

Tacit Knowledge Revisited – We Can Still Learn from Polanyi

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Abstract: The field of knowledge management is still relatively new, with all but a few of its related papers and books published during the last 15 years or so. However, one of the most cited sources is a much earlier work on the topic of tacit and explicit knowledge, by Michael Polanyi (1958 and 1966). An examination of some 60 papers from three major knowledge management journals demonstrates that Polanyi's work has frequently been misinterpreted by some authors and further suggests that, in some cases, the citing authors may not have read the cited work. Further, this has led to misinterpretation of Polanyi's work in ways that have affected wider issues in knowledge management. Polanyi's work is still relevant today and a closer examination of his theory that all knowledge has personal and tacit elements, such that knowledge cannot be made fully explicit, can be used to both support and refute a variety of widely held approaches to knowledge management. In particular, it raises issue about the continued efforts to make knowledge explicit through the use of information systems, without consideration of wider social issues, as well as refuting those who use the issue of tacit knowledge to dismiss the field of knowledge management as a misguided concept. It provides support for more recent work on next generation knowledge management.

Keywords: Polanyi, Nonaka, tacit, explicit, next generation KM

1. Key citations in knowledge management

It is reasonable to argue that widespread interest in Knowledge Management (KM) both as an academic subject and as a business issue dates only from the mid-1990s. Early authors such as Stewart, Wiig and Sveiby published their first works around 1990. Serenko and Bontis (2004) found that fewer than 100 papers were written on the topic until 1995, followed by a rapid growth in activity. According to Serenko and Bontis, some 5,000 papers were published on KM and Intellectual Capital (IC) in the period from 1995 to 2002. Given this recent explosion of publication, it is surprising that one of the most cited references in KM papers is not to any of the work published in this 15-year period but to the work of an author from some 50 years ago - Michael Polanyi, a chemist turned philosopher. Specifically, the work thus referenced consists of two books, "Personal

Knowledge: Towards a Post-Critical Philosophy" (1958) and "The Tacit Dimension" (1966); the second being a slim volume of essays building on one aspect of knowledge identified in the first, that of "tacit knowledge". Both books expand on ideas first presented by him at the University of Aberdeen, in the Gifford Lectures in 1951-2. Serenko and Bontis (2004) found, in a survey of all citations in three major KM journals (from first publication to the end of 2003), that Polanyi's two works are collectively the second most cited source. The most cited was Nonaka's "Knowledge Creating Company", which, in its two main forms (1991, 1995), was by far the most cited work, along with the very similar "A Dynamic Theory of Organisational Knowledge" (1994). With the exception of three papers (from 1978, 1982 and 1987), every other frequently-cited paper in the top 34 dated from the period 1990-2001. The top 10 citations are shown in Table 1.

Table 1: Top KM/IC publications ranked by number of citations, adapted from Serenko and Bontis (2004)

Rank	Paper	Author	Year	Citations
1	The Knowledge Creating Company	Nonaka	1991	
	A Dynamic Theory of Org. Knowledge	Nonaka	1994	
	The Knowledge Creating Company	Nonaka and Takeuchi	1995	202
2	Personal Knowledge	Polanyi	1958	
	The Tacit Dimension	Polayni	1966	60
3	Working Knowledge	Davenport and Prusak	1998	58
4	Intellectual Capital	Stewart	1997	55
5	The New Organisational Wealth	Sveiby	1997	50
6	The Fifth Discipline	Senge	1990	42
7	Intellectual Capital	Edvinsson and Malone	1997	40
8	Reengineering the Corporation	Hammer and Champy	1993	39
9	Process Innovation	Davenport	1993	39
9	Organisational Learning and Communities of Practice	Brown and Duguid	1991	32

As an additional support of the significance of Polanyi in the KM field, a simple citation count done on the EBSCO database in late 2004, using the key words "Polanyi and Knowledge" produced 965 links; the same search using "Nonaka and Knowledge" produced 1033. References to Polanyi tend to be mainly in two forms -- either as a general credit as an early and key contributor to the concept of tacit knowledge or as a more specific reference to some variant of a single quotation "We can know more than we can tell." What is less clear is whether, in a number of cases, the authors have actually read the work they are citing and whether the citation, when used, actually supports the authors' argument.

2. Nonaka and Polanyi

The Tacit-Explicit dimension of knowledge is one of the most widely discussed topics in knowledge management. The pivotal work might be seen as Nonaka and Takeuchi (1991), which presents a new description of knowledge in an organisational context. Its essence is that successful innovation comes from the mobilisation and conversion of tacit knowledge through four modes of knowledge conversion -- Socialisation, Externalisation, Combination and Internalisation (the "SECI" model). A subtext to this paper is an argument that a focus on the importance of tacit knowledge is more in tune with Japanese culture and could be seen as a reason for the success of major Japanese companies in the 1980s. It is in this paper that Polanyi's famous quote "We can know more than we can tell" is first given wide circulation. Nonaka has expanded on his interpretation of Polanyi (for example in Nonaka, 2004) and, in a crucial argument, makes the leap from "at a fundamental level knowledge is created by individuals" to "organisational knowledge creation in a corporate organisational setting" (2004, page 21). As stated in Nonaka and Takeuchi (1995), they derive "a new theory of organisational knowledge creation with an epistemological dimension of "tacit-explicit knowledge" and an ontological dimension of knowledge levels (individual/group/organisation/inter-organisation). Thus, Nonaka and his co-authors have taken Polanyi's work on "personal" knowledge and extended it to a new field of "corporate" or organisational knowledge.

3. Research questions

The genesis of this paper came from the author's growing personal concern that emerged in reading through the KM literature, following an examination of Polanyi's work. Specifically, while many theories of knowledge management start with some view on tacit/explicit knowledge and a

large number of the papers and articles cite Polanyi as the source of this concept, there seemed to be little consistency in the use of his work. Indeed, given that it could be argued that current interest in Polanyi stems largely from Nonaka's use of Polanyi in developing his work through the Knowledge Creation Cycle, a cynic might be excused for thinking that some of the authors did not in fact actually read Polanyi but, more simply, re-presented what Nonaka reported, while still citing Polanyi as the reference. Since the tacit/explicit dimension is the root of much work in the field, has been used to justify major projects and has even been used by some to argue that explicit knowledge is not really knowledge at all, this seems worthy of further investigation. Thus, the objective of this paper is to reflect on the use of Polanyi and to consider three questions:

- Does the body of recent KM literature citing Polanyi accurately reflect the concepts presented by Polanyi in his two key works?
- If the answer to Q1 is no, then what implications does this have for the interpretation and use of his work?
- Given that Polanyi did his work some 50 years ago, can a deeper look at his work and its use shed a light on current challenges in KM?

4. Methodology

4.1 Review of polanyi's work

This review concentrated on his two books (1958, 1966). Each was reread and all references to tacit/explicit knowledge noted, and a summary of his related arguments was prepared.

4.2 Initial citation review

Using the same 3 journals as Serenko and Bontis (2004) -- "Journal of Intellectual Capital", "Journal of Knowledge Management" and "Knowledge and Process Management" -- all papers that cited Polanyi, between the initial publication of each journal and early 2006 were examined, some 60 in total. Each paper was examined to determine the degree of reference to Polanyi's work and whether there was evidence to suggest whether the original work had been read.

4.3 General literature review

A more general literature review was then carried out to examine the use of the tacit knowledge concept in knowledge management theory. Of necessity, since the topic is so widely referenced, this review was fairly selective.

4.4 Integration of findings

The findings from both the citation analysis and the more general literature review were then integrated, along with a revisitation of Polanyi's work to position the findings in a framework and develop some responses to the research questions.

4.5 Identifying broader considerations

Finally, some conclusions were developed looking at the broader implications for the use and misuse of Polanyi's concepts.

5. Analysis

5.1 Polanyi's work on knowledge

Michael Polanyi was a leading chemist who became disenchanted with the scientists' view of knowledge. Along with others in the early 20th century, he saw the weaknesses inherent in the scientific method and moved towards a more post-modernist view. As he says in his introduction to his major work, "Personal Knowledge" (1958), "The purpose of this book is to show that complete objectivity as usually attributed to the exact sciences is a delusion and is in fact a false ideal." He does so, in part, by examining how individuals gain knowledge and share it, arguing that knowledge is highly personal and questioning the commonly held view of the dispassionate objective scientist, saying, "Into every act of knowing there enters a passionate contribution of the person knowing what is being known and that this coefficient is no mere imperfection but a vital component of his knowledge." "Personal Knowledge," (1958) is a broad-ranging philosophical book examining the nature of scientific research and the nature of knowledge. He speaks much more of "knowing" rather than of "knowledge" and roots much of his argument on the role of language in communicating knowledge. While suggesting that language is a vital tool we can use to share knowledge, he also emphasises that we can often know how to do things without either knowing or being able to articulate to others why what we do works.

He distinguishes skills and how we learn them from knowledge. "The aim of a skilful performance is achieved by the observance of a set of rules which are not known to the person following them." One of his examples is that of riding a bicycle (made possible by the offsetting of centrifugal and gravitational force) and has been widely used (but not normally referenced) by others as an example of tacit knowledge. But he does not say, as some suggest, that this tacit

knowledge can't be transferred. Rather he suggests that some types of knowledge have limited capability for transfer. "Art which cannot be specified in detail cannot be transferred by prescription, since no prescription for it exists. It can be passed on only by example from master to apprentice. This restricts the range of diffusion to that of personal contacts." (Polanyi, 1958) He sets some elements of this in terms of Gestalt psychology and suggests two kinds of awareness – subsidiary awareness and focal awareness – we can achieve some wider objective by the use of a proximate device such as a tool (he gives the example of hammer and nail, others might think of a golf club and ball with the objective of putting the ball in a distant hole). Skilful individuals can focus on the overall objective; less skilled ones pay more attention to the proximate device (the subsidiary awareness).

He then extends this discussion to point out that "our beliefs are anchored in ourselves." We have a whole set of presuppositions (to be distinguished from specific assertions) and we have no clear understanding of what these are and would find it difficult to express them. Mostly, we have assimilated these beliefs through learning and using specific language and by being part of specific societal groups. Some we learn (hitting the nail or golf ball) as bodily-learned skills, others we learn by using language, still others come from our experience in given situations. But there are key constraints to the use of language. To Polanyi, using a word confidently implies an acceptance of a meaning of that word to both speaker and listener. There is an underlying tacit element of confidence that the word will be understood. Thus, it is not "words that have meaning, but the speaker or listener who means something by them." When we assert something this is both a statement and a tacit act. Belief is the source of all knowledge -- requiring tacit assent, intellectual passion, shared idioms and cultural heritage, affiliation to a like-minded community.

To him, there is not an either/or between tacit and explicit knowledge. It is not something amenable to conversion. But it can be transferred and made more explicit in certain circumstances.

Indeed, for him, ALL knowledge has a tacit component. He discusses the process by which "the tacit cooperates with the explicit, the personal with the formal" (Polanyi, 1958, p 87). Further, tacitness is something personal, an ability or skill to do something or to resolve a problem that is based, in part, on one's own experiences and learning. With the appropriate use of language, much, perhaps most, but probably not all, of this knowledge can be shared between individuals

who share a mutually agreed language. When the tacitness predominates so that articulation is not possible, he calls this "ineffable" knowledge. (e.g. Ask Tiger Woods how he hits his golf shots.) "For just as, owing to the ultimately tacit nature of all our knowledge, we remain ever unable to say all that we know, so also, in view of the tacit character of meaning, we can never quite know what is implied in what we say" (Polanyi, 1958, p 95). This is rather more complex than the extensively used quote from "The Tacit Dimension" (1966), which is little more than an introductory remark on page 4 of the book, which more fully stated, says "I shall reconsider human knowledge by starting from the fact that we can know more than we can tell." He also points out that, in any "hierarchy" of knowledge, the higher levels cannot simply be derived from the lower levels but require additional context to be understood. This provides a complement to the often-used DIKW model, developed by (but frequently not cited as) Ackoff (1989).

5.2 Initial citation review

52 papers that cited Polanyi as a source were examined from the three journals examined by Serenko and Bontis, drawn from every issue from the foundation of each journal to early 2006. First, the use of Polanyi was assessed at one of three levels -- simple reference, some use of the concept, more significant discussion. Next, in any case where the content and context made it possible, a subjective assessment was made of whether the use did, in fact, correspond to Polanyi's work and whether there was evidence to support whether the author had read the original or not. The results were classified as "clearly read", "unlikely to have read, or "can't tell in the context." (For example, it is unlikely that anyone who had read either of Polanyi's works, even superficially, would cite Polanyi as the source of an either/or categorisation of tacit/explicit knowledge or use a common misquote, where the

"can" is missed out from the "We can know more than we can tell." Indeed, it is difficult to understand why any author would cite the later work (Polanyi, 1966) as a source of the tacit/explicit distinction, since the book focuses on the implications of "the tacit dimension" and makes no significant mention of explicit knowledge.) Similarly, it might be argued that for several of these examples, there were many other elements of Polanyi's work that might have been better used to support the authors' thesis. The results are presented in Table 2.

This (somewhat subjective) analysis suggests that only about one third of the papers demonstrated clearly that Polanyi's work had been read and almost half (42%) were unlikely to have read it, based on their use of the related concepts. Further, some 23% seem to significantly misrepresent Polanyi's work. Typical misinterpretations include:

- The most frequent occurrence is the suggestion that Polanyi identifies two types of knowledge --tacit and explicit -- and that this is an either/or state. This is really in direct contradiction to his view that all knowledge has a tacit element and that the degree of tacitness varies.
- The suggestion that Polanyi was writing about knowledge in a corporate or organisational context.
- That it is impossible to convert tacit knowledge to explicit knowledge.
- That tacit knowledge is embedded in corporate processes and routines.
- That tacit knowledge is the same as implicit knowledge.
- That explicit knowledge is the same as information.
- That explicit knowledge can be expressed in computer systems.

Table 2: Analysis of 52 papers citing Polanyi's work in three KM journals

ASSESSMENT	Significant	LEVEL OF USE		
		Some	Simple Ref	In Total
Number of Papers	16	12	24	52
Clearly read it	69%	8%	29%	37%
Unlikely to have read it	25%	42%	54%	42%
Can't tell in the context	6%	50%	17%	21%
TOTAL	100%	100%	100%	100%
Misinterpretation	25%	42%	13%	23%

6. Discussion

Building on the preceding analysis, responses to the three research questions are presented below.

Question 1: Does the body of recent KM literature citing Polanyi accurately reflect the concepts presented by Polanyi in his two key works?. There are two quite distinct conclusions that can be drawn for this question. The first relates to the rigour expected of a researcher in social and business research. As Remenyi et al (1998) put it in their advice to doctoral researchers, "Related to plagiarism, but not quite of the same severity, is the issue of quoting an authority without having read the original reference, but rather having seen it published in someone else's work. It is considered unacceptable to do this. However, it is acceptable to use the 'cited by' approach." This analysis of the use of a single reference source suggests that, for this early authority in KM, a very significant proportion of those citing the reference (perhaps over half) have done so without reading the original, but have used content from another intermediate author, without using the "cited by" approach. This might be viewed as raising some questions about the responsibility of paper reviewers, however the primary role of the reviewer is not to validate the use of references. Interestingly this issue has been raised in other fields. For example, Simkin and Roychowdhury ("Read before you cite!" 2002, as cited in Muir, 2002), by examining misprints in 4300 citations of a 1973 paper on the structure of crystals, estimated that only about 20% of the authors had actually read the cited article. Not only does this raise questions about the quality of research papers, it also brings into question the relevance of citation counts as a method for determining the value of specific works.

The second conclusion, perhaps more important to KM researchers, is that the failure to read the original can lead to misinterpretation and, as Muir (ibid) suggests, "when misconceptions take root, they spread like weeds." In this review, limited to 52 papers in 3 journals, more than 20% of the papers present significant misconceptions on Polanyi's work on tacit knowledge. (Note: Of the 52 papers analyzed, almost half had little direct discussion on tacit knowledge, so the misconceptions really affected more than 40% of the relevant papers.)

Question 2. If the answer to Q1 is "no", then what implications does this have for the interpretation and use of his work? This brings us to the broader "so what?" question. Is the first finding simply a comment on the sloppiness of (some) researchers or does it have wider significance to researchers and practitioners in KM? The examination of the ideas attributed to Polanyi in a number of the papers revealed some significant misrepresentations, as discussed above. So Polanyi is being used as an authority to support a wide range of concepts that are quite at odds with his work. When we look beyond the 52 papers reviewed in the initial citation review, further examples can be seen. A brief review of some 30 additional papers from a variety of sources was broadly consistent with the 52 papers examined in depth.

Question 3. Given that Polanyi did his work some 50 years ago, can a deeper look at his work and its use shed a light on current challenges in KM? Building on the discussion in the last section, we can now look at the current relevance of Polanyi's work. The concept of tacit and explicit knowledge as expressed by Polanyi (primarily from pp 87-101, Polanyi, 1958) can be represented as a diagram, shown in Figure 1.

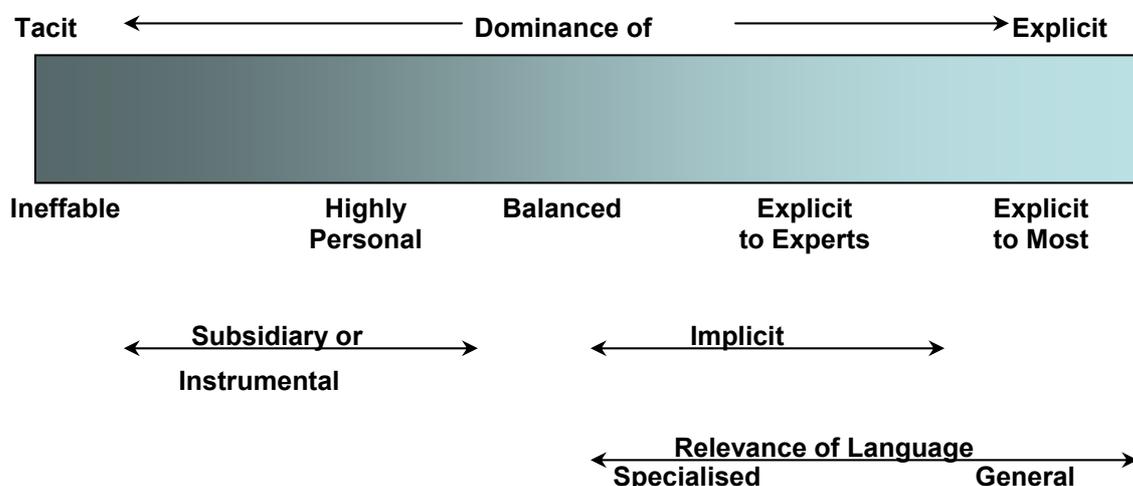


Figure 1: The Tacit/Explicit Dimension, derived from Polanyi (1956, 1966)

This shows Polanyi's basic precept that, to some degree, all knowledge includes a degree of tacitness and we are looking at a continuum in which one or the other may have dominance. The continuum ranges from a situation where there is little tacitness to the knowledge, and it might be widely held by many with a limited background experience; through a situation where experts can share the tacit knowledge given their common background, specialised training and experience; to the situation where there is a strong personal element to the knowledge, that is very difficult to express; and, finally reaching the point that it is impossible to articulate the knowledge ("ineffable" knowledge). The degree of explicitness can be closely tied to the use of language. Where there is a high degree of acceptance on the use and specificity of the language used (spoken, written, represented) the knowledge can be highly explicit to most. Where a more sophisticated level of knowledge and experience is needed for the language to have meaning, the level of shared tacitness increases. It is in this last area that we might position the concept of "implicit" knowledge, a concept not discussed by Polanyi but often offered as an alternative to tacit knowledge. This model suggests that implicit knowledge might be described as tacit knowledge that could be made explicit but need not be, in a community that shares a common view of the necessary tacit knowledge.

7. The value of revisiting Polanyi's work in current research

So if we accept that many authors root (at least the beginnings of) their theories on tacit/explicit knowledge in Polanyi's work, what does this fuller review of his work suggest? A rejection of the either/or view of tacit/explicit knowledge: First, Polanyi's view of knowledge as a continuum between tacit and explicit raises questions on the validity of the two extremes of the tacit/explicit debate. At one end we get the claim that all knowledge is tacit and that explicit knowledge is just information (for example, see Wilson, 2002). At the other, we get the view held by many in the "Technocratic" school described by Earl (2001) and proposed by authors such as Davenport and Prusak (1998), who suggest that converting tacit to explicit knowledge (codification) is a key objective for KM and can be done largely by using information systems -- which remove the tacitness. It supports a more "social" view of knowledge: Alternatively, it provides support for those who argue for the social elements of knowledge. For example, the Communities of Practice approach, proposed by Wenger (1998) and others has a fairly obvious similarity to the

part of the model identified as "explicit to experts" often through an implicit shared understanding.

It also suggests a need to revisit Nonaka's work more critically: It is also interesting to revisit Nonaka's work in this context. Given Nonaka's position as the most referenced author, who credits Polanyi as a key source on whose work he builds, there is certainly the possibility that, as we often find the two referenced together, that authors simply repeat Nonaka's reference to Polanyi, without looking at the source. Most uses of Nonaka's work in the KM literature focus on his SECI model, which describes how tacit becomes explicit and then leads to new tacit knowledge, in a corporate setting. However, an associated theory of Nonaka's -- that of "ba" is much less frequently referenced, but may have equal or greater importance. Nonaka (1998) proposes the creation of environments suitable for the support of knowledge creation, by taking the concept of ba proposed by the Japanese philosopher Kitaro Nishida and adapting it to a knowledge concept. For Nonaka, ba is "a shared space for emerging relationships." This space can be physical (e.g. office, dispersed business space), virtual (e.g. email, teleconference), mental (shared experiences, ideas, ideals) or any combination of them." In short, ba is a shared space that serves as a foundation for knowledge creation. He describes several types of ba that correspond to the stages of his SECI model. There would seem to be a solid argument to associate this idea of space creation with Polanyi's view of how individuals and groups develop the relationships, trust and agreement that allow complex knowledge to be shared.

In this context it is worthwhile to note that, while Nonaka's "corporitisation" of the tacit/explicit knowledge concept is quite explicitly stated in his work, it is often not mentioned by other authors. Since variations of his work have been used as support for the widespread use of IT to convert knowledge from tacit to explicit, often with very limited success (see Grant and Qureshi, 2006), we might suggest that it has quite negative effects in many organisations. Indeed this raises the wider question that, while we often cite Nonaka, there has been little effort to validate his theory (Gourlay, 2004). It provide support to some of the views of "Next Generation" Knowledge Management: Further, it can be used to support some of the assertions made by the proponents of "Next Generation Knowledge Management" (NGKM), such as McElroy (2003), Snowden (2002) and Wiig (2004), including the failure of IT to deliver expected results in KM, the limited usefulness of some of the models being used, insufficient focus on the ways to create "new"

knowledge and the highly personal and social nature of knowledge.

8. Conclusions

Three significant conclusions can be drawn from this work. The first is some confirmation of the commonly held view that authors can be sloppy in their research and frequently cite work which they have not read, relying on someone else's interpretation of that work. Further this is more than a simple comment on research procedures, since it can lead to the misinterpretation of the original work and propagation of these misinterpretations. Secondly, in the specific case of Polanyi's work, this paper has shown that this misinterpretation can cause authors to erroneously claim Polanyi as a key support to theories that are not consistent with his work. Indeed, it could be argued that this has been a contributory factor to major problems in both research and practice, through the adoption of an overly simplistic view of the tacit/explicit dimension and significant failures in practice, especially in IT-related projects. Finally, it seems we can still learn from Polanyi. Fuller examination of his work can be used to raise questions about some approaches to knowledge management, especially those of the Technocratic School. Indeed his work could be used to help explain many of the weaknesses of "First Generation Knowledge Management", that have been widely

discussed in the last couple of years. In fact, when examining the work of various proponents of "Next Generation Knowledge Management" Polanyi's theory of the tacit/explicit dimension could be useful in supporting and explaining some of the theories being proposed.

9. Limitations and further work

This paper is a first effort in a complex area. Some questions might be raised on the sampling technique. The examination of some 60 papers from leading journals is likely a reasonable first step in examining how Polanyi's work is being used, but a wider review could well change some of these initial findings. Further, the papers were simply analyzed by inspection. No sophisticated methods of text or discourse analysis were used and the work is therefore subject to the opinions of the author in interpreting whether Polanyi's work was accurately cited and used. (Indeed, as Polanyi might say, this is a personal "recognition of an orderly pattern" of misuse). A wider ranging literature review is in process to examine this issue in more depth. Each of the conclusions is worthy of revision in more detail and further research planned will look at the impact that the misinterpretation of Polanyi's concepts might have had on specific IT KM projects. In addition more theoretic work will look at how the emerging view of NGKM could be helped by reference back to Polanyi's theory.

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