Money Talks: Communication Patterns as Knowledge Monetization

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Abstract

In this conceptual paper, we suggest that knowledge flows constitute the antecedences of value creation by means of its communication component. Knowledge is increasingly being accepted as a source of value creation and a differentiator between firms. However, to a large extent, current approaches to management and governance of knowledge resources prescribe measurements of the stock of knowledge. Therefore, we suggest a bridge that connects current knowledge sharing understanding with properties from communication theory, to explicate knowledge in use through a communication patterns perspective. Building on the perspective of knowledge as a flow, and postulating that value is based on knowledge use, rather than knowledge possession, this paper addresses the research question: How can we express knowledge in such a way that it can be monetized and made accessible to specific managerial interventions? We explain how communication is instrumental in capturing knowledge value and allows for a connection with monetary value. Extant literature on organizational communication roles emphasizes the role of boundary-spanners in the search for and combination of experience and tacit knowledge. Individual nodes in organizational networks can possess knowledge. However, to be valuable, the knowledge resources need to be deployed and utilized. The use of knowledge will involve the communication of this knowledge through ties to other nodes. The paper proposes that boundary-spanning roles provide a focal point for such monetization efforts. The contribution of this paper is six propositions for future research on how management accounting and control systems can be brought to bear in their governable and calculable aspects if communication functions are given more attention.

Keywords: *boundary spanners; monetization; communication; knowledge flows; knowledge sharing.*

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INTRODUCTION

This conceptual paper combines and links insights from several different disciplines, including communication theory, strategy theory, and management accounting theory, to provide a framework for the monetization of knowledge resources. We suggest that knowledge flows constitute antecedents of knowledge-based value creation and, subsequently, formulate six propositions to expound monetizing of knowledge resources.

Over the past decade, several efforts have been made to account for knowledge as a resource. Many of these attempts have emphasized the ownership of the knowledge resource and, consequently, its valuation and reporting, rather than the dynamic processes involved in the use of knowledge (Breunig & Roberts, 2013). Meanwhile, managerial accounting endeavors to account for knowledge as a resource tend to be limited to adopting a management control perspective, matching specific aspects of knowledge resource management against existing management control concepts of, for example, uncertainty and one's decision-making tool set (Ditillo, 2004; 2012).

In contrast, our approach is based on a relational premise and we argue that because communication is the carrier of knowledge flows, it constitutes the starting point in developing an approach towards knowledge-based value creation and, ultimately, towards monetizing the knowledge resource. We claim that the relational deployment of knowledge matters more than how much knowledge one has 'on inventory'. Such knowledge deployment is grounded in communication patterns around a problem-solving effort, possibly supported or triggered by an organizational artefact such as an information item (e.g., a report, a customer query, or a design blue-print). In this paper, the organization is viewed as a networked pattern of knowledge flows with communication acting in a platform role. This perspective allows for the identification of value creation patterns which, in turn, allows for monetizing knowledge by looking at the structural make-up of these patterns. Building on a dynamic pattern of knowledge flows and acknowledging that value creation is based on knowledge-in-use, this paper addresses the research question: *How can we express knowledge in such a way that it can be monetized and made accessible to specific managerial interventions?*

The paper's core proposition is that the communication patterns inherent in social networks of knowledge sharing carry the rudimentary bases for monetizing knowledge-value creation. The latter concept here adopts the postulate that the role of management accounting and control systems is a functional technology for constructing a governable reality (Miller & O'Leary, 1987) given its instrumental capabilities towards monetization. The paper contributes an extension of existing theory on intellectual

capital and knowledge management by bridging it with social network and communication theory. Indeed, this ambition relates directly to unresolved issues, and recent calls for research, in the knowledge management field (Cuozzo, Dumay, Palmaccio & Lombardi, 2017; Dwivedi, Venkitachalam, Sharif, Al-Karaghouli & Weerakkody, 2011).

Knowledge management research encompasses diverse topics. A recent review article aimed at identifying current themes and future trends could neither conclude that the field was fragmenting nor that a future dominant theme was emerging (Lee & Chen, 2012). However, it remains to be resolved how knowledge management, and indeed knowledge application, is related to value-in-use. Recently, the relevance of resolving this issue has been emphasized by the digitalization trend threatening to disrupt the way knowledge workers make their living (Christensen, Wang & van Bever, 2013). Indeed, a recent review article identifying four potential future directions for knowledge management research point towards specifying the knowledge process as a particularly promising future direction (Mariano & Awazu, 2016) that relates to the complex combination of three distinct phenomena: social capital, networks, and knowledge transfer (Inkpen, 1996; Inkpen & Tsang, 2005; 2016).

This paper relates directly to this discourse in that it aims to explain how specific communication roles are instrumental in capturing knowledge value creation and its subsequent monetization. The implication of this extension is particularly relevant for management control systems, based as it is on a decomposition logic of breaking down strategies into objectives, targets, and performance metrics. Applied within the context of knowledge-based firms, this decomposition logic reduces knowledge management to a strategy implementation problem, involving selection of appropriate responsibilities, budget allocations and performance measurement models. The latter (performance measurement modeling) has been a key tenant of intellectual capital approaches in which it is treated similarly to the financial resource in terms of how it can be exploited or governed through a regime of transactionable property rights and accompanying measurements and reporting systems. Rather, we approach the issue differently by taking a close look at 'knowledge-in-use', focusing on the knowledge sharing phenomenon, identifying its relational, networked, and communication aspects, and then attempting to work towards monetization opportunities.

The paper is built up as follows. First, we address different ontologies when addressing assets, and how these ontological differences affect the ability to surmise knowledge flows. Second, we address knowledge value creation as knowledge flows and integrate theory on communication networks into our line of argument, indicating how the concept of boundary spanners can offer

a suitable vantage point for managerial intervention. Third, the monetization opportunities related to the networked communication flows are discussed. We conclude by discussing both the theoretical and practical contributions of this paper, and the perspectives it develops for future research.

METHODOLOGICAL CONSIDERATIONS

The aim of this conceptual paper is to build mid-range theory by detailing a specific line of argument. Rather than singling out a narrowly aimed structured literature review to extract existing literature, our argument for knowledge flows, as the antecedence of value creation draw on a broad set of disciplines and literatures. Therefore, consistency considerations emphasize the sequence of laying out the line of argument, and underpinning it with reference to extant research. The essence of our approach is the credibility of argument in this inductive theory building ambition.

The line of argument, leading to six propositions, is presented in the following sequence. First, we address different ontologies when addressing assets, and how these ontological differences affect the ability to surmise knowledge flows. Second, we address knowledge value creation as knowledge flows and integrate theory on communication networks in our line of argument, indicating how the concept of boundary spanners can offer a suitable vantage point for managerial intervention. Third, the monetization opportunities related to the networked communication flows are discussed. We conclude by discussing both the theoretical and practical contributions of this paper, and the perspectives it develops for future research.

LITERATURE BACKGROUND AND CONCEPTS

Ontologies of "assets" affect the ability to address the flow of knowledge

Within the field of strategy, knowledge and competence form a strategic asset for firms, with the term asset being used in a pluralistic way to signify multiple processes and routines (Nelson & Winter, 1982). In particular, the knowledge-based theory of the firm considers the firm itself to be a repository (i.e., a big warehouse) for knowledge. That is, the firm functions as a container that bounds the various knowledge forms, types, and categories available for deployment (Grant, 1996; Spender, 1996) with the container itself being a fluid entity that adapts to the content whirling within it (Teece, 2004). Issues of asset ownership are considered of less importance than "*control or access to resources on a preferential basis*" (Helfat et al., 2007, p. 4)

Conversely, within accounting theory, the definition of an asset is more monistic, referring to a legal property right that can be exchanged via market transactions (Schuetze, 1993). Typically, the monist accounting perspective of what constitutes an asset allows for an epistemology of value creation in which assets are building blocks that can be reconfigured to optimize value creation. Meanwhile, it allows for an instrumentation of the reconfiguration process, by adding, merging, or transforming asset categories (Venkatraman and Henderson, 1998). As such, it has the benefit of being able to address instrumental questions on, for example, asset development, deployment, transformation, transaction and the like, thereby opening up the conceptual treatment of knowledge assets for operational and managerial use (Bollinger & Smith, 2001). Such use includes the articulation of knowledge assets into monetary terms in such a way that assets are transduced from the strategy ontology to a financial ontology as occurs in mergers & acquisitions and in joint ventures. This transduction will equip knowledge assets with an instrumentation that allows for monetization (e.g., goodwill or brand valuation) and, simultaneously, in the transduction process itself, flex the kind of multiple epistemological muscle that is called for in deepening the development of a knowledge-based theory of the firm (Spender, 1998).

One of the ontologies that monist accounting theory brings to bear on knowledge assets is that of financial categorization. It distinguishes assets into fixed and current asset categories, based on a (time of holding the) property right criterion. Other categorizations are equally possible, such as tangible versus intangible assets, or purchased versus self-generated assets with the problematization of categorization criteria (i.e., what and how to create relevant epistemological containers)—an important area for transduction heuristic creation (Grojer, 2001). The asset categorization used for this paper is one based on (asset) stocks and flows. However, rather than applying a dichotomy of (static) stocks and (dynamic) flows, we employ a continuum in which (asset) stocks liquefy into (expense) flows and vice versa. The classic example of this transformation is asset depreciation; over time, the asset stock decreases while the depreciation expense increases. Typically, the accounting heuristic is supported by a further categorization, that of capitalizing expenses (putting them on the balance sheet as a stock item) and expensing assets (putting them on the income statement as a flow item). Given that these accounting heuristics are motivated by arguments of risk and uncertainty for proper value estimation, the principle of conservatism is applied. That is, a decision heuristic is used in cases of high uncertainty to categorize transactional events as flows (expense the item) rather than as stocks (capitalize the item). It is important to note that ‘value’ in accounting theory is singularly perceived as monetary value based

on a market exchange transaction, while referring to principled arguments of 'objective' measurement.

Returning to 'knowledge assets', the above implies that categorizing knowledge as an asset would assume that it is of low risk and uncertainty—an assumption that is highly dubious given the dynamic nature and much debated phenomenological status of knowledge, both of which are illustrated in the many disparate efforts to measure it (von Krogh et al., 1998; Liebowitz & Suen, 2000; King & Zeithaml, 2003). As a result, and for the purpose of this paper, we emphasize knowledge as a flow between knowledge users rather than as replenishing or depleting a stock. Equally importantly, we emphasize the dynamic nature of knowledge; the knowledge itself is changed through its use each time it flows between users. This interpretation locates our understanding of knowledge flows within the literature on knowledge sharing, with each user having the potential to add to the organization's shared knowledge (Ipe, 2003; Cabrera & Cabrera, 2002; Riege, 2005). Stated differently, knowledge sharing harbors an appreciation rather than a depreciation mechanism with an ever-increasing value based on its use (Hansen, 2002). This view resonates strongly with a learning ontology; the more it is shared and used, the more we learn and the more its value is increased (Yang, 2007; Ardichvili, 2008).

As for the flow process itself, we adopt a network rather than a dyadic perspective on sharing. That is, there are multiple knowledge users who share knowledge with one another within bounded networks or clusters rather than one-on-one (Rowley, 1997; Cross et al., 2001). Users, thus, have sharing portfolios in which knowledge flows are routed among different users. Moreover, it implies that the level of analysis of our discussion is the network per sé, thus allowing for arguments and constituting features that pertain to networks as well as intra- and internetwork behaviors. There is an implicit assumption that knowledge-sharing networks create more knowledge value than the simple dyadic sharing between two users. This assumption resonates with the interpersonal network literature and the various social and behavioral assumptions that accompany it, including why such knowledge sharing networks are ultimately important (e.g., innovation, value creation) (Swan et al., 1999; Hildreth & Kimble, 2004). However, here, we do not distinguish between formal and informal flows (knowledge sharing) because we do not want to limit ourselves to the instrumentation options that are bundled with the formal versus informal knowledge sharing dichotomy.

We adopt three concepts in our line of argument, all centered on the core concept of social networks: (1) relations, (2) communications, and (3) sharing. Briefly, to create value out of knowledge, people need to relate to one

another to communicate and share knowledge. Relatedness ('connectivity') is therefore the basic premise upon which all other subsequent stages are built. Relational 'capital' and social networks thus provide the first step in building knowledge-based value creation. The actual communication patterns that are established within social networks then give rise to the sharing of knowledge (experience, insights, and tacit understanding). Hence, it is communication patterns that provide the second step. These patterns develop and evolve towards a 'meeting of minds' in tackling tacit, sticky, and hard to codify knowledge held by communication participants (Liyanage et al., 2009). These 'meetings of minds' take the shape of (re)combinations and (re)configurations of new and existing knowledge and interpretations in which participants arrive collectively at a new level of understanding, or a knowledge 'innovation'. This third step, thus, revolves around the combinations made within communication patterns, bringing desperate tacit and codified knowledge together. As such, the combinatory, sharing aspect of communication patterns is considered to be a 'personalized' approach to knowledge management (Hansen et al., 1999) that is highly reminiscent of situated cognition and learning (Brown & Duguid, 1991; Lave & Wenger, 1991). Therefore, the combinations of tacit knowledge are highly localized and contingent on context, but nevertheless are open to identification and intervention.

The three steps in our line of argument provide for an equal amount of analytical approaches. For example, step one focuses on the arena of knowledge-based value creation: the identification of the primary times and places when and where relatedness ('connectivity') occurs. Typically, these are meetings; including project meetings, debrief sessions, seminars, investment evaluations, milestone assessments, and problem-solving task forces, among others. Usually, these meetings tend to be dominated by a specific agenda (e.g., solving a problem, launching a product, a campaign kick-off) that mobilizes implicitly a wide range of formal and informal knowledge resources. From the new product development literature, we know that to be considered successful, such meetings need to comply with a series of minimal requirements related to input diversity, a semi-open agenda, and a participative and collaborative process (Houman & Balslev, 2009; Swink et al, 2006; Cooper et al., 2004). We postulate that these arenas are aligned with business activities and do not exist in a vacuum. That is, they are there to create value even if this value is not clearly and unequivocally considered or assessed upfront. Arenas as such are not 'investment objects' subject to return criteria but part of processes of value creation with these processes created and justified for the aim of value creation. That is, these meetings are not talk for talk's sake.

The communication patterns that constitute the next step in our line of argument are where the knowledge monetization possibility emerges. Interpreted as social network structures in which these patterns are nested or accommodated, the constituting nodes and ties and the classification of each category in terms of their characteristics provide the building blocks for mapping out value creation flows. For example, different nodes occupy different positions within networks, each having a predominant association with a specific activity (Cross et al., 2001). A node can bind a network together owing to its centrality in the network, with communication flows going primarily through this central person or unit. Or a node can serve as an inter-network link, fulfilling a boundary-spanning role that allows for diversity of knowledge interaction and the emergence of novel insights and conclusions. Similarly, the ties between the nodes in a network signify how loose or tightly knit a network is. Strong ties indicate an intense and frequent communication pattern, whereas weak ties indicate an infrequent and random communication pattern. Networks as such can be typified according to a number of characteristics apart from the characteristics of their constituent parts. For example, the characteristics of centrality, density, and bridging address the distribution of nodes within networks while homophily, multiplexity, and reciprocity describe connections within networks. Hence, social network characteristics promulgate a series of drivers in communication patterns that can be used to diagnose the strength, cohesiveness, and focus of a knowledge value-creation effort.

Where earlier stages are articulated in terms of communication patterns (i.e., who talks to whom), the third stage expresses itself in terms of combinatory criteria and, as such, allows for specifying optimization of who talks best with whom; certain combinatory patterns are more likely to result in successful solutions, insights, or proposals than others. This third step resonates with research on optimal team composition vis-à-vis team performance; certain combinations outperform others owing to their members' configurational characteristics (Mathieu et al., 2014; Hollenbeck et al., 2004). In comparison with the focus on communication patterns in stage two, the combinatory focus provides an additional set of criteria that can act as drivers for knowledge-value creation, which can either predetermine or leverage communication pattern criteria and define their potential for use as a metric in monetizing knowledge. However, for the purpose of this paper, we limit ourselves to looking at steps one and two in developing knowledge-based value creation, selection of relational ('connectivity') arenas, and specifying appropriate communication patterns.

Knowledge value creation is relational

According to Bontis (1999), knowledge originates from human capital and is combined with other knowledge resources in relational capital, being harvested ultimately as organizational capital in the form of new sets of routines, procedures, and managerial processes. Breunig and Roberts (2013) surmise that knowledge value creation is located within relational capital, combining individual knowledge in a networked fashion and based on communication. Typically, efforts in managing relational capital involve establishing such communication networks, making them work, directing them, and maintaining them. Our main underlying proposition is that the social relations among (groups of) people constitute a firm's knowledge value creation process, while it is the communication within these people-to-people networks that provides the novel combination of hitherto separated knowledge of perspectives upon which new business ideas and innovative practices are based. In this context, we distinguish between concurrently existing "contactivity"[3] (between people) and "connectivity" (between communication systems).

Within the field of communications research, several of these processes have been specified and refined. For example, in the communication model developed by Tucker, Meyer, and Westerman (1996), strategic knowledge capabilities are developed as the result of interpersonal communication systems at an institutional level. Their model stresses the role of organizational routines and managerial direction, implicating the importance of management intervention in authorizing and establishing critical communication opportunities and channels. Once communication occurs, connectivity and contactivity are created, and subsequent stages of combining knowledge can be entered, including knowledge sharing, expertize leveraging, and collaboration (Cross & Prusak, 2002; Davenport & Prusak, 1998; Nahapiet & Ghoshal, 1998; Tucker et al., 1996). The communication perspective on knowledge value creation revolves around the design features, procedures, and routines that establish intra-network connections. Some of these facets are codified and embedded in information and communications technology systems. However, many relate to concepts and methods outside the domains of knowledge management, information and communications technology, and communication theory. Examples are incentive systems for knowledge sharing and work collaboration, a project staffing system that engenders contactivity between people with diverse sets of interpretations and action vocabularies, the meeting and debriefing methods used around reporting systems within management control, and an intervention style that

3 The term 'contactivity' was coined by Leif Edvinsson, a reputed author within the Intellectual Capital field.

is based on openness and involvement rather than entrenchment into job descriptions and other formally mandated responsibilities.

In summary, knowledge value creation through communication networks requires pulling from a broad set of distinct disciplinary areas. Criteria for soliciting conceptual and instrumental inputs revolve around system connectivity and interpersonal contactivity in a sequential, step-wise manner, initiating from awareness to development, often in practical efforts aimed at knowledge co-creation (Kazi et al., 2007). It is perhaps ironic that academic workshops tend to claim a similar knowledge co-creation focus (Hatcher et al., 2006).

Knowledge value creation is communication based

Communication as a personalized process refers to the interpersonal transfer of knowledge. From the perspective of the firm, however, such interpersonal exchange is understood as personal networking, with the firm's role in communication revolving around encouraging, allowing, bounding, and focusing the development of such personalized communication networks. Both codified and objectified knowledge as well as non-codified and subjective knowledge are communicated via such networks. Thus, interpersonal communication networks become the focus of a deliberate effort to manage knowledge by combining different perspectives. But the question remains of how can these processes be managed and followed up with management accounting and control systems.

Research has indicated that firm level networks tend to revolve around communities, including communities of practice, collaboration, interest, and innovation (Adler, Kwon & Heckscher, 2008; Ahuja, 2000; Inkpen, 1996; Wenger & Snyder, 2000). These communities are networks that are organized around several ground rules, one of which is that of purposeful information and experience sharing. Communities of practice can arise spontaneously but can also be encouraged to develop by management through deliberate design (Brown & Duguid, 2000). It is in the interest of management to develop communities that can be used as vehicles for more effective information and knowledge sharing, compared to the more hierarchical reporting flows of typical organizational responsibility structures (Stevenson, 1990). The emergence of the community concept and its apparent usefulness in information, experience, and knowledge sharing has triggered a large array of application areas, ranging from online communities to civic communities in urban renewal and politics (Putnam, 2000). The community of practice concept informs the present work in two ways: the community as a social network of communication; and the community as an organizing format for the structuring of communication flows.

The social aspect of these communities (i.e., the fact that communication is interpersonal and personalized) provides a possibility to map communication flow patterns. Using Social Network Analysis (SNA), these maps outline who communicates with whom, and with what frequency (Scott, 2000; Wasserman & Faust, 1994). Actors (communicators) within these "communicaties" that have high frequency counts can be classified according to the roles they fulfil. Hence, we conceive of communication networks as stable communities over time, and vice versa (i.e., communities as communication networks) (Brown, Broderick & Lee, 2007; Gillani, Yasseri, Eynon & Hjorth, 2014). For communication networks to classify as communities, network roles need to develop over time. Hence, the community becomes an organizing format to group and classify communication. Consequently, we suggest that:

Proposition 1: Knowledge value creation is communication network-based.

Knowledge value creation by means of communication roles

Communities conceived of as organizing formats for communication flows and patterns are demarcated by the various roles that people take up within these networks (Cross & Prusak, 2002). Each role is defined as creating a certain type of connectivity, with a distinct set of communication functions. Breunig and Roberts (2013) identify four roles (i.e., central connectors, boundary spanners, information brokers, peripheral specialists; Cross & Prusak, 2002) in social networks that allow for the appropriate management of each network. For example, the inclusion of the concept of boundary spanners can accelerate the implementation of a corporate-wide communication system with boundary spanning individuals acting as gatekeepers to other domains within the organization. Similarly, the information brokers within a selected number of social networks can be asked to chair formal meetings, thus propelling the distribution and accelerated dissemination of information across constituencies. As these examples elucidate, identifying the above roles within social networks is followed by a selection of which roles and which networks are important for knowledge-based value creation.

Although these roles are stated originally vis-à-vis people, they can also be elaborated towards roles for typical organizational formats. That is, an item on the organization chart or within work process flows where cross-functional coordination and exchanges occur. Such 'organizational arenas' can be relatively low key, such as, meetings that have been systematically structured into workflows and occur with periodic regularity. But in contrast to being based on an agenda defined by hierarchical reporting on formal responsibility areas, these 'arenas' are defined by activities and shaped by

a role towards (diversity of) interpretations and requisite actions precipitated by a dynamically changing context. For example, a customer order flow might be standardized as a formal activity protocol, but with each new customer requirement, variety and diversity are introduced, requiring a response in terms of requisite knowledge deployment, such as a response based on codified (design or installation blueprints) and/or tacit (prior personal experiences executing a similar job) information.

Moreover, a combination is equally possible. Personal roles may be harnessed or leveraged by the roles of the organizing arenas. That is, people can fulfil boundary spanner or connector roles within networks, but organizing arenas can take up these roles too. For example, a meeting sequence can have a connector role within dispersed functional knowledge areas or it can have a boundary-spanning role across knowledge domains. Jones (2007, chapter 4) holds that these 'integration mechanisms' are already known within the organization design discipline. However, they tend to be related to the allocation of tasks and responsibilities to counteract the silo-effect of functional specialization and, by purpose, are far less intended for the exchange and sharing of insights, tacit knowledge, and experience. Therefore, the organizing format of communities has a different agenda and a different purpose. This distinction is also revealed in how such organizational arenas are commonly identified, not on an organization chart, but in an activity/work flow process map. The boundaries that these roles (fulfilled by people and by organizational formats either separately or in combination) span determine the diversity and richness of the tacit and explicit knowledge inputs that are invoked in them. High diversity (of knowledge inputs) across all knowledge dimensions requires the involvement of boundary spanning roles, with high diversity increasing the potential for novel knowledge creation that, in turn, increases the potential for value creation.

Therefore, with the aim of connecting monetary value to a firm's knowledge resources, identifying a firm's boundary spanners provides a first step towards monetizing knowledge-value based on communication. Though all of the aforementioned roles are relevant for knowledge exchanges to occur, Breunig and Roberts (2013) suggest that the role of boundary spanner is particularly important. Boundary spanners bridge different knowledge communications in which knowledge is produced and maintained, including their related interpretative schemata. Tushman and Scanlon (1981) indicate that boundary spanners are individuals who maintain a high level of contact with both the external environment and the internal organization, enabling them to diffuse, filter, and translate information across domains. Specifically, the translation aspect is relevant as information is recast in terms that can be understood and used by others (Allen, Tushman & Lee,

1979). Translation of work requires a 'common syntax, code, or heuristic' (Zhao & Anand, 2013: 1517), such as a value creation conceptual toolbox and accompanying constructs of value and profit drivers. Bringing this diversity of knowledge, practice, and learning together via boundary spanners provides a high potential to create new knowledge. Once entities that will fulfil the boundary spanner roles within an organization have been identified, the ties that connect different communities and knowledge repositories can be identified and made available for managerial interventions (Obstfeld, 2005). That is, identifying and managing the boundary spanner roles fulfils the first value creation step originating from connectivity. This supposition implies that there will be a boundary role 'discovery' process mediated through, for example, network analysis or deliberate construction (e.g., via a purposeful organizational design intervention involving the establishment of 'arenas') that creates a similar opportunity for conversion of knowledge into monetary value. Similarly, the various ideas that are pulled together via boundary spanner roles (and combined into novel knowledge configurations on that specific boundary spanning location) allow opportunities for alternative ways of configuring the monetary value encapsulated in each knowledge input to be identified (e.g., in terms of business or pricing models). Consequently, we suggest that:

Proposition 2: Boundary spanner roles provide a vehicle for monetization.

Boundary spanner individuals

The concept of boundary spanners is interdisciplinary and not novel. For example, within the communications discipline, they are sometimes referred to as "communication stars" (Tushman & Scanlan, 1981). Such "stars" are able not only to connect, but also to translate information into a format that conforms to an organization's decision-making processes. Internal communication stars are seen by their co-workers as being technically competent and having work-related expertize. These stars communicate significantly more often than non-stars with other areas in their close work environment, in the organization as a whole, and with areas outside the organization.

Considering the ideas of boundary spanners and communication together, it can be said that boundary spanners act as bridges between networks, and do so both intra-organizationally and inter-organizationally. This bridging activity refers to accessing and applying local knowledge across domains of application, combining it into novel understanding and insights. Boundary spanning as an activity is not entirely removed from the formal organization design; people occupying a high hierarchical position tend to

have more opportunities for establishing internal and external organizational ties and, thus, are more likely to act as boundary spanners (Manev & Stevenson, 2001). In other words, the existing organizational hierarchy and its corresponding responsibility design can act as a proxy for the uncovering of boundary spanning roles rather than deploying a full-fledged social network analysis. As a result, the internal responsibility accounting structure and its accompanying reporting system continues to be relevant for identifying monetization opportunities (Gupta & Govindarajan, 1991). In particular, the communication and bridging activities of 'bosses' (management work), provide flow denominators for knowledge value creation. Consequently, we suggest that:

Proposition 3: Communication patterns at boundary spanning, hierarchical nodes in the organization structure, provide the first opportunity to initiate knowledge monetization.

Some qualifications of boundary spanners include technical skills, economic skills, legal skills, network knowledge about the partner, and experiential knowledge gained through past interactions. Boundary spanners conceived as persons rather than as organizational formats, contain social qualifications, such as being autonomous, being an extravert, and displaying ambiguity-tolerant behavior in social settings. Typical communication abilities include conflict management, empathy, emotional stability, self-reflection, and cooperativeness. This list of individual characteristics can be used to identify boundary spanners by means of questionnaires issued within organizations (Ritter, 1999). For example, the authors of this paper used such a questionnaire to screen for boundary spanners as part of a communications instrument developed for the International Association of Business Communicators (Roberts, Simic-Brønn & Breunig, 2003). Human resource departments may possess in their skill and social profile databases information that can be used as a first-stage filter to prescreen, identify, and target specific individuals with the skill set and social characteristics desirable for boundary spanners for a subsequent boundary-spanning survey questionnaire.

Boundary spanner arenas

Insomuch as boundary spanner roles at a personal, individual level refer to "contactivity" in social networks, organizational formats also can fulfil this role. Typically, this role encompasses deliberate information flow interventions concentrated at a specific 'stoppage point' within an activity sequence or protocol, such as a handover within a larger project that is accompanied

by a milestone assessment (meeting, reporting, measurement) or a 'stage gate' moment in a new product development process. This 'stoppage point' creates a natural organizational arena that aggregates, combines, and reconfigures diverse knowledge inputs, commonly for subsequent use in activities downstream of the 'stoppage point'.

Purposeful design and the regular occurrence of the boundary spanning arena with a declared agenda of knowledge sharing are key. Hence, it is not a one-off moment related to a single project or special circumstance (as in project management), but rather a regular and systemic feature of an activity stream across projects. Thus, boundary spanning arenas should be visible on activity flow charts and embedded in organizational routines of knowledge work in terms of systemic debriefing and 'what did we learn?' agenda points and performance measures (Gasson, 2005). Although boundary spanning arenas may not be represented on an organizational chart, they can involve specific tasks and responsibilities that are allocated to individuals or functional expertize areas. Their exclusion makes sense because the boundary-spanning role would break down if it were to be locked into a specific domain, liaison role, or task force responsibility that is bounded by an agenda of coordination and the numerous standard operating rules involving reporting, key performance indicators, and budget accountabilities. These arenas tend to be located outside of existing, formal responsibility domains and at the periphery of the organization's focal activities, an idea which resonates with existing perceptions of where organizational learning takes place (Lave & Wenger, 1991). Consequently, we suggest that:

Proposition 4: Identifying communication arenas acts as a proxy for boundary spanning, communication patterns for the purpose of knowledge-based value creation, and its subsequent knowledge monetization.

Knowledge monetization opportunities

The monetization of knowledge can be conceived of as a form of capital conversion as inspired by Bourdieu (2008). Its aim is to exemplify the reciprocal interdependence between knowledge and financial resources without getting stuck in a 'the chicken or the egg' primacy argument. Both knowledge and financials are interrelated, with one driving the other and vice versa; financial resources are needed to create originating stocks and receptor pools as well as to make sure that knowledge actually flows. Vice versa, knowledge actively stored and mobilized within networks and 'spun' by boundary spanners acts as both a cost and revenue driver for a firm's financial success. To paraphrase a tired management slogan, people might be the organization's most important resource, but one needs to be able

to afford to convert knowledge carried by people into knowledge made financially productive for the organization. Ultimately, the argument here is for the sustainability of a firm's competitiveness: the conversion of non-financial (knowledge) resources into financial resources and back again is essential for being able to compete over time (Allee, 2008). Thus, conversion requires addressing how one can be expressed in terms of the other, showing the interdependence of the two.

Knowledge networks and the role of the boundary spanner in creating reciprocal interdependencies necessitate a requisite conceptualization towards the financial domain in terms of networks and patterns. Typically, such conceptualization addresses the area of cost behavior in which total costs are categorized as the sum of fixed and variable costs, allowing for the computation of profit (costs < revenues) or determination of breakeven status (costs = revenues). The patterns identified are related to the axiomatic form of the two cost categories (including (dis)proportional, progressive, regressive, and (non)linear costs or mixes thereof) following the canons of underlying microeconomic cost functions. As a result, patterns of cost behavior are understood as independent variables in a cost function, but do not generate a pattern beyond the domain defined (bounded) by the variables. Networked cost functions or patterns that transcend the initial domain of definition (e.g., a production cost function, a logistics cost function, a sales cost function etc.) are unfamiliar territory (Boons et al., 1992). However, we argue that we can avoid this problem area by using an identified communication pattern as the template for a commensurate and requisite cost behavior pattern. That is, by layering two patterns, an underlying communication pattern and an overlaying cost pattern, we can attempt to monetize the knowledge that flows through the communication pattern. Stated differently, it is not so much the knowledge itself that gets 'costed' but rather the 'pipelines' (patterns) through which it flows. This form of structural (behavioral) equivalence implies that the characteristics of the communication patterns are reflected by corresponding characteristics in the structure of the cost patterns. Thus, the characteristics of networked patterns in communication, such as centrality, density, frequency, and bridging, ought to be reflected in cost behavior patterns.

At this point, an effort to establish 'pattern matching' between the communication domain and the financial domain would benefit from avoiding as yet too narrow definitions. Rather than talking about 'cost patterns', it would be beneficial to use a wider and more inclusive definition of 'spending patterns'. The difference is that spending simply means a financial outlay disregarding its origin as cash, a cost, or an expense. Consequently, we suggest that:

Proposition 5: Monetization rests on pattern matching and establishing definitional equivalence between characteristics of communication patterns within social networks and spending patterns.

Spending patterns

For the purposes of this paper, we conceive of the organization as a network of networks in which networked relational clusters that can connect to one another exist. We also conceive of networks as conduits for knowledge transfer, with such transfer being motivated by and aimed at value creation (i.e., their purpose is legitimized upfront in the creation of their ties) (Zhao & Anand, 2013, p. 1518). Similarly, the organization as a 'network of networks' can connect to its external environment, which also consists of network clusters. The boundary spanner role here is to develop connectivity between network clusters with the relative success of its connectivity expressed in terms of membership: a well-connected organization has many memberships across multiple constituencies and stakeholder groups (networks). The latter can be understood as a metric of the relative success of organizational-level knowledge sharing and its 'situated learning'. Conversely, an organization (network of networks) that is not well connected will have barriers to knowledge sharing and transfer due to its distance from relevant networks and an absence of interfaces (connections). Boundary spanners (individuals or arenas) can be deployed to overcome this relative isolation and bridge the distance. In social network theory, this issue is addressed in terms of 'structural holes': collaboration produced by the bridging of networks with distinct, non-overlapping knowledge repositories (Burt, 2002; Ahuja, 2000). 'Structural holes' are not necessarily desirable. An organization may choose to isolate themselves, wholly or in part, for strategic reasons, such as for protection of proprietary knowledge or unique competencies.

Spending patterns can take one of two orientations: inflows (revenues) or outflows (costs). Revenue patterns are commonly referred to as 'revenue streams' with the patterns of relatedness left to the identification of 'revenue drivers', which can be causally interdependent in their occurrence over time (e.g., Thrane, 2002; Douglas & Douglas, 2004). In this respect, much is made of the use of "big data" to reveal patterns among revenue drivers. Typically, the point of departure is (customer) buying behaviors available in customer relationship management systems. Similarly, typical accounting tools, such as 'customer profitability analysis' and 'customer lifetime value', are grounded in prior knowledge of these revenue patterns.

Cost behavior patterns and their identification and visualization have a long history given their background in microeconomics (Boons et al.,

1992). This history also constitutes a barrier for change due to entrenchment in conventional wisdom and canonical knowledge. Spending patterns are intuitively understood in terms of their textbook meaning. However, we suggest, specifically, that a recent development in the so-called 'driver hierarchies' is relevant. The term cost driver was coined as part of the activity-based costing approach to cost allocation, representing a link between operational domain activities and financial resource consumption in the monetary domain (Foster & Gupta, 1990; Cooper et al., 1992). Drivers are operational factors that cause financials. The issue then becomes identifying relevant cost drivers and assessing the causal relationship between activities performed and financial resources consumed, that is, what leads to what, and how far the causal chain of interdependence should be followed.

Within network research, the issue of costs is used primarily as a decision-making criterion for the effectiveness of connectivity, thus ignoring the idea of patterns (Zhao & Anand, 2013). For example, when assessing the effectiveness of knowledge transfer by boundary spanners, Zhao and Anand argue that a 'collective bridge' of boundary spanners is more effective than a single boundary spanner. Their criterion for effectiveness is the costs for development and maintenance of network ties (i.e., connectivity), which are considered to consist of training, travel, and IT support. Typically, these costs can be viewed as interrelated; communication requires knowing who to connect to (IT support), to meet physically or in virtual space (IT support, travel), and to establish a common base condition for understanding (training). Zhao and Anand's definition of knowledge complexity as 'the extent of interdependencies and interactions among different subareas of the totality of the knowledge' (based on Simonin, 1999) hints at a suggestion of cost patterns as much as costs as stand-alone categories. 'Collective knowledge', which combines individual knowledge on specific subject areas with the knowledge of how to coordinate, share, distribute, and interpret the subject area knowledge, provides yet a further basis for considering patterns rather than individual cost categories or cost as a mere decision-making criterion. As a result, a consequence of focusing on cost patterns is that it enables knowledge to be considered as complex (as defined by interdependencies among the encompassed knowledge areas), implying that knowledge value should be considered as a combinatorial pattern rather than a point-item object or outcome (Tasselli, 2015). In other words, communication is as multiplex as its network conduit, as is its substance of exchange and its representation as a pattern. This concept preempts the question of whether knowledge value creation can be circumstantial or randomly incidental; collective knowledge defined as interdependencies already includes an assumption of contextual value-in-use.

Monetization can be reduced into an effort to identify drivers within spending patterns, with the spending patterns in turn being driven by the characteristics of the communication networks in which they operate. For example, if the network is of high centrality (revolves around one or a few individuals or arenas), high density (all communicating participants are closely related in time and space), and high frequency (communication occurs often), then there are three spending drivers. Moreover, if the communication ties between the participants are strong, a fourth spending driver is identified. The spending pattern that is the result of these four drivers is a multiplicit bundle of four financial origins that make up the structure of the communication activity: the central actors that initiate, the participants that are structurally near, the communication that is frequent, and the historical tenure of the communication. Each communication driver has its own associated variable, committed, and infrastructural spending levels that combine into an overall spending pattern that is a corollary of existing network characteristics.

Furthermore, in terms of spending patterns, monetization would follow a network dynamic in that it has no hierarchy (top or bottom), but rather a center and a periphery. Dynamics are thus defined in terms of centrifugal or centripetal forces (outward or inward). Spending patterns have a corresponding dynamic in that the patterns multiply (grow) outward or contract (shrink) inwardly. Obviously, a longitudinal perspective is needed to observe this dynamic with the spending patterns signaling knowledge sharing and value creation activities' increasing or diminishing returns to scale. Consequently, we suggest the following:

Proposition 6: Spending patterns are proxies for knowledge sharing and knowledge-based value creation with communication network characteristics acting as drivers and providing its longitudinal dynamics.

CONCLUSION

In this conceptual paper, we have addressed the research question: "How can we express knowledge in such a way that it can be monetized and made accessible to specific managerial interventions?" and distilled six propositions for future research on how accounting can be brought to bear onto the governable and calculable aspects of knowledge management.

The contribution of this paper is its addressing knowledge value creation at the level of communication flows within social networks. Networks represent a meso-level between individual actors and the organization, where the identification, visualization, and management of knowledge value creation can be operationalized. Communication flows use the organizational

format of communities of practice, so-called "communicaties", emphasizing boundary spanners and other connectivity roles held within a communication network (Hildreth & Kimble, 2004). The monetization of knowledge value revolves around identifying communication roles, each of which acts as a point of origin of expense patterns that reflect the knowledge value-creation process. Boundary-spanner expenses are expressed in financial terms, with expenditure patterns acting as multipliers (not aggregations) driven by the communication patterns initiated by a boundary spanner (role) within the network. The fact that communication is a commonly existing function within organizations—supported by both technology and specific human expertize, each with an accompanying set of databases— makes it a useful starting point for operationalizing knowledge value creation.

In this paper, we propose that the boundary-spanning role brings together diverse knowledge and provides a focal point for monetization efforts. Extant literature on organizational communication emphasizes the boundary-spanner role in the search for and combination of tacit knowledge and user experience (Tushman & Scanlon, 1981; Cross & Cummings, 2004; Levian & Vaast, 2005). We address how the boundary-spanner role is fundamental for this combinatory effort to occur. In addition, we address how these combinatory efforts within boundary-spanning roles can be extended to communication-enhancing regimes at the organizational level. Moreover, we show how monetization itself reflects a networked characteristic as a combinatory perspective (rather than conventional point-item aggregation) of flows. Therefore, we suggest that the argument starts from the resource consumption perspective (i.e., costing) rather than from the commonly used valuation or pricing perspective. The visualization of knowledge communication activities is important because it shows how the knowledge resources of a firm actually flow. The monetization aspect here falls back on the identification of the various communication roles, among which the boundary spanner role acts as a focal point for monetization. Consequently, we do not claim to provide an instrumental algorithm that converts knowledge into money. Rather, we intend to direct attention toward *where* to focus the conversion effort (boundary spanners), and how to build an argument of primarily *what* to convert (communication) as well as indicating *which* form such a conversion might take (multiplying patterns). In doing so, this work aims to bring the research and practitioner communities within the knowledge management field closer together (Metaxiotis, Ergazakis & Psarras, 2005).

The practical benefits of visualizing knowledge value creation by means of communication networks are twofold. First, the insight gained can be used to improve accountability. Visualizing the exchange of knowledge

within communication networks shows what one actually does, not what one says they do or what instructions/contracts/task descriptions say one's role is nominally. This transparency allows for an immediate allocation of accountability with a subsequent 'reality capture' in terms of localized metrics and relevant costs. The practical benefit, thus, is not in suggesting that spending on communication networks is equivalent to the creation of value. Rather, that value originates from looking at communication network roles and spending patterns in relationship to each other, with the implication that close matches are preferable. This statement is open to empirical validation by future research. Second, communicating the knowledge flows within an organization to its external constituencies has an external and immediate usefulness. It is a form of "turning the firm inside out" towards, for example, customers and suppliers (notably in industrial and B2B markets), showing how expertize and knowledge resources are internally connected and made productive, including how management coordinates, enhances, and directs knowledge resource flows.

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Abstract (in Polish)

W niniejszym, koncepcyjnym, artykule sugerujemy, że przepływ wiedzy jest prekursorem tworzenia wartości poprzez swój komponent komunikacyjny. Wiedza staje się coraz bardziej akceptowana jako źródło tworzenia wartości i różnicowania między firmami. Jednak w znacznym stopniu obecne podejścia do zarządzania i zarządzania zasobami wiedzy wskazują na pomiary zasobów wiedzy. Dlatego postulujemy, że aby zrozumieć dzielenie się wiedzą, trzeba zaczerpnąć z teorii komunikacji w celu wypromowania słownictwa używanego we wzorcach komunikacji. Opierając się na wiedzy jako przepływie, a postulując że wartość opiera się na wykorzystaniu wiedzy, a nie na posiadaniu wiedzy, niniejszy artykuł opowiada na pytanie badawcze: „Jak możemy wyrazić wiedzę w taki sposób, aby mogła być zmonetyzowana i dostępna do konkretnych celów kierowniczych? Wyjaśniamy, w jaki sposób komunikacja ma zasadnicze znaczenie w zdobywaniu wiedzy i pozwala na połączenie z wartością pieniężną. Dalsza literatura na temat znaczenia komunikacji w organizacji podkreśla rolę, jaką odgrywają pracownicy przekraczający granice organizacji w poszukiwaniu i połączeniu doświadczeń z wiedzą milczącą. Poszczególne węzły w sieciach organizacyjnych mogą posiadać wiedzę. Jednakże, aby być cennym, zasoby wiedzy muszą być rozmieszczone i wykorzystane. Wykorzystanie wiedzy obejmie przekazanie tej wiedzy poprzez powiązania z innymi węzłami. W artykule proponuje się, aby role rozciągające granice stały się centralnym punktem dla takich działań w zakresie monetyzacji.
***Słowa kluczowe**: pracownicy przekraczający granice organizacji; monetyzacja; komunikacja; przepływ wiedzy; dzielenie się wiedzą.*

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