# A Taxonomical Account Of Knowledge Creation In Organizations: Research Directions

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ABSTRACT:

The global knowledge economy could become the next booming economy. This point can be buttressed by the flood of literature on knowledge management. New job roles have emerged in many firms to handle the challenge of the global knowledge economy. But despite the developments, there are still gaps in literature and divergent views about the subject of knowledge and how it can be created. Knowledge is an abstract term that captures the art of knowing and what is being known, is difficult to study (Davenport and Völpel 2001). Knowledge management, the application of knowledge in organizations can be broken down into knowledge creation, knowledge sharing and knowledge transfer (Alavi and Leidner 2001, Alavi and Leidner 1999, Nonaka 1994b). These three elements are difficult to separate in practice(Argote et al. 2003), but this article focuses on presenting a taxonomical review of Knowledge creation in organizations, highlighting challenges involved, methods, approaches and directions for research.

Keywords: *Knowledge creation, knowledge creation outcome, knowledge intensive organizations.*
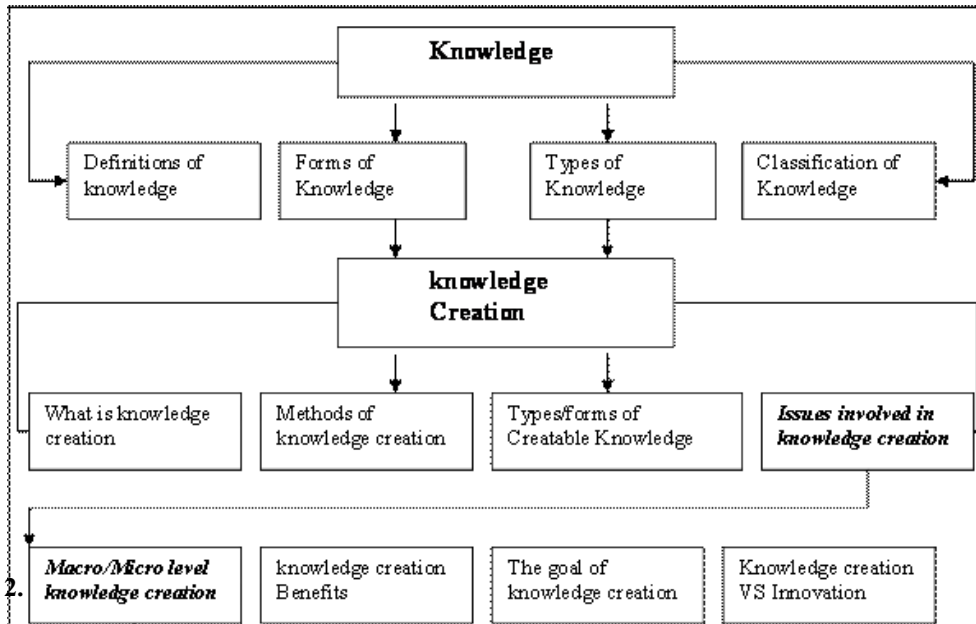
## 1.    Introduction

The focus on knowledge creation in this paper is especially interesting because knowledge creation is the foundation for other knowledge management practices in an organization (Mitchell and Boyle 2010, Argote et al. 2003). Figure 1 below shows the framework for the comprehensive literature review presented in this paper. Starting from the meaning of the term knowledge and moving down to the issues involved in knowledge creation at micro and macro level.

The meaning of knowledge may not be easily understood without taking into account the forms, types and classification of knowledge (Mingers 2008). Also, due to the broad nature of knowledge, its creation is no easy task as there are several tentacles; subject areas that must be covered. An approach that is encompassing with clear macro and micro level distinctions may be the best approach to study knowledge management in organizations.

The issues involved in knowledge creation can be said to be the main areas producing divergent opinions in management literature. There is now an emerging approach in literature and practice on how organizations can create knowledge and this emerging approach would create yet a greater flow of counter opinions (Foss 2007, Foss and Pedersen 2004). This paper utilizes the framework below to give a step by step analysis of knowledge creation literature. The aim of this review is to identify the issues that are critical to knowledge creation in organizations and how knowledge creation can be effectively studied. The paper is divided into two sections, section one deals with issues generally related to knowledge creation while section two deals with more specific issues.

**Figure 1: Literature Review Framework**

**Knowledge**

| Definitions of knowledge | Forms of Knowledge | Types of Knowledge | Classification of Knowledge |

**knowledge Creation**

| What is knowledge creation | Methods of knowledge creation | Types/forms of Creatable Knowledge | *Issues involved in knowledge creation* |

2.

| *Macro/Micro level knowledge creation* | knowledge creation Benefits | The goal of knowledge creation | Knowledge creation VS Innovation |

Often confused with information, knowledge has been defined in many different ways by different scholars. Justified true belief (Mingers 2008, Nonaka et al. 2000); the art of knowing (Minbaeva 2007, Mitchell and Boyle 2010); a product of human reflection and experience (Roth 2003); a codified in...

| New theory of Knowledge creation: The Knowledge governance approach | Organic/ traditional theories of knowledge creation | Structures and processes involved in knowledge creation | High Knowledge intensive V s Low knowledge intensive organizations |

...n, context, ...al asset for firms.

Although there is a link between data, information and knowledge (Nonaka et al. 2000, Roth 2003), the three concepts are different. The linkage can be understood and interpreted in a top to bottom or bottom to top fashion. The first interpretation is that data leads to possession of information and possession of information leads to knowledge while the second interpretation would mean that without some knowledge you may not be able to extract the necessary information or data you may need in a particular situation (Mingers 2008, Mitchell and Boyle 2010). Knowledge is highly contextual and can lose its meaning without a specific context unlike information that can be detached and transmitted from one source to another without losing its meaning (Chua 2003). Though an ambiguous term, it can be reasonably understood when divided into types, classes and forms. In my opinion, it is important to be highly specific when studying the concept called knowledge.

## 2.1. Types Of Knowledge

The work of Polanyi in the middle of the 20th century created a lot of advancements in the study of knowledge. Based on his work, and subsequent studies and modifications, knowledge became conceptually understood as being divided into two types: explicit and tacit (Alavi and Leidner 2001). Explicit knowledge is knowledge that can be easily codified, expressed and formalized (Hippel 1994, Nonaka and Takeuchi 1995). It is also systematic and easily communicated in the form of hard data and codified procedures (Shan and Scarbrough 1999).

On the other hand, tacit knowledge is based on actions, experience and specific contextual involvements (Nonaka 1994a). It can be said to be based on natural endowments and is considered to be residing in the heads of the individual that possesses it.

## 2.2. Classifications Of Knowledge

Knowledge can further be classified into different groups; propositional, experiential, performative and epistemological based on the object of the knowledge, the source of the knowledge, the form of representation and the criteria for validity (Mingers 2008). Table 1 below presents a classification of knowledge with illustrative examples.

| Class of knowledge | Object of knowledge | Source of knowledge | Form of representation | Criteria for validity |
|---|---|---|---|---|
| **Propositional** <br> I know it is raining <br> I know there is a train at 3.00 | States of affairs in the physical and social world. <br> To know that x | Direct perception, receipt of information, communications, the media | Generally explicit and propositional although some may be tacit | (Ontological) truth Referential-expressive |
| **Experiential** <br> I know her well <br> I know the feeling <br> I know how the system works | People, places and events we know through personal experience: <br> To know x | Personal experiences | Memories, some aspects of which may be tacit and embodied | Sincerity Normative-fiduciary Adequating |
| **Performative** <br> I know how to ride <br> I know how to read an X-Ray | Skills, abilities and competences <br> To know how to do x | Personal experience, learning, training | Embodied | Competence, (Epistemic) rightness Alethic |
| **Epistemological** <br> I know what black holes are <br> I know linear algebra | Reasons for the (non-)occurrence of things and events. <br> To know why x | Formal methods of discovery, for example, in science | Explicit, discursive, 'objective', open to debate | Truth, rightness, sincerity Ontological, Alethic |

**Table 1: Classifications Of Knowledge (Habermas's validity claims; Bhaskar's four dimensions as seen in Mingers, 2008)**

The above classification can make it relatively easier to study specific dimensions of knowledge. References will be made to this table in subsequent sections of this review.

## 2.3.  Forms Of Knowledge

Knowledge is a concept that can take various forms. Apart from being time and space specific (Nonaka et al. 2000), it is also context specific and takes the form of its context. According to Jorge Luis Borges as seen in (Demarest 1997), "knowledge comes to us in various forms some of which we cannot assimilate because of our own assumptions about what knowledge is".

Several forms of knowledge can be distinguished. For example, scientific knowledge, philosophical knowledge and commercial knowledge (Demarest 1997). Scientific knowledge is objective and most philosophers would argue that it is the most valid form of knowledge because it can be proven or verified (Mingers 2000, Hunt 2005, Pratton 2007). Philosophical knowledge on the other hand argues that truth cannot be accessed since it is hidden in language or context (Demarest 1997, Hunt 2005, Mingers 2000). According to Demarest, (1997), commercial knowledge differs from scientific and philosophical knowledge in the sense that its main objective is not truth but success, in Demarest's words, "the main objective of commercial knowledge is to promote what works". This kind of knowledge is what many firms are interested in.

The late 1990s saw an increased awareness of knowledge or commercial knowledge related issues in organizations and the creation and management of this form of knowledge has since been recognized as a very important source of global competitive advantage (Bonache et al. 2001, Nonaka 1994b, Minbaeva 2007, Roth 2003, Maryam and Dorothy 2001).

Continuous knowledge creation is important for the survival of organizations in the new global knowledge economy (Davenport and Völpel 2001, Roth 2003). However, many organizations do not know how to be successful in this activity. The presence of discrepancies and divergent opinions in the knowledge creation literature does not help matters either. I hope to uncover some of the major discrepancies in existing knowledge creation literature in this study.

## 3.  Knowledge Creation

Often confused with innovation, knowledge creation is endowed with many definitions; a major factor that allows an increase in value/cost ratio of a cooperative process; building new knowledge (Matusik and Hill

1998); bringing innovative products and services into the market place(Ganesh 2000); a process that allows insights of individuals to be converted into knowledge that can then be used to develop new products and improve performance (Choo 1996); the difference between what is known and what must be known for success of a project (Johnson 2002); use of complex and discontinuing phenomena and a set of components emerging from communication across interpersonal relationships (Styhre et al. 2002).

Many Authors discuss this subject without specifically pointing out the aspect of knowledge creation that is being studied. According to Mitchell and Boyle in their recently developed taxonomy of knowledge creation, there is a process/input, output and outcome dimension to account for in defining knowledge creation (Mitchell and Boyle 2010). Figure 2 below presents a good illustration of this idea.
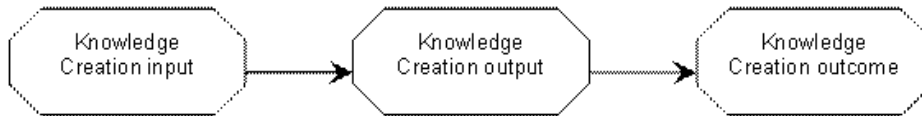


**Figure 2: The Knowledge Creating Process/Activity**

The knowledge creation input refers to the method and process of knowledge creation, the output refers to the initial result of the knowledge creation activity while the outcome refers to the final result of the knowledge (Mitchell and Boyle 2010). The fact that there is new knowledge (output) adds a certain level of value to an MNC but the highest value would be realized when the new knowledge is translated into routine knowledge (outcome) (Gooderham 2007, Alavi and Leidner 2001, Roth 2003). A clear specification of the aspect of knowledge creation under study is highly important and would facilitate comparisons between different models and methods of knowledge creation (Mitchell and Boyle 2010).

### 3.1. Methods Of Knowledge Creation

Many methods have been proposed or put forward by researchers as agents of knowledge creation in organizations. An important argument against knowledge creation is that it is not necessary because all knowledge required for organizational success resides within employees the argument emphasizes the need for knowledge application instead (Grant 1996b). A contrary view stipulates that the fact that knowledge resides somewhere in the organization does not mean that the organization is benefitting from it (Roth 2003, Bonache et al. 2001, Minbaeva et al. 2003) hence the need for knowledge creation efforts.

Taken to be a dynamic process, knowledge creation can be achieved through socialization mechanisms (Nonaka et al. 2000, Nonaka 1994b); open dialogue and discussions coupled with the use of facilitators skilled at extracting useful knowledge within organizations are seen as catalysts that can speed up the process(Fong et al. 2007); care (Krogh 1998); cooperation (Choo 1996); mentorship, openness and use of teams (Mitchell et al. 2009); use of clusters (Bathelt et al. 2004); contingent work and permeable organizational boundaries (Sharon and Hill 1998). In addition, the work of specific departments within an organization has been identified as critical for effective knowledge creation because of how they contribute to favorable knowledge economies in the organization (Demarest 1997).

The Research and Development department (R&D) has been highly promoted in literature for its contributions to knowledge creation (Mansfield 1972) not only at firm level but also at country level (Mairesse and Mohnen 2004, Lichtenberg and Siegel 1991). R&D can be observed not only in manufacturing firms but also in service oriented firms (Faridah et al. 2003) and presents high potential for knowledge creation (Grilliches 1979). Another critical department is marketing department (Hippel 1994, Fourt and Woodlock 1960), famous for its role of focusing knowledge creation efforts to areas compatible with organizational goals and vision (Johne and Snelson 1988).

The human resource management department cannot be left out since it is mainly responsible for knowledge management practices which include expatriation in the case of multinational corporations (Bonache et al. 2001, Minbaeva and Michailova 2004, Gallupe 2001, Skuce 1993). There are several other departments that are involved in the knowledge creation activity to a good extent but a complete breakdown of all the departments is beyond the scope of this review. From the previous section, it can be

seen that there are outputs and outcomes of the knowledge creation process. These are presented in the next paragraph.

## 3.2. Knowledge Output And Outcome

The classification of knowledge presented in table 1 above shows four classes of knowledge but organizations being profit seeking entities are typically interested in experiential and performative knowledge (Demarest 1997). The reason for this is the identification of skills and abilities as a source of high performance for firms (Grant 1996a). In light of this discovery, the ultimate goal for firms should ultimately be to create performative knowledge and transform it to experiential knowledge for individual employees by facilitating internalization (conversion from explicit to tacit (Nonaka et al. 2000)).

Performative knowledge shows up as skills, abilities and competencies often residing within employees. Extracting this knowledge and making them experiential for all other employees within the organization can be a major source of competitive advantage based on the knowledge application argument by Grant. (Grant 1996b). Market knowledge is another important knowledge output for organizations (Griffin and Hauser 1996, Gupta et al. 1986, Brown and Eisenhardt 1995); it also facilitates the emergence of another kind of knowledge output: product ideas, product prototypes, ideas for new techniques (Füller et al. 2006, Mitchell and Boyle 2010, Gruner and Homburg 2000).

The outcome of the knowledge creation process is highly important for organizations because it is at this point that value is being generated for the firm (Popadiuk and Choo 2006). The initial output undergoes several processes; commercialization, implementation, adaptation (Cummings and Teng 2003) in order to become the final outcome (Mitchell and Boyle 2010): new products, new techniques and new procedures. At this point, it is difficult to differentiate knowledge creation from innovation. However, a clear definition of knowledge creation shown in figure 2 could make it easier to distinguish knowledge creation from creativity and innovation at some level.

This leads to the next section of this paper that deals with the major issues involved in studying knowledge creation. The next section presents the major issues involved in knowledge creation in organizations. Starting from an attempt to distinguish knowledge creation from other concepts like innovation and creativity, the paper discusses macro and micro level considerations in knowledge creation, challenges involved in knowledge creation and the existing theories of knowledge creation.

## 4. Knowledge Creation, Innovation And Creativity

There are many arguments about the relationship between innovation and knowledge creation. Some Authors define innovation as the accumulation and development of relevant knowledge (Fischer 2001), others define it as the point when knowledge creation output is developed and implemented in the organization for profit (Popadiuk and Choo 2006).

Creativity on the other hand can be defined as the seed of all innovation (Amabile et al. 1996); the act of new knowledge generation (Amabile et al. 1996); the drive to do something because it is interesting or involving (Amabile 1997). According to Boden, (1998), it is a seemingly paradoxical concept (Boden 1998) as seen in (Bednarik 2000) and can be highly influenced by work environments (Amabile et al. 1996).

Whether knowledge creation is a part of the innovation process, or separate from it, the definition and measures need to be clearly defined and differentiated in order to separate the influence of even more similar constructs such as creativity. By separating the outcome of knowledge creation from the immediate output, the taxonomy developed by Mitchell and Boyle (2010) potentially provides a basis on which to differentiate concepts such as the generation of a new idea, from the notion of innovation as value-adding knowledge creation outcome. Some research may be needed to investigate the relationship between the components of knowledge creation shown in figure 3 below and the related constructs: innovation and creativity.

**Creativity?**                                          **Innovation?**

| Knowledge Creation input | → | Knowledge Creation output | → | Knowledge Creation outcome |

-
-
-
-
-
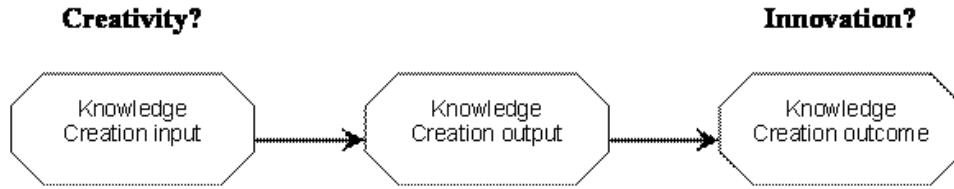
**Figure 3: Components Of Knowledge Creation Vs. Innovation And Creativity**

## 4.1. Theories Of Knowledge Creation

The strong promotion of knowledge creation as a source of competitive advantage (Choi and Lee 2002) has led to the generation of many knowledge creation theories. A look at the methods most frequently proposed by researchers for knowledge creation reveals that most Authors adopt an organic approach to studying knowledge creation: adhoc freelance knowledge creation (Bartunek et al. 2001, Bathelt  et al. 2004, Choo 1996). The idea promoted here is that flexibility encourages creativity which facilitates knowledge creation (Lee and Cole 2003).
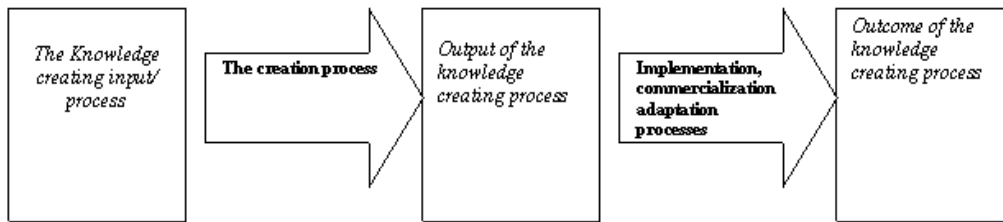
The emerging knowledge governance approach argues the opposite. According to this approach, formalization is beneficial in facilitating the knowledge creating process (Miner 1990, Foss 2007, Foss et al. 2010). Some Authors present arguments based on a combination of both approaches in their study i.e flexibility and structure (Chua 2001). Whether we adopt an organic/traditional approach, a formal approach as in knowledge governance, or a combination of both approaches, the fact remains that these considerations are important in studying knowledge creation in organizations (Nonaka et al. 2000, Spender 1996).

## 4.2. Macro And Micro Level Knowledge Creation

Some studies take a macro level approach to knowledge creation, i.e studying the process or phenomena at an aggregate level as against a micro level approach that would be focused on knowledge creating activities at the individual level (Argote et al. 2003). Regardless of the approach used, it may be important for theorists to note that the sum of individual knowledge in an organization is not equal to the organizational knowledge of the firm (Grant 1996a, Roth 2003). This recommendation is backed by Grant's suggestion for knowledge application rather than knowledge creation in organizations. Knowledge application involves attempts by firms to extract useful knowledge from their employees and subsequently integrating the knowledge into the organization's knowledge repository (Grant 1996a, Huang and Newell 2003).

The use of expatriation especially by multinational corporations is a justification of the notion that what an individual knows is often different from what the organization knows (Minbaeva and Michailova 2004, Bonache et al. 2001). An important challenge in knowledge management is based on this notion and a practical question for organizations will be how they can motivate their employees to create, share and transfer useful knowledge within the organization for maximum benefit (Dixon 2000, Swee 2002).

## 4.3. Knowledge Creation Processes: Structures And Mechanisms

The Knowledge creating input/process

The creation process

Output of the knowledge creating process

Implementation, commercialization adaptation processes

Outcome of the knowledge creating process

**Figure 4: Knowledge Creating Processes**

In practice, there are several processes involved in knowledge creation. Conceptualized as a dynamic process (Nonaka et al. 2000), a synthesizing and a dialectical process (Nonaka and Toyama 2003), knowledge creation involves several interacting processes that cannot be entirely observable. As seen from the section on methods of knowledge creation, several mechanisms and structures are believed to facilitate the process.

### 4.3.1. Input To Output

This phase can be termed the knowledge creating process. Socialization mechanisms as well as network structures have been said to promote the knowledge creation processes (Reagans and McEvily 2003, Nonaka et al. 2000). The emerging knowledge governance approach suggests the use of organizational structures as a mechanism to facilitate or enhance the knowledge creation processes (Foss and Pedersen 2004).

### 4.3.2. Output To Outcome

There are many processes that could occur in the phase between output to outcome, commercialization, and implementation are among the processes identified in reviews. Commercialization involves the actual activities that MNCs carry out in order to put their new products out in the market and the implementation process involves the actions that firms take to implement new techniques to solve problems or to facilitate the handling of new products. Adaptation is then the organization's ability to obtain successful implementation and commercialization (Miner 1990)

The two processes typically involve the intervention of the Knowledge management system in the MNC, the system that supports knowledge management practices in an organization (Gallupe 2001, Skuce 1993). It normally includes but is not limited to a good expatriation strategy/mechanism, management information systems and transmission channels (Bonache et al. 2001, Minbaeva and Michailova 2004). Changes within the knowledge management system could become necessary in order to facilitate or improve the implementation and commercialization processes (Davenport and Prusak 1997).

The ultimate goal of organizations is or should be to attain the outcome stage. This stage is the stage at which innovation can be said to occur (Popadiuk and Choo 2006). However, attaining this stage is not a very simple task as I will show in the next paragraph.

### 4.4. Challenges Involved With Knowledge Creation In Organizations

As some companies may have already realized, the translation from one phase to the other is not automatic. This is one of the biggest realities facing organizations today (Cummings and Teng 2003). Some knowledge creation projects may not yield the expected outputs or outcomes. Some may not yield any outcomes at all. Apart from the factors that generally affect projects like funding, time constraints etc, there are factors that are exclusive to knowledge creation projects.

### 4.4.1. Market Factors

The output to outcome success of knowledge creating activities depends on the market to a reasonably great extent. Argument by marketing scholars is that marketing activities can help to enhance or facilitate the output to outcome translation by ensuring that the necessary desirable characteristics are incorporated into the output in a way that would be appealing to the final consumer who will utilize the outcome (Nuseibeh 1996). This could be new techniques or new products.

Further arguments are based on the notion that the level of consumer acceptance can be predicted by firms (Sherrell et al. 2004, Fourt and Woodlock 1960) by taking into account the ease of use of the new product, usefulness of the product and compatibility with existing products(Chen et al. 2004). Some organizations test their prototype in the market and use purchase and re-purchase decisions as a predicting factor of consumer acceptance.

Market research activities can be structured to ensure that the output of the knowledge creating process is compatible with existing systems and explicit enough to be easily assimilated by employees (Sorell 1994). Consumer acceptance of a new product, compatibility with existing systems and explicitness are said to enhance the implementation and commercialization processes (Gruner and Homburg 2000). Market factors when ignored can render knowledge creating efforts unsuccessful (Gruner and Homburg 2000).

### 4.4.2. Institutional Factors

The new knowledge (new ideas, new techniques, problem solution and product prototypes) realized from knowledge creation efforts are often faced with mixed feelings within a typical organization, much less an MNC. Institutionalization agents can be influential in determining not only the outcome of the knowledge creating process but also the output. Institutionalization is a mechanism that can create structure within an organization (Sewell 1992, Greenwood and Hinings 1996). It is also the coordination of a system of unique behavior collectively prescribed as a solution to particular problems in an area of social life (Eisenstadt 1964). Governments, schools, professions and organizations are typical examples of institutionalization agents that have potential to impact the output to outcome translation (Royston et al. 2002, Lawrence et al. 2001, Scott 2008).

Organizations like to think of themselves as entities of individuals working together with a homogenous goal or objective(Scott 2004), but this in reality may not always be the case as there is often a lot of diversity and sub groups (Haveman and Rao 1997) within the organization. Individuals can have different goals, ideas and norms based on their cultural-cognitive orientation (Scott 2008). Organizations that acknowledge this diversity or role of institutions, establish managerial practices that elicit suggestions from employees in order to include everyone in knowledge creation projects (Milstein-Adler et al. 2010) while those that ignore institutional factors may do so at their own peril.

### 4.4.3. Employee And Organizational Factors

Employees constitute a major factor that affects knowledge creation in organizations and reasonably so because they should typically embody the organization's knowledge stock. However, in order to create knowledge continuously, an organization must first create a knowledge mindset or knowledge culture (Hauschild et al. 2001, Long and Fahey 2000, Smith et al. 2010). This becomes often necessary because there could be resistance in the acceptance of new knowledge as a result of some individuals in the organization being more prone to inertia than others based on their personal orientations, experiences or profession (Lippmann 2005, Aldrich and Ruef 2006b).

Organizational culture is derived from organizational schema; the way an organization sees itself (Aldrich and Ruef 2006a). This is often imprinted from the founding of the organization, deeply rooted and difficult to change (Johnson 2007). In the same way, individual employees also possess unique schemata imprinted by their professions and experiences and this affects how they interpret their position in the organization. Organizations may be able to influence their employees gradually over time because the evolutionary processes; variation, selection, retention and struggle that they go through in their existence will ensure that individual and firm level inertia may not survive too long (Hannan and Freeman 1984, Aldrich and Ruef 2006a).

These challenges may seem daunting but the existence of high performing firms shows that they are surmountable. An interesting approach may be to investigate the best practices in knowledge creation by

studying organizations that are successful in knowledge creation.

## 5. Research Directions

So far, Research in knowledge creation has been characterized by several suggestions and recommendations. Most studies do not only lack a specific distinction of the aspect of knowledge creation under review, they are also limited in scope to suggestions for how knowledge can be created without taking into consideration, the specific types of knowledge that organizations are more interested in, the challenges involved, macro/micro level distinctions, new and existing theories of knowledge creation.

Studies have shown that the outcome of knowledge creating effort is influenced by the context in which the knowledge was created (Farooq 2010) making the knowledge creating input very vital for the desired output and outcome. In determining best practices in knowledge creation, research should be focused on identifying organizational structures that are most suitable for micro and macro level knowledge creation and that are highly effective in surmounting the challenges involved in knowledge creation highlighted in this paper.

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