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Beyond an IT-driven Knowledge Society: Knowledge Management as Intertwined Sociotechnical Circulation

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Starting from a critical review of Knowledge Management initiatives in managerial contexts, this contribution proposes an alternative approach to knowledge management as intertwined sociotechnical circulation. In most organizational settings, Knowledge Management has been driven by ICTs (Information and Communication Technologies) and has equated knowledge with information, and so faces massive failures and conflicting results. In order to overcome the influence of the managerial debate in Knowledge Management, an alternative approach is proposed. Drawing on the Mobility Paradigm, Science and Technology Studies, and Practice-based Studies, knowledge and its management are re-framed as a collective, situated, heterogeneous and contextual practice, performed through sociotechnical processes embedded in multiple infrastructures. A short agenda of outcomes and consequences of this alternative Knowledge Management is then outlined, in order to emphasize the continuity and dialectic relationship between theory and practice, conceptual and operational levels, in enabling knowledge transformation and circulation.

Introduction

The debate about Knowledge Management is exemplary of the contradictions through which the conception and definition of knowledge takes place. Given that the concept of a Knowledge Society has been shaped by the centrality of ICTs (Information and Communication Technologies) as key carriers for both knowledge production and transfer, this contribution emphasizes the role of sociotechnical infrastructures, devices and practices in enhancing and nurturing knowledge and its management. The attempt is to overcome the IT-driven, deterministic approach to Knowledge Management, which is particularly widespread in most of the managerial literature. Such an aim is pursued by referring to diverse theoretical frameworks and related disciplines, which will be presented as a basis for establishing a non IT-driven approach to Knowledge Management.

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In particular, three theoretical perspectives will be proposed to figure out an alternative approach to Knowledge Management:

- The so-called 'Mobility Turn'.[1–3] This points out that the creation of knowledge is made possible by forms of mobilization and circulation, not only of data and information, but also of cultures, representations and risks. In this respect, mobility is vital to knowledge dynamics, communication and social interaction.
- The Science and Technology Studies (STS) field.[4–7] This highlights the co-constructed, translated and multiple process of technological innovation; the situatedness of sociotechnical practices; the embeddedness of infrastructures surrounding and supporting knowledge.
- The sub-field of Organization Studies concerned with the embedded, situated and practice-based dimensions of learning processes.[8,9] According to these approaches, knowledge is a process rather than a product, always imbued with tacit elements taken for granted by specific actors in particular contexts.

The objective of such a composite theoretical framework is to produce alternative metaphors and representations of knowledge management: circulation and sharing[10] versus transfer, co-construction versus isolated creation, collectivity versus individuality.

An overview of the consequences and outcomes of this alternative approach will be provided, emphasizing the role of knowledge as a continuous, multi-sensory and sensuous process of learning developed through multi-level infrastructures in hybrid, heterogeneous contexts. Technological artefacts are crucial to it, in a way that is different from what is suggested by the managerial literature. However, their role must be taken into account in order to re-frame the mode(l)s and loci of knowledge innovation, at both theoretical and empirical levels.

Information, Knowledge and Limits to Codification

One of the reasons for the reduction of complexity characterizing the knowledge society discourse is the more or less explicit equivalence between knowledge and information. Although some critical literature in organization studies points out the necessity of a distinction between knowledge and information,[11–13] many concrete cases of implementation of knowledge management systems in organizational settings are based on the assumption that information and knowledge are interchangeable. Expressions such as knowledge transfer and knowledge management come from an engineering, mathematical theory of communication, which poses an almost unsolvable contradiction concerning both creation and management of knowledge. The empirical evidence of the inadequacy of management through traditional control strategies in organizations has resulted in disenchantment and failure of the implementation of information/knowledge management systems. Japanese theorizations on the knowledge-creating company,[11,13,14] and their popularity in academic and corporate contexts in Western countries, emphasize the possibility of creating knowledge as a productive process, neglecting the socially constructed character of knowledge.

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What is the difference between knowledge and information? The concept of context, which implies the problematization of individual experience through frames that make it meaningful, draws a first line of distinction between information and knowledge. Knowledge itself can, in turn, be intended in, at least, a double sense – as tacit and explicit knowledge – which is a distinction investigated by philosophy, economics and sociology. In particular, Michael Polanyi's formulation of tacit knowledge as 'tacit dimension'[15] and Bruner's concept of 'implicit knowledge[16] draw attention to a dimension of knowledge that is not articulated and formalized, but only transferable through practice.

However, knowledge management in managerial settings draws on the most explicit, codified and objective dimensions of knowledge, almost chasing the utopian dream of an unproblematic transformation of knowledge in information. This transformation is also an attempt to convert the tacit into explicit, reducing all knowledge processes to explicit information flows. It could be said that the contemporary debate on knowledge management is affected by a disjunction between means and end. By expelling the context from the definition and implementation of knowledge, the richness and density of tacit knowledge is constitutively undermined. The limits of such an operation lie in the possibility of accumulating knowledge through material devices that imply a formal codification of it. IT-driven knowledge management assumes that codification and formalization of knowledge are possible by ignoring the density of contexts and practices where such codification should take place. In fact, the context is a situational territory where commitment, care, emotions, values and beliefs are mobilized – what Zen philosophy names as 'Ba', situated social practice.[11] From this viewpoint, the act of sharing,[10] and knowledge sharing in particular, is at the heart of any organizational setting as a socially constructed system of learning and knowing.[17]

IT-driven versus Community-based Knowledge Management: The Challenge and Obsession with Hypermediatization

The equivalence between knowledge and information, as well as the exclusive role attributed to ICTs, are rooted in a cognitive approach to knowledge management where knowledge is factual, objectified, transferable and codified through information systems. According to such an approach, technology is the key, a sufficient and necessary factor, for a successful management of knowledge. That is to say, IT-driven Knowledge Management is the other side of the coin, the operational arm of the cognitive (informational) approach to knowledge, so much so that it is possible to trace the origin of knowledge management back to the diffusion of ICTs.

Indeed, technological artefacts and tools constantly intervene in developing and enhancing knowledge as the result of shared situated practices in communities.[8,18] The Organization Studies literature therefore proposes a community-based approach to knowledge against the IT-driven vision of technology as a privileged tool for knowledge capture, transfer and distribution. The critical community-based approach regards knowledge as socially constructed and shared through social networks, groups and occupational communities.

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According to this framework, the expression 'knowledge management' itself is criticized as a limited approach to knowledge. This criticism is fostered by the concept of knowledge as a situated practice in communities, as well as by the materiality of artefacts intervening in organizational work. On the other hand, technologies for knowledge management have proved to be able to reproduce established work practice and power dynamics within organizations. Qualitative and ethnographic studies show how building online corporate communities of practice can be the main goal of knowledge management initiatives.

Beside the criticism made to the epistemological reductionism of knowledge to information, which is related to codification issues, this literature points out the complexity of sociotechnical infrastructures and devices in managing knowledge within organizations, focusing on the non-use and failures of knowledge management technologies. Furthermore, the issue of building communities of practice through knowledge management systems can be inspired by IT-driven approaches, which consider technology as an abstraction from work routines and skills so as to produce the paradoxical situation of 'controlled communities', manipulating the rhetoric of the community in order to control its members. Such a contradictory scenario can be summed up with the category of 'hypermediatization'.[19] This concept refers to the co-presence and simultaneity of different ICTs and media in organizations, which produce an enhanced mediatization of routines and procedures, especially with reference to knowledge management systems. Hypermediatization is an ambivalent phenomenon: on the one hand, it contributes to increasing the complexity of communications and work, through the redundancy of different and diverse communication media; on the other, it reduces such a complexity, when trying to convert tacit into explicit, informal into formal knowledge. In this respect, hypermediatization conveys the expectation that it is possible to transfer dense contexts to technological artefacts, in fact increasing (rather than bridging) the gulf between formal and informal in organizational life, as well as the perception of a failure in the implementation of knowledge management systems.[20] Paradoxically, informal relations are used to bypass knowledge management systems,[19] so confirming that inscribing contexts within technological artefacts is a crucial point for enabling and enhancing knowledge sharing.

To sum up, hypermediatization is a challenge to the limits of codification and formalization of invisible, informal and tacit knowledge. On the other hand, it discloses an obsession with measurement, commodification and abstraction of knowledge, challenging (and trivializing) the density of situated practice and the intertwined sociotechnical circulation running in such contexts. The question is, therefore, how to take into account such a density and circulation.

Knowledge Management as Intertwined Sociotechnical Circulation

What can we learn from the Organization/Management Studies debate about Knowledge Management summarized above? In light of the centrality of learning and knowing in contemporary society, a reflection on the way we know and explore the world becomes ever more urgent. In order to overcome the limits of IT-driven knowledge management and the ambivalences of the community-based approach, a composite theoretical framework

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will be proposed to re-interpret the issue of both knowledge and its management. The aim is to call for an alternative approach to knowledge management as 'intertwined sociotechnical circulation'. The three components of such an approach are illustrated in the following section, drawing on three theoretical perspectives: the Mobility Paradigm for the concept of circulation; Science and Technology Studies for the concept of sociotechnical; Practice-based Studies for the issue of 'intertwining'.

Knowledge as Circulation and Mobilization: 'Lessons' from the Mobility Paradigm

Whereas the IT-driven approaches regard knowledge management as based on actions of capture and transfer, implying an almost hydraulic, unproblematic process of transmission of knowledge, the concept proposed here is that of circulation/mobilization of knowledge. Such a concept draws on the so-called 'Mobility Paradigm'[1–3] where the issue of multiple mobilities of objects, information, risks, cultures, people and infrastructures is crucial. Digitized systems of mobility[2] guarantee a dialectic circulation of all carriers of movement due to a relational characterof mobility. This cannot be conceived without its opposite, which is immobility, and is made possible by immobilities or 'moorings'. The issue of movement, mobilization and circulation seems particularly suitable to depict the dynamics of knowledge innovation and sharing: formal and informal can be equated, respectively, with immobility and mobility, in a relationship where reducing the one to the other always means obscuring and overlooking the dialectical, reciprocal relationality that sustains circulation and mobilization of knowledge. Rather than transfer, circulation entails transformation and change, which are constitutive of mobility, also accounting for the necessity of partial moorings and immobility (explicit, codified knowledge) for further development of knowledge.

Knowledge as a Sociotechnical Practice: 'Lessons' from Science and Technology Studies

Consistent with the concept of circulation and mobilization, knowledge can also be re-coupled with technology in a non-deterministic approach, looking at the sociotechnical, sociomaterial character of technologies, with these being interpretatively flexible, provisional outcomes of negotiations and conflicts among relevant social groups[5] as well as emerging from chains of enrolment and translation of human and non-human actants.[4]

Sociotechnical practice is the specific work of articulation performed to build up and make sense of technological artefacts, where a particular role is played by infrastructures as boundary objects.[6] Infrastructures represent the hidden, embedded and installed character of knowledge as a sociotechnical practice. They remind us of the sociomateriality that allows knowledge to circulate in society as well as of the exclusive, selective and uneven distribution of knowledge resources (and infrastructures) across contexts.[7] In this respect, knowledge is not simply mediated and transmitted by technologies or supported by technological artefacts; it is rather re-shaped and re-assembled through them, as well as deeply embedded in categorization and standardization processes that lead to codification, inclusion and exclusion of human and non-human actants in changing ecologies of knowledge.

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Knowledge as a Situated Engagement: 'Lessons' from Practice-based Studies

Rather than being abstract and disconnected processes occurring through individual biological and cognitive structures, learning and knowing are inextricably intertwined with practice and tacit knowledge, which make them social, collective and situated processes, intimately connected with passion and emotion. In the practice-based view of knowing,[9] 'learning by doing' and learning as a social practice are embedded into specific contexts, where rationality and emotionality coexist in tension within the same process.[21]

Mutual engagement and the sense of a common enterprise find sense and meaning in the concept of Communities of Practice,[8,18,20] so contributing to the idea that knowledge is a matter of situated engagement. In fact, Communities of Practice very often do not coincide with the formal, official organization, and that management sometimes fails to recognize them as valuable or even existing, instead encouraging the constitution of controlled, top-down communities as stated earlier in this contribution.

The engagement on which Communities of Practice are based is oriented by the reciprocity founded on emotional relationships, which seem to trigger and sustain the commitment towards innovation and the situated engagement where old and new knowledge can be fruitfully combined and reinterpreted.

Outcomes of (Alternative) Knowledge Management: An Agenda

If the re-framing of Knowledge Management as intertwined sociotechnical circulation is to be taken seriously, a tentative agenda of both conceptual and pragmatic actions could be drawn. In what follows, a set of outcomes of this alternative approach to knowledge and its management is listed.

- Technological determinism and optimism inspire the identification of knowledge management with systems devoted to realize it in complex organizational settings. Such rhetoric can be recognized and marginalized, re-establishing a distinction between information and knowledge, and especially the informal, tacit and implicit dimension of knowledge.
- Design and implementation of technologies do not take into account the richness and density of knowledge with reference to the contexts they attempt to reproduce and manage: evidence from sociotechnical practice and STS can support a more collective and context-sensitive technology design process.
- Possible solutions to failures of IT-driven knowledge management initiatives concern both the conceptual and operational levels: knowledge should be supported, enhanced and enabled rather than managed (enabling versus managing knowledge[17]). A comprehensive approach to knowledge can be more effective than a control-based vision (understanding versus managing knowledge).
- Knowledge is an ambivalent process, characterized by both enabling and constraining dimensions.

Furthermore, by re-interpreting knowledge management as an intertwined sociotechnical circulation it is possible to re-frame issues related to the process of knowledge creation in

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contemporary society, such as the issues of writing and reading, the information overload, and the balance between equalities and inequalities in accessing knowledge.

As for the question of writing and reading (processes crucial to the accumulation and circulation of knowledge), sociotechnical practice, with its emphasis on heterogeneity accounts for the peculiar *metissage* of oral and textual communication, verbal and non-verbal issues, symbolic and iconic systems of reference; at the same time, there is a rediscovery of tactile, multi-sensory learning environments based on pocketable devices as well as pervasive computing infrastructures (e.g. palpable computing). On the other hand, the limits of what has been termed as 'hypermediatization' show that redundancy and reduction of the media are always combined and interacting in users' current behaviours.

With reference to the information overload, the circulation of knowledge and centrality of infrastructures emphasize that the selection and filtering of data, information and knowledge, are the provisional results of extensive and never-ending processes of categorization, inclusion and exclusion. Such processes are confronted with the emergence of collective, connected, bottom-up categorization and prioritization of content (e.g. folksonomies and new information ontologies in the Web 2.0). In this respect, risks connected with an excess of self-exposure and tailor-made information (e.g. incomprehension, fragmentation and even Balkanization of knowledge) need to be traced back to the reproduction and ownership of underlying infrastructures.

Eventually, the unbalanced relationship between equalities and inequalities can benefit from the concept of situated engagement. Even if infrastructures are unevenly distributed and their availability is far from being comparable between the Western and the developing countries, bridging gaps is not just a matter of building up more infrastructures. New literacies and peculiar patterns of evolution can be observed in contexts where linearity of adoption is not the rule. As shown by the failure of IT-driven knowledge management, neither transplanting 'models' from one context to another, nor thinking of 'universal', cross-context practices for including disadvantaged subjects might suffice to develop a solid bridge between genders, ethnicities, generations, and populations.

Concluding Remarks

Management of knowledge is a powerful rhetoric in corporate, managerial organizational settings, as well as a crucial guideline for the development of future, favourable social settings. Emphasis on management rather than on knowledge has resulted in a cognitivist, IT-driven approach to knowledge, which is identified with information.

Drawing on evidence from organizational and managerial literature, this contribution puts forward the necessity to learn from failures of knowledge management initiatives that delegate codification and transfer of knowledge to more or less complex technological systems. Starting from a criticism of IT-driven knowledge management, the article points out the ambivalences of a community approach based on the challenge of hypermediatization as an attempt to enhance the codification and formalization of knowledge (information) in organizational and social contexts.

In order to re-frame the issue of knowledge management, the emphasis is placed on knowledge as a multiple, dialectic and situated sociotechnical process. Using evidence

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from the Mobility Paradigm (circulation/mobilization), STS (sociotechnical practice) and Practice-based Studies (situated and emotional engagement), it comes out that knowledge management manifests itself as differently crucial to contemporary society. In fact, overcoming the rhetoric of an IT-driven knowledge society, technology can be re-framed as constitutive but not sufficient to mobilize (new) knowledge, whereas the concept of circulation accounts for transformations occurring in diverse, multiple contexts where situated engagement is performed and carried out.

Intertwined sociotechnical circulation represents an alternative approach to knowledge management, which inspires an agenda of outcomes and consequences, through which issues of accumulation, transmission, overload and inequality in knowledge society can be re-framed at both conceptual and operational levels.

References

1. M. Sheller and J. Urry (2006) The new mobilities paradigm. *Environment and Planning A*, **38**(2), pp. 207–226.
2. J. Urry (2007) *Mobilities* (Cambridge: Polity Press).
3. P. Adey (2010) *Mobility* (London: Routledge).
4. B. Latour (1989) *Science in Action* (Oxford: Oxford University Press).
5. W.E. Bijker (1995) *Of Bicycles, Bakelites and Bulbs* (Cambridge, MA: The MIT Press).
6. S.L. Star and J. Griesemer (1989) Institutional ecology, 'translations' and boundary objects: amateurs and professionals in Berkeley's museum of vertebrate zoology, 1907–1939. *Social Studies of Science*, **19**, pp. 387–420.
7. G. Bowker and S.L. Star (2000) *Sorting Things Out. Classification and Its Consequences* (Cambridge, MA: The MIT Press).
8. J. Lave and E. Wenger (1991) *Situated Learning. Legitimate Peripheral Participation* (Cambridge: Cambridge University Press).
9. S. Gherardi (2001) From organizational learning to practice-based knowing. *Human Relations*, **54**(1), pp. 131–139.
10. H. Mathiasen (2012) Time to rethink the concepts of knowledge dissemination and transfer in the educational system? A systems theoretical perspective. *European Review*, **20**(2).
11. I. Nonaka and I. Takeuchi (1995) *The Knowledge-creating Company: How Japanese Companies Create the Dynamics of Innovation* (Oxford: Oxford University Press).
12. P.A. David and D. Foray (2002) An introduction to the economy of the knowledge society. *International Social Science Journal*, **54**(171), pp. 9–22.
13. G. Von Krogh, K. Ichijo and I. Nonaka (2000) *Enabling Knowledge Creation* (Oxford: Oxford University Press).
14. I. Nonaka and T. Nishiguchi (2000) *Knowledge Emergence. Social, Technical and Evolutionary Dimensions of Knowledge Creation* (Oxford: Oxford University Press).
15. M. Polanyi (1966) *The Tacit Dimension* (London: Routledge and Kegan Paul).
16. J. Bruner (1986) *Actual Minds, Possible Worlds* (Cambridge, MA: Harvard University Press).
17. H. Tsoukas (1996) The firm as a distributed knowledge system: a constructionist approach. *Strategic Management Journal*, **17**(Winter special issue), 11–25.
18. E. Wenger (1998) *Communities of Practice. Learning, Meaning and Identity* (New York: Cambridge University Press).
19. G. Pellegrino (2005) La sfida dell'ipermediatizzazione. Tecnologie per il knowledge management tra rappresentazioni e non uso. *Studi Organizzativi*, **1**, pp. 131–155.

https://doi.org/10.1017/S1062798711000408 Published online by Cambridge University Press

20. J.S. Brown and P. Duguid (1998) Organizing knowledge. *California Management Review*, **40**(3), pp. 90–111.
21. B. Villardi and G. Pellegrino (2005) Face-to-face and distant learning as emo-rational microprocesses. Understanding learning through collective learning from within. In S. Gherardi and D. Nicolini (eds) *The Passion for Learning and Knowing. Proceedings of the 6th International Conference on Organizational Learning and Knowledge* (Trento: University of Trento e-books), pp. 751–772.

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