interaction and negotiation as they offer each one something they can grasp from their usual point of view. These viewpoints then find an anchorage, allowing some convergence (e.g., drawing connections between otherwise disassociated aspects) or divergence (e.g., dependency relation). IOs sometimes appear precisely

when the involved actors do not understand each other; these objects then disappear once a level of mutual understanding has been achieved (Lefebvre, 2003). Involved in interactive dynamics, they not only contribute to the emergence of a shared approach or a partially mutual understanding, but also support the aggregation of different decisions leading to a collective interpretation or solution. Mediating KC, IOs foster, complicate and orient the sharing of knowledge, support the collective memory and build new knowledge.

In addition, IOs act as markers and operators of change in the collective dynamics. A draft version of a protocol stimulating the discussions, the final version reflecting a consensus and its dissemination transforming it into a prescriptive tool all shape the dynamics and contribute to KC, but they are associated to very different impulsions towards action. They progressively either open the discussion and integrate heterogeneous actors or align its members and widen networks to newcomers. The sets of IOs reflect the temporal structure of socio-cognitive dynamics, the division of work, the aggregation of data, the definition of a standard, etc. KC depends on this materiality and the logistics of IOs, which associated practices need to study.

Intermediary Objects as Shaping (A)Symmetric Relationships

IOs and their circulation also materialise the type of relationship created in cooperative networks. This broadens visions such as those of postcolonial approaches that naturalise the central/peripheral position of some regions or contexts (Rodriguez Medina, 2013; Suárez Estrada, 2018). Following IOs reveals the history and variability of relationships; it helps to qualify the type and degree of symmetry or asymmetry, the centralisation or distribution and to unfold the evolution of collaborations. Knowledge flows in and between the Global North and the Global South contexts, which can be traced from IOs.

Applying the Concept to the Study of Heterogenous Knowledge Collectives: Innovation

The case studies (European or Colombo-Mexican networks) relate to KC between research teams. They show the various involved actors, not only researchers from different disciplines, but also clinical services and industry. In fact, following the IOs helps to discover many more actors, among others, technicians, public services, decision-makers, NGOs, patient or consumer associations, trade unions and regulatory authorities. This is also the case for studying engineering and innovation (Boujut & Blanco, 2003; Brassac & Grégori, 2001; Vinck, 2003; Vinck & Jeantet, 1995; Vinck et al., 1996), both in the Global North and South (Godjo et al., 2003). This led to considering interdisciplinarity, trans-disciplinarity, innovation processes and public participation in science and technological development. The notion has also been used in organisational studies (e.g., Reverdy, 2003), public policies, geography, management, architecture and technology transfer. Considering IOs opens new avenues to include non-academic actors locally or globally and deal with questions such as what moves society and what constitutes society's fluidity. Identifying and following IOs and associated activities help to understand knowledge production and circulation spaces and dynamics without reducing them to academic or innovative milieu; to cultural institutions, books and libraries; to patent and technical documentation; and to written laws and accounting practices.

This approach helped to produce another picture of human activity and organisation. It led to the discovery of sketches, drawings, prototypes, listings and screenshots in the offices visited. Many of these objects were textual (e.g., specifications, operation plans) or graphic documents (e.g.,

manufacturing plans, block diagrams). They were also physical objects (e.g., prototypes, broken parts). They led to characterise contrasted technological cultures, some around well-ordered stacks of folded sheets, others with disorganised masses of industrial drawings and manual annotations, another full of lists of data and equations, another displaying a mass of prototypes and broken parts, which people are looking at, picking up and moving from their desk to a test bench. Some objects and activities appeared somewhat clandestine (e.g., the use of modelling clay in a firm whose management insists on using digital modelling only). All these IOs revealed specific forms of KC with their own practices, such as pointing, making annotations, gathering, drawing, using bodily gestures, task-sharing, sequencing and regulation. This also brought to light contrasting socio-cognitive processes from one organisation to another, even when they performed very similar technical activities (Ravaille & Vinck, 2003).

Conclusion

The emergence of the IO concept stems from work on a series of other notions: the notions of inscription (Latour & Woolgar, 1979) and immutable and combinable mobiles (Latour, 1987) used in the analysis of scientific fact construction, the notion of boundary-object (Star & Griesemer, 1989) and Callon's notion of intermediaries (1990) regarding technico-economical networks. Latour showed that looking at inscriptions led to deflate some of the questions arising in epistemology because these inscriptions were not just pieces of information, they were also material entities, engaging in some transformation of knowledge production and circulation. Since the end of the 1980s, the social sciences have considered the materiality of things (bodies, artefacts, etc.). Science and technology studies and several other social sciences (Carlile et al., 2013) have called attention to the materiality in the study of knowledge, technology and innovation. ANT has played a major role in this respect.

Initially, the IO notion was an empirical entry to give depth to the ethnographical investigation into SCNs. It had no theoretical pretention and was open to interpretation. It could become a subordinating object, as Leandro Rodriguez Medina pointed out regarding scholarly works produced in the metropolitan centres (2014), but this would be the result of the field investigation, not an a priori characteristic. Further, from one field investigation to another, the notion started to be theorised as a form of representation (the inscription of intentions, working habits, power relations or agreements in the very matter of an object and object to design), of translation (uncontrolled shifts), of mediation and of framework. Different authors benefited from the concept and added more theoretical impulse.

This sometimes led to some confusion with Susan Leigh Star's concept of boundary object (BO) (Star & Griesemer, 1989). The IO notion differs significantly from this one. Both notions emerged in the sociology of science, but within different research frameworks. For BO, the authors were analysing the intersections between social worlds around a specific place, i.e., a museum of natural history. It was designed from symbolic interactionism, a micro-sociology movement that refused the idea of sociological or biological determinism, preferring instead to base its explanations on the dynamics of observable interactions between individual perspectives. The IO notion emerged from studying SCNs in an ANT perspective, which implies accounting for sociotechnical constructions regarding networks of associations between heterogeneous entities obtained following a translation operation (Callon, 1986). Both movements considered the heterogeneity of the (social) worlds of science, following the actors and reporting on their activities and practices. In both cases, the authors behind these notions' emergence strove to account for the materiality of things that actors produced and used in a specific situation.

However, the BO aims to shed light on how several social worlds are cognitively synchronised without losing their perspective, while the IO helped to describe the networks of relations between actors without considering them as a priori social worlds. Unlike the notion of the BO, the IO remained open to interpretation in terms of the mechanisms at work.

The empirical interest of studying KC following IOs relates to its capacity to ground cognitive, epistemological and social aspects of the phenomenon in practice and materiality, and to reveal otherwise invisible actors, practices and relations. It also makes visible the differences between teams, disciplines and countries. This suggests potential application to any situation where knowledge flows in relation to IOs being manipulated and produced, even if they are common, unspecific and apparently unimportant. It helps to understand that KC depends not only on words, talks, writings and people, but also on paper and the printing processes, digital formats, inscription tools, laws, taxes and customs practices, samples and collections, instruments and so on. Looking at these entities helps to raise other questions regarding cost, infrastructures and the logistics of KC and its influence. It also helps people grasp the relevant knowledge and open up ways to stabilise the meaning while the knowledge is translated from place to place, support to support and format to format. In the context of international SCNs, IOs make possible the understanding of the dynamics of knowledge production and circulation between different countries and regions without being restricted to forms of dependency assumed a priori (e.g., between the Global North and South). They display learning processes in the different participating contexts and allow understanding phenomena that distance themselves from a linear vision of North-South transfer.

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