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What Do We Mean by Information Technology Enabled Organisational Transformation?

Kyung Jin Cha
Kei-Myung University, kjcha7@kmu.ac.kr

Zoonky Lee
Yonsei University, zlee@yonsei.ac.kr

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Kyung Jin CHA, College of Management Administration, Kei-Myung University, Deagu, South Korea, kjcha7@kmu.ac.kr

Zoonky LEE, Graduation School of Information, Yonsei University, Seoul, South Korea, zlee@yonsei.ac.kr

Abstract

The term of "IT enabled organizational transformaion (ITOT)" is much used in the practice and literature of information systems. Thus, we treat this variety of usage as interesting and potentially significant, but IS cholars have used ITOT construct in diverse and often contradictory ways. To discusses the meaning of ITOT, this article present a conceptual review of the ITOT literature, highlighting important concepts and theories relating to ITOT over time. We first presents the current definitions of OT in general, and then trace the evolution of the ITOT construct in the broader organizational change literature. On the basis of critical analysis and synthesis of available literature the draft of a new matrix for explaning the concept of ITOT will be proposed.

Keywords: information technology, organizational transformation, IT intermediate impact, organizational change, organizational learning, complementary change

1. ORGANIZATIONAL TRANSFORMATION

The concept of "transformation" has been with us for several decades, and today it is one of the most popular concepts in business. OT has become one of the most used change concepts of our time (VanTonder 2004). Although the usage variety is interesting and potentially significant, the discourse surrounding OT remains poorly explicated in terms of both meaning and relationship with other related concepts (Dehler and Welsh, 1994). As such, the notion of OT might seem commonplace, yet it is not easy to arrive at a precise and generally agreed meaning of OT (Van Tonder, 2004). To thoroughly understand OT, it is necessary to review the broad definitions proposed by other research disciplines. This section presents a sample of the definitions of transformation proposed by various authors.

The point of departure of this study is the generic concept of transformation. Most contemporary definitions appear to view transformation as making or becoming something new that starts at a specific point in time. Several studies have explored this phenomenon, alternatively referring to it as "quantum change", "second order change", "core feature change", "large scale change", and "strategic reorientation". OT is typically portrayed as being on a bigger, wider, and deeper scale than other forms of change (Tosey and Robinson 2002). Table 1 shows a range of definitions of OT. Differences between definitions of transformation, such as those cited in Table 1, tend to be a function of selective emphasis (i.e., elevating the motion element or the outcomes of transformation, the role of context, and so forth). The more common conceptualisations of transformation, however, appear to focus on the central role of *time* and the notion of manifest *differences* in pre and post change conditions or states.

Key Idea	**Descriptions**	**Reference**
Fundamental change	*'……Profound, fundamental changes in thought and actions, which create an irreversible discontinuity in the experience of a system' (p. 278)*	Adams (1984)
	'……….is the application of behavioural science theory and practices to effect large-scale, paradigm-shifting organizational change. An organizational transformation usually results in totally new paradigms or models for organising performing work'(p.1)	French et al.(1994)
	'….is the process of fundamentally changing an organization's processes in order to allow it to better meet new challenges'	Palmer and Hardy (2000)
	'…Succession of states that differ fundamentally from one another'	Marshak (1993)
	'Transfiguration from one state to another Series of transitions with evolutionary and revolutionary moments'	Hill and Collins (2000)
	'the process of fundamentally changing an organization's strategy, culture, structure and processes in order to allow it to better meet new challenges'	Scott-Morton (1991)
Productivity	*'.....By organizational transformation I mean intra organizational change that leaves the organization better able to compete effectively in its competitive milieu'*	Newman (2000)
Discontinuous change	*'.....change that is episodic, discontinuous, and intermittent'*	Weick and Quinn (1993)
	'..second order change, multidimensional, multilevel, qualitative, discontinuous, radical, a paradigm shift'	Levy and Merry (1986)
Broad change in organizational entity	*'……reframing, which is a discontinuous change in the organization's or groups' shared meaning or culture. It also involves broad change not only in work processes, but also in other dimensions of organization, such as organizational structure, strategy, and business capabilities'*	Davenport (1993)
	'Difference in form, quality, or state over time of organizational entity'	Van de Ven and Poole (1995)

	'Organizational transformation is a transition between organizational states that differ substantially in crucial features such as strategy and structure'	Wischnevsky and Damanpour (2006)
Unpredictability, Emergence	*"..Emergence of new and unknown state from the remains of the old.."* *"..Rapid transition from one to another, sudden unexpected and dramatic change.."*	Ackerman (1997) Macintosh and Maclean (1999)

Table 1. Definitions of Organizational Transformation

As observed in Table 1, many different definitions are available but there is no single, universally accepted, concise definition of OT. A substantial variation in the meaning of OT suggests that the most significant shortcoming of the above definitions is that they represent the thoughts of a few people based on their particular perspective, anchored in specific research studies. Each research community seems to have some preferences for different terminology, adding to the difficulties in communicating across researchers and practitioners. For instance, academics may use the term 'punctuated equilibrium' (e.g. Gersick, 1991) to refer to the same transformation dynamic that consultants may call 'radical', 'revolutionary', or 'fundamental' change. The definitions do not capture the collective wisdom of the diverse organizational research community, which is not conducive to successful transformation management practices. It is clear that efforts to clarify and further define the meaning of OT, leading to more agreed upon typologies and terms, would greatly improve the understanding of IT-enabled organizational transformaion.

1.1 A Shift from Revolutionary Change to Continuous Change

Organizational change analyses, written since Porras and Silvers' review (1991), suggest that an important contrast in change research is the distinction between change that is revolutionary and discontinuous, and change that is incremental, evolving, and continuous. The distinction between incremental and radical change was first articulated by Watzlawick et al., (1974) and then followed by Van de Ven and Poole (1995).

In its early usage, various researchers regarded OT as a synonym for revolutionary change and second-order change (Levy and Merry 1986; Lichenstein 1997; Torbert 1989). This perspective probably oriented from Levy and Merry's definition (1986, p.5) of OT as "*second-order change which is a multi-dimensional, multi-level, qualitative, discontinuous, radical organizational change involving a paradigmatic shift*". With this definition, scholars such as Marshak (1993), King (1997), and Hill and Collins (2000) continued to attach their own specific meanings to the concept of OT. For example, King's (1997) view was that OT is a planned change designed to significantly improve overall organizational performance. Hill and Collins (2000) refer to OT as a transfiguration from one state to another. These authors detail OT as change that is a fundamental and "state" change, indicating change in the organizational core system.

In the later 1990s, researchers started to understand that OT may have more descriptive power than radical or discontinuous change, simply since the properties of these change concepts are far more narrowly conceived. Although the concept of planned change dominated the organizational change discourse for decades, criticisms surfaced in the form of the new 'emergent approach', largely focused on challenging the episodic linear movement of change from one state to another, given the uncertainty and turbulent enviornment (Orlikowski 1996). Research evidence exists that IT-enabled OT is often incremental, informal, emergent, and is based on learning through small innovations (Harkness et al. 1996; Mintzberg 1979). Transformation is described as situated and grounded in continuing updates of social practices (Rindova and Kotha 2001; Tsoukas 1996). The distinctive idea in this perspective is that small, continuous morphing, increased simultaneously across units, can accumulate and create substantial transformation within an organization (Marshak 2002).

Both revolutionary and incremental change theorists have proposed a number of contrasting tactics for accomplishing OT (Stoddard and Jarvenpaa 1995). These tactics vary in the type of employee participation, scope of communication for transformation, and nature of leadership (e.g. transformational leadership) (Harkness et al. 1996). Table 2 shows that there is clear distinction

between change that is revolutionary and incremental in terms of its concept, emphasis, and perspective. However, the ideal organization, in both types of organizational change, resembles the successful self-organising firms that Brown and Eisenhardt (1997) found. In their study, successful firms did not rely on a purely organic process and structure. Instead, successful firms had well-defined managerial responsibilities and clear project priorities along with processes that were highly *flexible, improvisational, and continuously changing*. The images of organizations that are compatible with both revolutionary and continuous change include those built around the ideas of continuous change, improvisation, translation, and learning (Orlikowski 1996).

A shift in vocabulary from "change" to "changing" has an important implication for understanding OT. When organizations understand the changing nature of OT, isolated small innovations can be celebrated and seen as important to a wider range of fundamental transformation.

	Revolutionary and Discontinuous Change	**Incremental and Continuous Change**
Metaphor of organization	Organizations are inertial and change is infrequent, discontinuous, intentional	Organizations are emergent and self-organizing, and change is constant, evolving, cumulative
Perspective	Change is an occasional interruption or divergence from equilibrium. It tends to be dramatic and it is driven externally.	Change is a pattern of endless modifications in work processes and social practice. Numerous small accommodations accumulate and amplify.
Emphasis	Short-run adaptation	Long-run adaptability
Key concepts	Deep fundamental change, replacement and substitution, revolution	Emergent patterns, improvisation, translation, learning

* adopted from Weick and Quinn (1999)

Table 2. Comparison of Radical and Incremental Change

1.2 History of Concepts Relating to Organizational Transformation

The concept of OT has evolved over time. In the 1980s, OT was a synonym for "second-order change" (Levy and Merry, 1986, p.5), radical change, deep change, and revolutionary change. The radical tone of earlier understanding of OT has been somewhat tempered by a more holistic view of OT (Grover et al. 1995). King (1997) and Guha et al., (1997) view OT as a planned change designed to significantly improve overall organizational performance (e.g., quality, responsiveness, cost, flexibility, satisfaction etc.), by changing most organizational features. Their basic assumption is that change would not be necessary if the organization had done the job right in the first place. Such a model, which treats change as an event to be managed and planned, may have been appropriate for organizations that were relatively stable and bounded and in which functionality was sufficiently fixed to allow for detailed specification.

Later, researchers started to define OT as fundamental change that results in substantial differences in crucial organizational features, such as structure, process, culture and capability (Nutt and Backoff 1997). The studies further suggest transformation comprises a series of transitions from one state to another, that entail both evolutionary and revolutionary change. OT was viewed as a series of fast, mini-revolutionary changes and incremental changes (Weick and Quinn 1999). It is a long innovation journey, rather than a single planned event.

Since then, the term 'morphing' has also been introduced in an academic context to describe comprehensive, continuous, dynamic OT. Regardless of whether 'morphing' is the right term, it does have some advantages for describing the emerging context of OT (Marshak 2002). The idea of continuous morphing is consistent with the emergent paradigm of OT, which emphasises environmental dynamism and flexibility (Rindova and Kotha 2001). Rindova and Kotha (2001) describe organizational transformation as "continuous morphing" and profound transformation.

They include significant changes in the range of products and services offered, along with reconfiguration of the resources, capabilities, and structures employed to deliver the extended range of products and services. Relying on continuous morphing to attain OT may require significant changes in managerial thinking, and a shift in focus from planned control to opportunistic evolution and experimentation (Rindova and Kotha 2001).

As such, the scope, speed, and even nature of OT seem to be changing. The history of the meaning of OT offers important insights for understanding the nature of IT-enabled OT. The most important point is that researchers have started to address more holistic organizational systems, rather than parts or segments of an organization. The literature now proposed a new perspective of defining OT calling for adopting comprehensive views (e.g the concept of balancing change with continuity (Nasim and Sushil 2011)) rather than choosing one over the other (planned vs emergent or incremental vs revolutionary).

2. THE NATURE OF IT-ENABLED ORGANIZATIONAL TRANSFORMATION

IT-enabled OT has been studied from many theoretical perspectives, including an evolutionary perspective (Orlikowski 1996), the resource-based view (Wade and Hulland 2004), complementary changes (Hill and Collins 2000), total quality management (TQM) and BPR (Kettinger et al. 1997). These perspectives have provided alternative views on organizational transformation enabled by IT.

2.1 History of Concepts Relating to IT-enabled Organizational Transformation

Analysing the meaning of OT suggests that it might be fruitful to undertake a historical study of the interrelationship among the concepts relating to IT-enabled OT. The meaning of IT-enabled OT has evolved over time; it is an overarching and extensive concept encompassing a range of terms including radical and incremental change, business process re-engineering, emergent change, complementary change, and innovation and learning (Besson and Rowe 2012).

In the 1980s and 1990s the dominant approaches to IT-enabled OT were; total quality management (TQM) and business process reengineering (BPR). TQM adopts a continuous change approach to OT, focusing on improving overall product quality, lowering operating costs, and reducing lead time. BPR attempts to abandon existing processes in favour of radical reform (Davenport 1993; Hammer and Champy 1993). However, organizational change, in its various forms, had a fairly poor record throughout the 1990s. TQM and BPR (Gardner and Ash 2003) required massive amounts of financial and human resources, with limited returns. Such a mechanistic view of IT-enabled OT, which ignores the emergent, complex, and often contradictory socio-technical interactions fundamental to IT-enabled OT, was criticised (Grover and Kettinger 2000). Orlikowski (1996) introduced the emergent perspective of IT-enabled OT. She noted that IT-enabled OT is emergent rather than planned and suggested that ongoing adaptation and adjustment are the essence of IT-enabled OT. She also proposed that there is a complex relationship of reciprocal causality between IT and OT, with the outcomes emergent and difficult to predict in advance (Orlikowski 2000).

At the same time, the resource-based view (RBV) has been a popular theoretical lens for research on the relationship between dynamic capabilities (Teece et al. 1997) and IT-enabled OT. Among the RBV researchers, Wade and Hulland (2004)'s paper emphasises the importance of looking at resource complementarities and moderating influences when studying the effect of information systems on organizational performance. Brynjofsson and Hitt (2000a; 2000b) initially proposed the importance of complementary changes enabled by IT. A more recent idea is that variation in IT value may be explained by the extent to which IT is used to enable organizational transformation (Melville et al. 2004). Econometric IT value studies (Bresnahan et al. 2002; Bresnahan and Greenstein 1997; Brynjolfsson and Hitt 2000a; Brynjolfsson and Hitt 2000b; Brynjolfsson and Hitt 2003; Murnane et al. 1999) have indicated that organizational transformation outcomes explain the greater increases in productivity associated with IT.

2.2 Interdiciplinary view of IT-enabled Organizational Transformation

2.2.1 ITOT with Resource Base View (RBV)

The RBV of the firm has frequently served as a theoretical foundation for understanding the locus of ITOT. According to RBV, firm create organizational competitive outcomes on the basis of resources that are unique, valuable, and not easily imitable or substitutable(Barney 1991). The RBV sees information systems resources or capabilities as a potential source of competitive advantage (Bharadwaj 2000). These authors argue that differences in access to complementary strategic resources explain differences in organizational performance. Recently, this perspective has gained significant empirical support (Jeffers et al. 2008; Oh and Pinsonealt 2007; Ravichandran and Lertwongsatien 2005; Ray et al. 2005).

Traditional RBV research centres on the relationships between IT resources themselves and business performance. This view has been criticised for its limited conceptualisation, Clemons and Row (2002), Floyd and Wooldridge (1990), Powell and Dent-Meicallef (1997), Zahra and Covin (1993), Mata et al., (1995) and Dedrick et al., (2003) found that IT resources alone do not provide competitive advantage; rather, firms gain competitive advantage by leveraging complementarities among people, culture, strategy, and structure. Further, Wade and Hulland (2004) and Ravichandran and Lertwongsatien (2005) emphasise the importance of examining resource complementarities and moderating influences when studying the effect of IT on organizational transformation. *Complementarity* refers to "how one resource many influence another, and how the relationship between them affects competitive performance" (Wade and Hulland 2004 p.123). Teece et al., (1997) referred to these complementarities as firm's unique abilities to deploy resources in combination or bundles to create a capacity for achieving a desired objective. These authors suggest that IT resources or capabilities are likely to affect organizational performance only when they are deployed to create unique complementarities with other firm resources.

In the RBV literature, resource complementarities have been conceptualised in two broad ways. The first perspective conceptualises resource complementarity based on how one resource enhances the effect of another resource, using multiplicative terms in statistical analyses. For example, Powell and Dent-Micallef (1997) used interaction terms to test the effects of complementarities between human resource practices and IT on organizational performance. Another perspective conceptualises resource complementarity based on how resources are channeled and utilised. It is not the co-presence of resources that results in complementarities; rather, firms have choices about how resources are deployed (Ravichandran and Lertwongsatien 2005). Complementarities arise when resources are used in a mutually reinforcing manner (Brynjolfsson and Hitt 2000a). While the complementarities between IT and other resources have been emphasised (Ray et al. 2005) in determining the contribution of IT to organizational outcomes (Dedrick et al., 2003), limited work has been undertaken to examine the effects of complementarities on IT enabled organizational transformation.

2.2.2 ITOT with Organizational learning perspective

An important element of the ITOT process is organizational learning. In particular the concepts of exploitation and exploration are relevant in ITOT because they help to explain how and why a firm exploit IT and explore IT. According to March (1991), exploration refers to an organizational experimentation with new alternative and pursuit of knowledge about unkown opportunities. Exploitation, in contrast is considered to be the development use of things through the refinement and extension of existing resouces and knoweldge. Such concept was used by IS researchers such as Subramani (2004) and Lee (2012), they distingushes two modes of IT use; IT exploration and IT exploitation.

Furthermore, recent organizational change studies have emphasized the role of "dynamic capabilities" in facilitating fundamental organizational transformation. Dynamic capabilities have been defined as 'the firm's ability to integrate, build, and reconfigure internal and external competencies to address

rapidly changing environments (Teece et al., 1997, p.516). Dynamic capaiblites are an appropriate perspective for developing a theory of organizational transformation in turbulent environments because they are focal to the organiztional processes that enable growth and adoptation in changing environment (Dixon et al. 2010). The dynamic capabilities approach merge with a range of issues from organizational development and learning literature. However, in general the approach to ITOT is still rooted in traditional planned versus emergent mode of change. The lack of alignment between the ITOT and the OC literature suggests there is a need for interdisciplinary study to enhance the theory of of organizational transformation with respect to the impact of IT.

3. THE IT-ENABLED ORGANIZATIONAL TRANSFORMATION MATRIX

An analysis of the emerging thoughts and concepts on IT enabled OT indicates that although a large number of researchers acknowledge the importance of transforming with IT, very few have actually attempted to explain the nature of ITOT using validated or actionable conceptual framework. Based on the issues and dimensions reviewed above, we propose a draft conceptual framework of "IT enabled OT" on a matix (Figure1). The matrix and its three dimensions are our choice about how to synthesise and represent the findings from the literature review. The first vertical axis represents two modes of IT use: IT exploration and IT exploitation (March 1991; Subramini 2004). In particular, IT exploitation refers to a firm's activities to adopt information technologies to improve existing process. In contrast, IT exploration refers to the firm's activities to acquire new IT to develop novel strategies for the pursuit of new possiblities. IT exploration reflects risk taking, experimentation and innovation. The second vertical axis represents degree to which organization acheive complementarities between IT and its organizational contexts. For fundamental transformation enabled by IT, it is essential to accompany necessary change to organizational resouces such as strategies, structures, process and culture. Venkatraman (1996) note that the realisation of IT benefits are only marginal if only superimposed on exisitng organizational conditions. The horizontal axis concerns the means by which mode of change is pursued. As van de Van and Poole (1995) proposed, the mode of change can be distinguished in terms of whether the change event is precribed a priori, or whether the progression is constructed and emerges as the change process unfolds. Similary, "Planned and Discontinuous" indicates a prescribed, intentioanl transformation focused on short-run adoptation. This planned mode evokes a sequence of change events in accord with a pre-established rules or program such as BPR and TQM. In constast, the mode of "Emergent and Continuous" change is a pattern of constant, improvising, and long run adoptation. The outcome of such changes is unpredictable beforehand and there is a high degree of uncertainty and a need to make sense of the changes. The four main vairieties are not seen as having hard boundaries, but rather as giving a high-level view of how companies can be compared in their implementation of IT enabled OT. These categories appearing in the quadrants of the matrix are:

- *Quick-run Organization*
  This quadrant appears to represent a radical transition from one state to another, expected change enabled by a single implementation of IT. Strong leadership take place in this quadrant, so that OT is highly controlled and planned consequences from a single IT solution such as software package and upgrade of database management system etc. The key aim is to change processes in order to obtain improvement in lead time, quality and cost reduction. Although 'quick-run' firm can frequently acheive improved efficiency from IT, they often find it difficult to sustain because of the resulting imbalnace with other organizational factors.

- *Innovative Transformer*
  In this quadreant, we locate a discourse of intentional change that emphasis organization-wide change through a relatively controlled or planned process. Large scale change approaches that are related with business process reengineering and others seem characterd by a need to be more transformed and innovate and a highly organized and planned beforehand, usally expert-led or

outsourced, method leading towards ITOT as a "a rapid and revolutionary change" enabed by IT. This seems closest to us to Levy and Merry (1986)'s definition of OT as "*second order change, multidimensional, multilevel, discontinuous, radical, a paradigm shift".* Eventhough the change is rapid, their focus is appropriate integration of IT with key organizational resouces such as business process, strategy, quality to improve the speed of response to the market's specific needs and thus to enable firms to seize new opportunities by changing their existing ways of doing things. Over the long term, small revolutionary changes may cumulate to produce as larger transformation and their new IT intiative complements with its organizational structure, strategy culture and process. In such organization, the uncertinty experienced by organization member is relatively low, because they typically anticipate the direction of change over the course of IT enabled OT.

- *Learning Organization*
  In this quadrant, ITOT involves a particular emphasis on incremental changes, and is based on learning through many small IT related innovations. Classic organizational learning literature (e.g Senge, 1990) has a generative and evolutionary focus, particularly a view that "accommodations to and experiments with the everyday contingencies, breakdowns, exceptions, opportunities, and unintended consequences" (Orlikowski 1996, p.65). The evolutionary characteristics of changes is smilar to "Dynamic transformer", but the major difference is the mode of IT adoption and "absence of dynamic capabilities". In this quadrant, only IT exploitation exist which enable the organization to reconfigure, leverage and thus to develop the threshold operational capabilities for short-term survival.

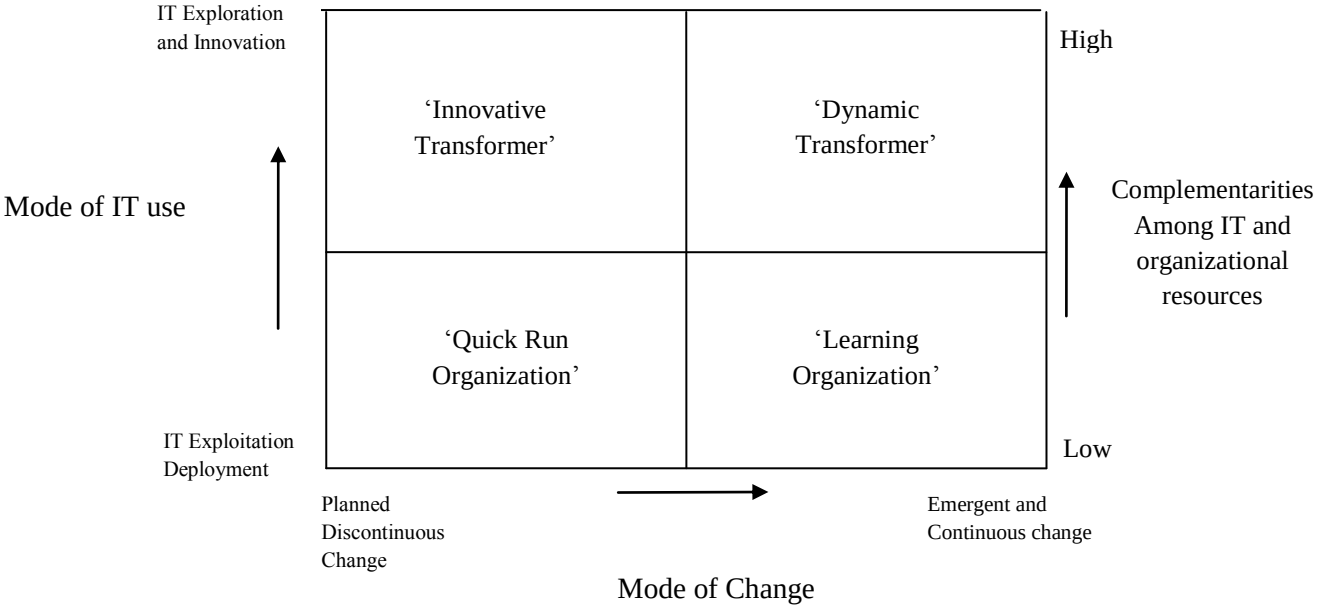

Figure 1 The Matrix of Information Technology enabled Organizational Transformation

- *Dynamic Transformer*.
  In contrast with learning organization, 'dynamic transformer' moves beyond mere survival to securing sustainable competitive advantage. This quadrant represents an continuously adaptive organization with IT having dynamic capabilities(Teece et al., 1997), along with processes that are highly flexible, improvistional and continously changing. In such organization, by balancing continous and discontinuous change and the two types of learning (exploration and exploitation), organization generates dynamic capailibites in their IT adoption to acqure the strategic flexiblity to adapt to changes in the environment, and thus to secure sustained competitive advatange. 'Dynamic transformer' engage in exploration learning in reponse to the challenges of the environment may require new business models and new creative innovation (Dixon et al., 2011).

The image of dynamic transformers that are compatible with continous emergent change and mini revolutionary change include those built around the ideas of continuous morphing (Rindova and Kotha, 2001) and learning through innovation (Orlikowski, 1996). Through situated and grounded in continuing updates of social practices, significant changes of organizational form can be occured in such dynamic transforming organization. This is broadly consistent with Marshak (2002)'s emphasis on IT enabled transformaion as accumulated substantial changes to an organization's strategies, structure, process, boundaries, culture and so on through small innovations.

4. CONCLUSION

Althrough attention to the role of ITOT in firm's competitive success has been incresing over the past two decades, many questions remain unresolved. Theoretical perspective in the ITOT literature, such as the resources-based view (RBV), daynamic apability view, complemeary perspective and the concept of exploitation and exploration bring different understandings about the locus of and the mechanisms of firm's ITOT. This study aim to provide an integrative theoretical perspective to explain the complex nature of IT OT.

The review section of this paper suggests that the definitions of OT vary, making it difficult to address the range of transformations enabled by IT. The scope, speed, and even nature of OT seem to be changing. The history of the meaning of OT suggests that reserachers have started to address more emcompassing organizational systems, rather than parts or segments of an organization. The matrix we proposed is a synthesis and specific application to the idea of IT enabled organizational transformation. The concept of ITOT inevitably collapes similar qualitavie differences that are enfolded within the term "organizational change" in general. We have argued that the meaning of IT-OT is more instructive to consider the possbile purpose to which the concept is recruited, and to explore differences of usage in the literature across different diciplines.

As a conceptual study in an organizational context, this study has potential theoretical limitation. Most of all, within a firm, the boundaries between the contrasting mode of IT use and mode of change, such as planned versus emergent, discontiunous versus continuous and explorative versus exploitative are not always clear. However, we speculate the the nature of IT enabled transformation is likely to differ markedly according to the quadrant on the matrix that represents their mode of change, mode of IT use and degree of complementarities. It is not suggesting that in practice, transformations necessarily fall into one of these pure types. It seems most likely that in practice there would be a mixture, with one quadrant perhaps domiant. The conceptual matrix may serve as building blocks for explaning processes of IT enabled OT. However, further research needed to identifies the circumstances with case examples when each type of ITOT applies and proposes how interplay among the four different categories explain the complex nature of IT enabled OT.

Despite the limitation, this study holds benefits for both academics and practitioners. First, this study helps to enhance ITOT theories and offers insights that may provide new ways to think about the proscess of ITOT. This study provides a theoretical foundation for further empirical studies around ITOT. The proposed matrix enables researchers to consider different set of conditions and characteristics of each of different types of ITOT. Finally, this study offers guidance for practitioners to more strategically and selectively focus their IT investment, depending on their different levels of environmental dynamism and their own organizational internal situation, in order to more effectively enable fundational transformation with IT.

Given the matrix of the term IT-OT, we expect to find greater curiosity about its potential of IT to facilitate substantial transformation in organization form. We hope it will promote clearer and more explicit theories of ITOT and provide a foundation for future emprical research.

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