From Knowledge Codification To Application: An Agent Perspective

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ABSTRACT:

While firms spend millions on data collection and knowledge codification, knowledge remains an elusive asset unless firms can strategically apply knowledge for securing competitive rents and sustainable advantages. This paper proposes a knowledge process reengineering that can allow firms to process their codified knowledge to secure rents through innovation and innovation diffusion. The reengineering emphasizes the roles of various knowledge application agents as intermediaries that can streamline the process. The knowledge application reengineering shows how knowledge can be exploited by transforming the stock of codified knowledge into creativity; then creativity to innovation; and finally the subsequent "selective" diffusion of innovation into data and knowledge. This implicates the perpetuity of knowledge management.

Keywords: *Knowledge application, Agents, Creativity, Innovation, Diffusion, Reengineering*

1. Introduction

Knowledge has long been equated with power and influence and competitive hoarding of knowledge has been common practice (von Krogh et al 2000). Yet, without application, knowledge remains elusive and investments to secure knowledge, a sunk cost. Moreover, without a focused initiative towards knowledge application, knowledge hoarding becomes popular. Hoarding makes knowledge "sticky", i.e., keeps knowledge context-dependent that is captive to its source (an individual, a system, a subunit….) and extremely difficult to transfer in a form usable by a seeker of the same knowledge (Von Hippel (1994). Without application or use, knowledge loses its value. Yet, pertinent heuristics to trace the exploration – codification – application are largely missing in literature and practice.

Although data is the source of knowledge, organizations have committed millions towards KM systems to build enterprise-wide knowledge platforms and creating content-rich environments (e.g. multimedia) that facilitate codification and transfer of complex context-dependent knowledge (Ramaprasad & Rai 1996). Sadly, KM systems merely provide a technological "wrapper." Successful knowledge management must develop viable routines that not only allow effective knowledge codification from exploration but also implement mechanisms to exploit and apply the accumulated knowledge stock. This paper forwards an effective knowledge process reengineering (KPR) scheme that uses various software and human agents to maintain flow and continuity of the codified knowledge. The central theme of this paper is to highlight the patterns of exploring - codifying - applying knowledge from storage to commercialization and reuse. In doing so, this work offers pertinent heuristics and extends the agent-driven knowledge codification reengineering forwarded by Datta and Acar (2010).

The need for applying codified knowledge to reap competitive advantages is core to every firm operation. "The dilemma before an organization is therefore to externalize knowledge so that it can be shared," as Choo (1998: 109) notes, "but to do so without compromising the impetus to learn and innovate." Because knowledge is a non-tradable organizational asset lacking a pre-determined price for objective valuation (Dierickx and Cool 1989), economic rents from knowledge can only be ascertained by their wholesome application as innovations (Nonaka and Takeuchi 1995; De Carolis and Deeds 1999). As an important source of organizational revenues (West and Farr, 1990), innovations provide returns across a broad spectrum- from reengineered cost-effective processes to the fruition of new products and services. But in to order to innovate, knowledge needs to undergo further transformation to ensure application. It is this sequence of transformations towards application that lies at the heart of knowledge management (KM) – yet it remains a largely understudied phenomenon in existing knowledge KM research.

Agents are central to reengineering knowledge-from codification to application. Agents are conceived of as autonomous entities that perform intermediation tasks on behalf of an organization (Datta 2007). In the context of KM, agents are autonomous software (codes that perform autonomous functions on behalf of the user such as Boland et al's "Spider") or human entities (autonomous persons or groups performing prescribed intermediation activities such as Nonaka and Takeuchi's "knowledge-creating crew"). In intermediating multiple domains, agents develop a transactive memory from their experience in transacting with diverse domains and observing their actions. For example, agents can use their transactional observations as references to develop a historically persistent thread (e.g. feedback ratings) to assess the reliability and credibility of knowledge sources and domains. A knowledge seeker could merely refer to that temporally persistent thread for assessing a source's transaction credibility. In a nutshell, the strength of weak ties arises from agents acting as brokerage nodes that link knowledge clusters by means of interfacing, linking, and translating. In this way, agents establish a shared context by "sitting in the middle" of domains of practice (Carlile 2002).

In what follows we use Datta's (2007) agent-mediated Knowledge in Motion (KiM) framework to reengineer KM processes from knowledge codification to knowledge application. Besides depicting a detailed KM process reengineering scheme, we surface specific agent characteristics core to knowledge application.

Prior to engaging in a discussion of the knowledge application framework, it is important to note that the proposed framework is essentially nonlinear. Nonlinearity of this model is argued on the grounds that the transformation of knowledge is inherently and intractably unpredictable. Each transformation process faces myriad interactions: the presence of agents, the heterogeneity of inputs, organizational conditions and culture, just to name a few. As a result, outputs and inputs cannot be equated as a linear function, as small changes in input can cause unpredictable shifts in output. In summary, due to the inherent nature of continuous refinement in KM, transformations are never constant. Thus the ratio of input and output in every phase of knowledge transformation is inelastic and non-linear. Although a theoretical assessment of non-linearity is beyond the scope of this paper, it is assumed that, in reality, KM transformations are more likely to mimic a curve than a straight line.

A transformation is linear in that the ratio or relationship between a certain amount (or unit) of input (x) and output (y) is constant, i.e., a certain amount of input will always result in a prespecified amount of output, and can be defined as a straight line ($\partial y/\partial x \neq 0$, $\partial 2y/\partial x2 = 0$); a non-linear transformation does not have a constant ratio between input and output and is designated by a curve (e.g., quadratic, cubic) rather than a straight line ($\partial y/\partial x \neq 0$, $\partial 2y/\partial x2 \neq 0$). In the context of the KiM framework, it is assumed that output consistently decreases, albeit in an inelastic manner ($\partial 2y/\partial x2 < 0$), across transformations from knowledge creation to knowledge application. The non-linearity is largely a function of the type of input and the moderating effects of agents (key players) that can influence the transformation outcome.

2. Knowledge Process Reengineering: From Knowledge To Innovation

2.1. Exploring: Transforming Knowledge Into Creativity

"The knowledge we have is not sufficient for creating a knowledge-based business," note von Krogh et al (2000: 21), "…the knowledge-creating company benefits from a broader mobilization of creativity and innovation." To make knowledge actionable, organizations need to foster creativity as an extension of their base of knowledge (Dennard 2000). We define creativity as the inception of a new idea or perspective derived from a given knowledge base. Although creativity is often a result of combinations and re-combinations of existing but previously unconnected knowledge, it is a unique outcome—a knowledge artifact that extends and makes knowledge "actionable" and serves as a prerequisite for innovations (von Krogh et al 2000; Sheremata, 2000). In applying existing knowledge to generate concepts that the organization can apply for economic returns, this phase is a first step towards knowledge application.

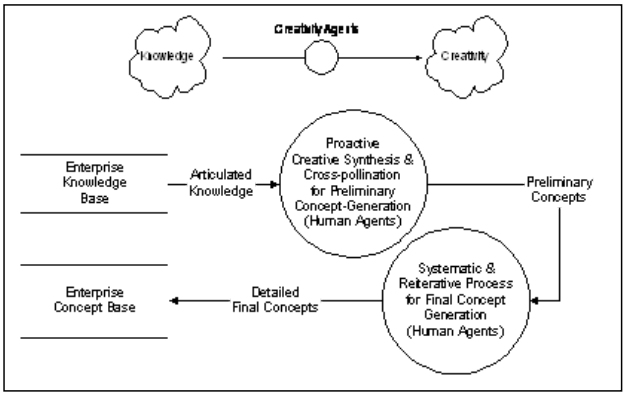
By linking knowledge creation and knowledge application, creativity instills a condition for the continuity of knowledge by its use and reuse (Markus, 2001). From a semiotic perspective, transforming knowledge into creativity is a semantic progression, further interpreting the intended meaning of concepts within an organizational context. While semantics in creating knowledge is rooted in context, semantics in creativity is rooted in ideas and concepts. Here, interpretation relies on the use and application of knowledge as creative concepts to promote novel ideas and perspectives pertinent to specific organizations. Because creative concepts are organization-specific, they offer a degree of causal ambiguity, making it extremely difficult for rivals to replicate. Also, the meanings assigned to these organization-specific concepts are "semantically sticky," making it difficult to transfer beyond organizational boundaries. Therefore, organizations welcome the "stickiness" inherent in creativity.

While KM systems today can streamline the transformation, storage, and transfer of knowledge, conversion of knowledge into creativity is not automated but reliant on intermediaries as human creativity agents. Creativity agents serve as stimuli to sense, interpret, and respond to new business opportunities and threats (Alavi & Tiwana, 2002). Creativity agents are groups of organizational members, mostly middle management, who group, match, and meld knowledge workers through social interactions to stimulate and enhance the pursuit of creativity (Leonard & Sensiper, 1998). By sensing, interpreting, and responding, these agents gather a precise understanding of focal areas where creative endeavors should be addressed. Then, they proactively guide organizational members to channel most of their efforts towards generating concepts related to these focal areas. Next, acting as boundary brokers, integrating knowledge on multiple issues derived from individuals and social collectives. They also integrate multiple content domains from the knowledge base for inter-departmental cross-pollination.

Creativity agents use dialectics, contradictions, and paradoxes to create and transform knowledge into concepts (Nonaka 1991; Nonaka and Takeuchi 1995). These preliminary concepts are generated by reiterative understanding of issues and by seeking solutions to focal topics. Once preliminary concepts are developed, firms can organize off-site creativity workshops where creative agents work intensively with individuals, groups, and subgroups to fill in the missing pieces and integrate concepts for creative synthesis. Final concepts are justified and systematically articulated in terms of feasibility (e.g. technical, operational, legal, and political), market appeal, and management priorities. These articulated and detailed reports are stored into an enterprise "concept base" consisting of product, service, and process concepts that are deemed to have future application potential. To summarize: in this phase, intensive interaction between tacit and explicit knowledge leads to collective reflections that are "finally crystallized into

explicit concepts" by creative agents who instill idea-generation and help justify the value of such ideas and concepts (Nonaka and Takeuchi 1995: 86).

Figure 1: Logical And Process Views Of Creative Transformation



2.2. Codifying: Transforming Creativity into Innovation

As 'the' starting point for innovations (Rosenfeld & Servo, 1990), creativity provides the abstraction on which an innovation is attempted. For firms to achieve "sticky" economic returns, creativity has to result in innovations. Because of a firms' credibility as a profit maximizing entity, fostering creativity in its absolute form is not a feasible alternative; commercialization of creativity through innovation is an imperative. As Alavi & Tiwana (2002: 1030) note, "an important aspect of knowledge management is enhancing the organizational application process. Knowledge leads to organizational value when it is used to produce effective performance…Organizations that excel at knowledge application are inherently better at continuously translating their intellectual capital into innovative products and services."

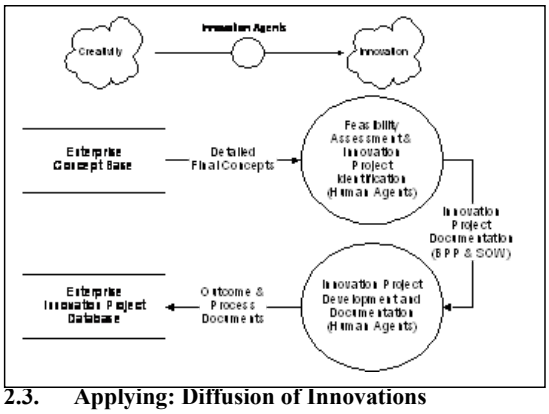
Following Amabile (1988), we define innovation as the "successful implementation of creative ideas within an organization." In "The Frontiers of Management" Peter Drucker (1986) expounds: "[creative] ideas are somewhat like babies—they are born small, immature, and shapeless. They are promise rather than fulfillment. In the innovative company executives …ask, 'What would be needed to make this embryonic, half-baked, foolish idea into something that makes sense, that is an opportunity for us?'" Kanter, et al. (1997) draw a parallel: "one of the problems in certain highly creative organizations, including many high-tech companies, is that they're very good at [creative] invention but lack the discipline needed to bring their ideas to market quickly." In short, the focus on creativity is not enough; firms need to transform creative ideas into process, product, or service innovations (Kiely, 1993) as sources of "sticky" returns.

From a semiotic standpoint, this phase deals with pragmatics concerning the use and outcome of creative concepts. Pragmatics asserts the need to increase organizational propensity to innovate by making their final concepts "actionable." Because knowledge is localized, embedded, and invested in practice, it is only through its application as innovations can resolve limitations originating from inadequate and mis-specified semantics (interpretations) (Carlile 2002). In the process, concepts become more granular, valid, and justified as they are pushed towards commercialization. From converting concepts into commercial solutions to reducing resistance and putting concepts into action, the philosophy of pragmatics drives this transformation.

In transforming creativity into innovations, an organization needs the habitual assistance of another set of intermediaries: innovation agents. Innovation agents perform brokerage activities in the transformation process and have a vital influence in molding innovations (Strassmann, 1994). In firms, innovation agents are managers who evaluate concepts, assess feasibility (economic, legal, political…), allocate resources, and proactively assist in development and implementation efforts (Nonaka and Takeuchi 1995). Efforts from innovation agents, albeit driven by practical rent-generating aspiration, are carefully balanced in order not to compromise on innovation quality. These agents conduct a detailed review of concepts from the enterprise concept base. They compare concepts in terms of dependencies (resources required, process and product prerequisites…), feasibility, and temporal relevance. Then, they identify suitable concepts for further development as innovation projects. After identifying suitable concepts, agents set up *ad hoc* development schedules for every project. Each project is formally documented using baseline project plans, work statements, milestones, prototypes, and deliverables. This entire phase of project development is team-based, with innovation agents brokering joint development. Once the innovation project is initiated, the agents also map and codify the entire process from initiation to commercialization, documenting relational structures between project entities and corresponding progress, activities, schedules, constraints, risks, pitfalls, resistance, and outcomes. Following this step, both the innovation outcome and process are mapped and documented by innovation agents into dedicated enterprise-wide innovation project databases. "In the process of turning innovative ideas into

reality," as Hargadon (1998:224) notes, mapping "[innovation] activities are invaluable because they generate a wealth of knowledge that's a result of struggles, the agonizing way they went through to try to figure out what's the right way to proceed." Also, the process of innovation is as important as the innovation outcome itself.

Figure 2: Logical And Process Views Of Innovation Generation



2.3. Applying: Diffusion of Innovations

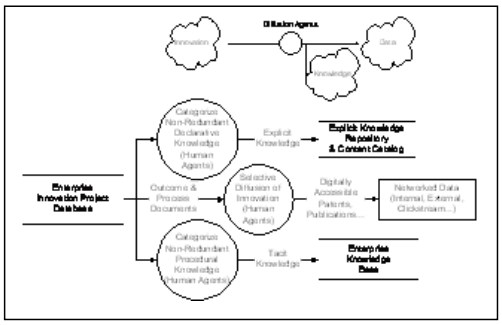
Innovations, although "sticky," do not undergo obsolescence. Every innovation may be regarded as having a memory that incorporates its development and can be explicated as data in forms of patents, publications, and other materials that are disseminated via journals, trade magazines, academicians, and practitioners, among others. This is what is known as "innovation diffusion" (Rogers, 1995). Rogers (1995) describes innovation diffusion as a process by which an innovation is communicated through channels over time, leading to further knowledge creation and implicating the perpetuity of KM and the KiM framework. From a semiotic perspective, this phase is concerned with the pragmatics of innovation diffusion to further knowledge use and reuse, without compromising competitive advantage. Pragmatics realizes that innovations, like knowledge, are also localized and embedded in practice (Carlile 2002); selectively diffusing data from innovations once again reduces stickiness and signifies the pragmatics of reuse through dissemination. The pragmatics of this phase focuses on communicating innovations by controlled generation and release of data in the form of patents and publications. We define innovation diffusion as a deliberate and calculated dissemination of data and knowledge from innovations for future manipulation, use, and reuse.

Abrahamson & Rosenkopf (1997: 4) note that the success of innovation diffusion depends on the size of networks that an innovation is associated with. Their research indicates positive network externalities, where the value of a network exponentially increases with the number of adopters and participants. Networks that diffuse rich and up-to-date data attract more participants and prompt further diffusion. Positive network externalities favor innovation diffusion into data that can be further recycled by the same firm or other firms in the network for continued innovation efforts. Rather than culminating knowledge application as innovations, innovation diffusion maintains continuity of knowledge by creating and dissipating new data from existing innovations. The new data is then absorbed into a fresh loop of the KiM model, setting in motion a fresh phase of knowledge creation and knowledge application.

Although innovation diffusion is an essential component in the KiM model, dissemination is never absolute but controlled. Diffusion agents, generally human, play an important role in controlling the innovation diffusion flow by internalizing mission-critical data while externalizing non-mission critical data. Disseminating mission-critical data can cost a firm its competitive advantage. Diffusion agents periodically query and scan the enterprise innovation project database to delineate critical and non-critical parts of the innovation documentation into critical and non-critical parts. Non-critical parts of the innovation documentation are generally declarative and factual; critical parts of the documentation are generally procedural and cognitive.

Diffusion agents work around three sub-phases, selecting channels for communicating innovations. The first two sub-phases are related to intra-organizational diffusion; the third sub-phase is related to extra-organizational diffusion. In the first two sub-phases, mission-critical knowledge acquired from the innovation process is re-circulated back into the organizational knowledge base; in the third sub-phase non-mission critical elements from the innovation project and process are selectively diffused, explicated and published as data that can be openly shared. For intra-organizational innovation diffusion, diffusion agents help categorize innovation documentation into non-redundant declarative (explicit) and procedural (tacit) knowledge. The declarative portion is fed back into the explicit knowledge repository and content catalog; the procedural portion is fed back into the enterprise knowledge base. Because innovation documents for intra-organizational diffusion are already relevant and contextual, the phases of transformation of data and information are naturally eliminated. For extra-organizational innovation diffusion, diffusion agents get to work by filtering out essential mission-critical facts and procedures to prepare and format the documents for submission as patents or publications. These submitted patents and publications then are disseminated as data for use by other organizations, reinitiating knowledge reuse.

Figure 3: Logical And Process Views Of Innovation Diffusion



3. Agent Attributes In Knowledge Application

Following Datta and Acar (2010), we use Hess, et al's (2000) set of agent attributes as characteristic features differentiate agents in knowledge application reengineering. The attributes are homeostatic goals, persistence, reactivity, mobility, intelligence, and interactivity. Persistence, reactivity, and intelligence are individual agent attributes; mobility and interactivity are social attributes; and homeostatic goal, an organizational attribute. Table 1 tabulates these attributes to capture agent characteristics and support the need for specific agents in knowledge application reengineering (refer to Datta and Acar (2010) for a more detailed analysis of agent characteristics).

3.1. Homeostatic Goal

Homeostatic goal-seeking behavior is an organizational-agent attribute. A homeostatic goal-seeking attribute allows the agent to reduce variance by constantly adapting itself to serve an organizational goal (Covrigaru and Lindsay 1991). For example, if the organizational goal is reaching consensus across diverse participants in an organization, the agent is expected to build consensus unless redefined. Human agents are well-versed in non-routine and complex goals.

3.2. Persistence

Persistence is an individual agent characteristic that refers to the ability of the agent to maintain consistent behavior over the duration of the agent's operation in knowledge transformation. The agent must be capable of properly executing their roles and functions as intermediaries. Persistence in human agents involved in knowledge application is more attuned towards building procedural memory which resides in complex social structures and practices. The relative complexity of social structures and practices over their material counterparts makes it easier for human agents to comprehend and capture these tacit maneuvers into memory that is less formal and more experiential in nature. For example, a human agent can parse tacit cues (e.g. specific behaviors, likes, dislikes of participants) and commit them as experience. Human agents are better at understanding and capturing inherent nuances to build procedural memory.

3.3. Reactivity

Reactivity refers to an agent's ability to sense and respond to changes in the knowledge application environment. This is a crucial attribute, mainly because agents are catalysts in knowledge application reengineering. Agents need to be expert at reacting correctly to shifts in the knowledge application environment. For example, if diffusion agents realize that hoarding innovation knowledge by reducing diffusion may be detrimental to the firm, diffusion agents need to reorganize their diffusion criteria and share the innovation knowledge. For example, Microsoft started shared-source to reduce its selective diffusion strategy and reveal more innovation knowledge related to the Windows Mobile software platform.

3.4. Intelligence

Intelligence is an individual agent attribute that refers to its reasoning capabilities. In agents, intelligence relies on inferences, experiences, and rational logic. Agent intelligence evolves and is updated in the face of exceptions and patterns. Human agent intelligence is conducive for reinterpretation and recontextualization, particularly by avoiding limitations of retrospective learning. Human agents are particularly deft at understanding and decision-making in non-routine situations and conditions that require reconstructing the 'whys' and 'hows.'

3.5. Mobility

Mobility refers to an agent's ability to serve multiple roles interchangeably. Mobility requires agents to be able to use their expertise across diverse situations. Mobility of human agents is marked by their capacity to adapt to heterogeneous entities and interact on an ad-hoc basis. Human agents can use their adaptive behavior for various goal-seeking behaviors. Human agents are adaptive about relating and working with diverse participants in an operational

network. A proper choice of human agents can be prolific in heterogeneous social networks beset by constant recontextualization of interactions. Here, human agents can use their interpretive flexibility to support heterogeneous participants across the operations and functions related to knowledge application reengineering.

3.6. Network Domain: Interactivity

Interactivity refers to the ability of an agent to maintain communication between different participants involved in knowledge application reengineering. Agents must be able to initiate and maintain communication following a set of communication protocols. While human agents cannot be inscribed with a definite, invariant protocol set (except for disciplinary jargon and syntax), human agents are flexible with their interactions and able to adapt and learn languages and structures over time. Agents have to know and understand the common interlingua such as domain-specific terms, mathematical notations, audio-visual cues, and models to interact between participants.

Table 1: Agent Characteristics In Knowledge Application (Individual, Network, Organizational)

Agent Typology	Task Description	Persistence (Individual)	Mobility (Individual)	Intelligence (Individual)	Reactivity (Network)	Interactivity (Network)	Homeostatic Goal (s) (Organizational)
Creativity Agents (Human)	Sense Focal Opportunities Cross-Pollinate and Promote Idea-Generation	Triggered by available knowledge resources; able to persist over creativity sessions; uncertain tenure; Build procedural memory.	Mobility limited to cross-functional members in organizational network only.	High intelligence; able to cross-pollinate diverse knowledge sources	Capable of highly focused reactivity to knowledge clusters; Use contradictions to crystallize concepts	Allow cross-pollination of existing knowledge; Intensive social interactions; Sense, interpret, respond to focal areas for creativity.	Integrate multiple knowledge workers and content domains; instill idea generation; Justify emergent concepts Hierarchy: Cross-Functional Management
Innovation Agents (Human)	Evaluate Concepts Assess Feasibility Allocate Resources Codify Innovation Process	Triggered by immediate organizational goals; build both procedural and declarative memory; able to persist over the lifetime of innovation projects; uncertain tenure	Mobility within the organizational network higher than creativity agents for validating feasibility of innovations across multiple functions;	Intelligence geared towards short and long-term organizational sustenance, profitability, and competitive advantage; able to validate feasibility and allocate resources in a timely manner.	Capable of objective evaluation of concepts and allocating resources for development; resource scheduling; codification of innovation process.	Allow interaction between different concept groups for integration of concepts into innovation; Interact with top-management for resource allocation towards specific innovation projects.	Evaluate multiple concepts for feasibility and organizational profitability; Champion innovation projects; Map innovation process Hierarchy: Middle and Top-Management
Diffusion Agents (Human)	Categorize Mission-Critical and non Mission-Critical Innovation Elements as Data for Dissemination. Externally Disseminate non-Mission-Critical Data for Profitability and Exposure. Internally Disseminate Mission-Critical Data for Reuse	Triggered by available innovations; able to persist over the lifetime of innovations; uncertain tenure;	Mobile within and beyond organizational networks from prompting reuse and promote use of innovations for profitability and exposure, respectively.	Highly intelligent; strategic focus on timely deployment of innovations for profitability without sacrificing mission-critical knowledge that could erode competitive advantage.	Capable of controlling and delineating innovation diffusion into mission-critical and non-mission-critical data in the organizational network; capable of ascertaining financial returns from innovations without compromising competitive advantage.	Interact with different domains, both inside and outside the organization; interact with internal and external entities in the network to promote product or process innovations; interact with internal entities for building and reusing of procedural knowledge from innovations.	Control and routinize innovation diffusion for profitability, knowledge reuse, and data generation; Maintain competitive advantage but promote diffusion. Hierarchy: Top-Management

4. Discussion And Conclusion

The significance of each phase in KM reengineering is rooted in particular knowledge boundaries that can enable or inhibit KM process transformations. “The irony is that these knowledge boundaries are not only a crucial challenge, but also a perpetual necessity because much of what organizations produce has a foundation in the specialization of different kinds of knowledge” (Carlile 2002: 442).

As newer technologies and pervasive data collection methods increase the inputs to knowledge codification, the aftermath of knowledge codification is often missed. When organizations embark on KM initiatives, a common concern they face is a lack of understanding of how codified knowledge can aid the fruition of their KM investments. Yet, it is paramount that organizations gauge how to secure rents from their codified knowledge. Addressing this concern, this paper combines separate fields of inquiry to present an agent-framework of knowledge application reengineering. We surface the process and agent-mediated mechanisms used to simultaneously share and appropriate knowledge. The knowledge application framework suggests the following:

While codification of knowledge occurs from filtering data into information, and translating information into knowledge (Datta, 2007; Datta and Acar 2010), knowledge application begins by using existing and new knowledge

to instill creativity, transforming creativity into innovations and its subsequent diffusion for the recreation of external data and internal knowledge. Knowledge codification has to be complemented by knowledge application because it is the application of knowledge that can ascertain economic returns, maintain knowledge as a source of competitive advantage, and further knowledge creation. Without proactive efforts in knowledge application, knowledge incurs costs of acquisition and storage, unable to contribute value by its presence.

Knowledge application is an agent-mediated process. At any given point in time, key players or agents in a KM process are involved in knowledge transformation. As boundary brokers, agents simultaneously translate every link in the KM process continuum and operate at multiple knowledge boundaries demarcated by KM states and transitions. Different knowledge application boundaries need different types of agents: creativity agents provide semantic translation to create new knowledge and generate concepts; innovation and diffusion agents ensure transformation based on the pragmatics of innovation and its diffusion leading to knowledge use and reuse. Addressing complexities inherent to each transformation requires mediation and intervention by appropriate intermediaries with requisite attributes and characteristics.

The research clarifies the notion and need for knowledge application in addition to knowledge codification. In literature on knowledge management, knowledge application remains understudied. Often, fueled by the concept that increased knowledge accumulation automatically leads to knowledge application and, thereby, to competitive advantage, it is assumed that knowledge creation is a final outcome of the KM process. Under this deterministic assumption, knowledge creation is treated synonymously with knowledge application, without much ado about the latter. While knowledge creation may be a necessary condition for achieving competitive advantage, it is not a sufficient one (Alavi and Leidner 2001). Therefore, for firms to create and sustain competitive advantage, knowledge not only needs to be created but also effectively assimilated, applied, and disseminated in everyday practice.

The proposed knowledge application reengineering further reveals the progressive mutability of knowledge. By moving away from a hierarchical to a transitional view of knowledge application the reengineering provides a systematic routine based on distinctive ways companies exploit knowledge without sacrificing the free-flowing nativity of knowledge.

The proposed reengineering provides insights on the knowledge application intermediaries in the KM process who transform, apply, and diffuse knowledge. Agents performed brokerage functions ranging from querying to linking and translating knowledge in its many states and forms. As facilitators agents in knowledge application establish the environment to translate, transform, and pollinate the knowledge boundary for active and continuous learning. Various agents match various phases of knowledge application – emphasizing proper agent allocation. Moreover, the inclusion of agents in the reengineering process creates a richer texture and offers an increased granularity of the knowledge application phenomenon.

As digital networks, globalization, and discontinuities in organizational environments propel organizations to substantiate collaborative structures for seeking knowledge, and as harnessing returns from knowledge remain shrouded in ambiguity, there is a need to develop novel approaches that can breathe fresh perspectives into conventional knowledge management (KM) paradigms. This paper is a step in this direction. The adopted approach synthesizes theory and practice to propose a new paradigm of actionable KM. The proposed knowledge application reengineering ushers in a fresh approach promoting KM as a transitionally dynamic agent-mediated process that links knowledge codification and knowledge application. As creators, users, and disseminators of knowledge, researchers and practitioners should find the framework useful in their future quests to both explore and apply knowledge.

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