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From Questions to Answers: Reviewing Organizational Learning Research

Abstract *Prior reviews of organizational learning (OL) have noted an exponential growth in the literature through the 1990s and have expressed concerns about the lack of empirical research. In this paper, we review the literature published during the period 1990–2002 and take stock of the state of empirical research in OL. Based on the 123 articles reviewed, we note a phenomenal growth in empirical research and the emergence of a learning perspective. We discuss key research findings pertaining to internal and external learning, and the facilitators of organizational learning. We discuss the implications of the empirical research and suggest directions for future research.*
Key Words: *citation search; empirical research; learning perspective; organizational learning; review*

Introduction

The domain of organizational learning (OL) has been portrayed as a 'volcanic activity' in which multiple foci of interest co-exist all the time, some of which are active, and others are passive but may resurface at any time (Easterby-Smith et al., 2000). Reviewing this volcanic activity at regular intervals is important for consolidation of the literature and progress of the field. Prior reviews (Crossan et al., 1995; Dodgson, 1993; Easterby-Smith, 1997; Fiol and Lyles, 1985; Huber, 1991; Levitt and March, 1988; Miller, 1996) have dealt primarily with theoretical analysis and have noted the paucity of empirical research. In this paper we respond to the questions raised in prior reviews of the literature by taking stock of empirical research in the field.

We employed an electronic search to identify OL research and a citation search to select the papers for review. Based on the 123 articles reviewed, we note the following about the current state of the field. First, empirical research has witnessed phenomenal growth since the late 1990s. The number of citations indicates that the impact of this research has also been high. Second, research in

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OL has been dominated by the application of a learning perspective to study strategic issues, particularly those associated with joint ventures and alliances. As a result, there has been a strong focus on various types of external learning. Finally, empirical research sought to better understand the role of contextual variables that influence OL.

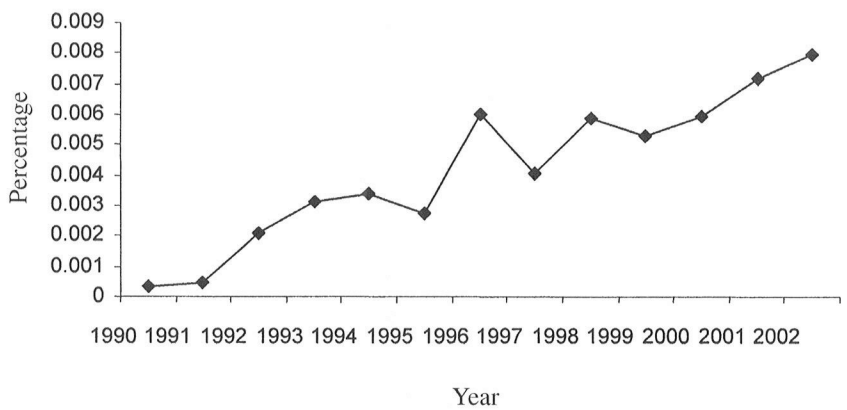
Based on the findings from empirical studies, we put forth several specific research issues that warrant further examination. Further, we provide broad directions for future research based on the overall trends in OL research. These include: (1) exploring the intersections of OL and organization theories; (2) extending the level of analysis beyond the firm; (3) strengthening the underlying research on the phenomenon of learning and ensuring that research employing a learning perspective is grounded in current thinking; and (4) examining the role of time in learning.

We begin by providing an overview of our review procedure, briefly describing some of the debates raised in prior reviews of the literature. Second, we discuss the growth in empirical research and the emergence of a learning perspective. Then, we review the research on external and internal learning, followed by the research on the contextual variables that influence learning. Finally, we present the overall trends in the literature, discuss their implications and provide directions for future research.

An Overview of Organizational Learning Research

A search for the term 'organizational learning' on the *Web of Science* database resulted in a list of 707 publications for the period 1990–2002. The growth in publications over the period has been phenomenal. In 1990, only four articles on OL were published; in 2002, 98 articles appeared. This suggests that the 'exponential growth in OL research' (Crossan and Guatto, 1996) that occurred until the mid-1990s has continued through 2002. Figure 1 shows this growth normalized for total publications.

Figure 1 OL publications as a percentage of total publications



To select the papers for review, we narrowed the field of 707 publications to a sample of 95 by focusing on papers that received an average of two or more citations per annum and had the word 'learning' in the title and/or in the keywords. As there is a natural lag of about two to three years between publication and citation, we incorporated all the OL papers published during 2000–2002 from the journals that accounted for over 70 percent of the 95 papers selected. These journals were: *Academy of Management Journal* (*AMJ*), *Academy of Management Review* (*AMR*), *Administrative Science Quarterly* (*ASQ*), *Human Relations* (*HR*), *Journal of Marketing* (*JMK*), *Management Science* (*MSC*), *Organization Dynamics* (*OD*), *Organization Science* (*OSC*), *Organization Studies* (*OST*), *Sloan Management Review* (*SMR*) and *Strategic Management Journal* (*SMJ*). This process added 28 papers to our review sample. Of the total of 123 papers, eight were review papers, 60 were theory papers and 55 were empirical papers.

About 10% of the papers selected were either review papers or those that clarified an issue by relying on an extensive literature review, for example resolving the issue of 'organizational learning' and 'learning organization' (Tsang, 1997).[1] These papers have not only provided a general overview of the OL literature but also enriched the field by providing directions for future research. In order to build on their contribution, we provide an overview of these papers and anchor our work with respect to them.

A Meta-review of OL Literature Reviews

One of the first questions debated in the OL literature was: what is learning and how is it different from constructs like 'change' and 'adaptation'? Based on a review of the strategy research, Fiol and Lyles (1985: 811) suggested that learning is primarily 'cognitive' while adaptation is primarily 'behavioural'. Further, they clarified that learning is 'the development of insights, knowledge, and associations between past actions, the effectiveness of these actions, and future actions'. The debate continued, resulting in a variety of definitions of learning (Bontis et al., 2002)[2] ranging from 'a change in the range of potential behaviour' (Huber, 1991: 89) to 'a dynamic process, occurring over time and across levels, that involves a tension between new and existing learning' (Crossan et al., 1999: 532).

The question 'what is learning' gave rise to further debate about the level of analysis or, more simply, about who or what does the learning? (Miner and Mezias, 1996). Some scholars argued that learning occurs through individuals and that organizations do not learn by themselves (Dodgson, 1993). Others contended that learning occurs at the social levels, i.e. group and organization (March, 1991). Some researchers suggested that the question of learning levels was an important research question (Miner and Mezias, 1996) and a useful tool for conceptualization (Crossan et al., 1995). However, further researchers suggested that the debate about levels (individual versus organizational) and changes (cognitive versus behavioural) limits discussion in the field and hinders researchers from capturing the richness of learning (Nicolini and Meznar, 1995). To this end, Easterby-Smith (1997) identified the contributions made to OL by various disciplines, ranging from cultural anthropology to psychology, and argued against searching for a singular research agenda.

The literature reviews underscored another issue: whether learning is exogenous or endogenous (Dodgson, 1993). This question was examined by Miller (1996) who argued that the type of learning depends on the level of people involved and the context in which it takes place. Miller (1996) also considered whether learning is methodical or emergent. However, the dichotomy between methodical and emergent learning was challenged by some scholars who argued that they coexist, interacting with each other within the situational context (Blackler, 1995; Cook and Brown, 1999). Finally, Miner and Mezias (1996) argued that there was a consensus in the research that learning can be both *incremental and radical.*

As the preceding discussion suggests, OL researchers debated various questions but agreed not to limit the scope of inquiry to definitions, causes, outcomes, levels and the pace of learning. There is a growing consensus in the literature that learning can be behavioural and cognitive, exogenous and endogenous, methodical and emergent, incremental and radical, and can occur at various levels in an organization.

Prior reviews made several observations about the state of OL research. Huber (1991) noted that the field lacked systematic empirical research, as did many other later researchers (Easterby-Smith, 1997; Miner and Mezias, 1996; Vince et al., 2002). Huber (1991) also observed that most research was focused on how organizations learn from their own experience, and called for research into how organizations learn from other organizations' experience. Many researchers also expressed concern about the lack of research on learning processes (Easterby-Smith, 1997; Miner and Mezias, 1996; Vince et al., 2002). In the following sections, we review the OL research against each of these observations.

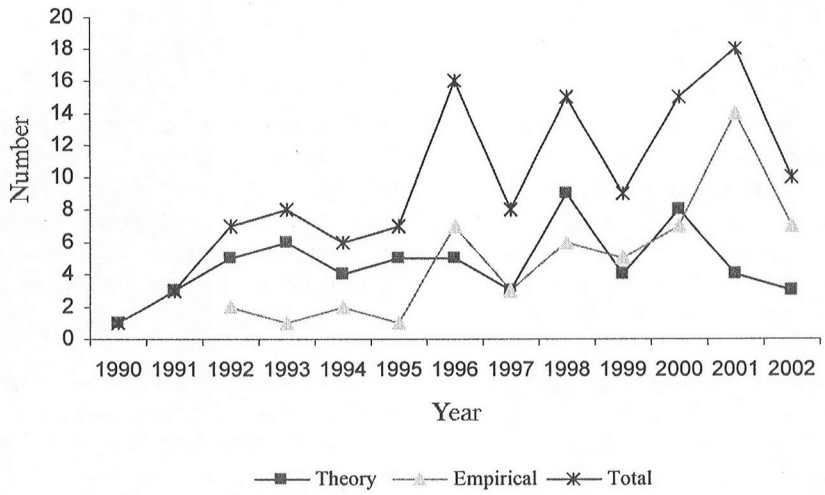
Empirical Research in Organizational Learning

In the 123 papers that were selected for review, empirical research was hardly visible during the early 1990s. However, as presented in Figure 2, the proportion of empirical papers increased in the late 1990s, as did their impact. Of the OL papers published since 1996, a total of 16 papers received an average of over five citations per annum. Of these papers, 10 were empirical studies, five were theory papers and one was a review paper (please see Table 1).

In our sample of 123 papers, 55 were based on empirical studies. The majority of these studies (37 or 67%) used the organization as the unit of analysis. Of the remainder, 13 studies included group or multiple levels of analysis and five studies analysed learning at the individual level. This indicates a growing consensus in the field that learning occurs at the individual, group and organizational levels. Further, quantitative methods were most prevalent in the empirical research. Of the 55 empirical studies, 43 (78%) used quantitative research methods, 10 studies used qualitative methods and two studies used both.

An important development in the field that occurred during the period 1990–2002 was the emergence of a learning perspective, i.e. using organizational learning concepts to explain various organizational phenomena such as performance, strategic alliances, innovation, market orientation and technology adoption. Most of the empirical studies (36 or 65%), employed a learning perspective to explain a particular phenomenon. The remaining 19 papers examined facilitators

Figure 2 Proportion of empirical and theory papers that met the review criteria



of organizational learning such as autonomy (McGrath, 2001), collaboration (Liebeskind et al., 1996) and organizational structure (Lane and Lubatkin, 1998). In contrast to the studies that used a learning perspective, studies that examined facilitators of organizational learning typically used organizational learning as a dependent variable and examined the processes that lead to it. In the following section we consider the literature that employed a learning perspective. We review

Table 1 Publications with five or more citations per annum (1996–2002)

Paper type	Average annual citations	Authors and source	Journal	Year
Empirical	28.29	Powell et al.	*ASQ*	1996
Theory	16.43	Doz	*SMJ*	1996
Empirical	11.40	Lane and Lubatkin	*SMJ*	1998
Empirical	10.86	Barkema et al.	*SMJ*	1996
Theory	10.14	Tsoukas	*SMJ*	1996
Empirical	8.25	Gulati	*SMJ*	1999
Empirical	7.60	Hurley and Hult	*JMK*	1998
Empirical	7.14	Liebeskind et al.	*OSC*	1996
Empirical	7.00	Hitt et al.	*AMJ*	2000
Theory	6.50	Crossan et al.	*AMR*	1999
Theory	5.80	Larsson et al.	*OSC*	1998
Review	5.71	Miner and Mezias	*OSC*	1996
Empirical	5.50	Simonin	*SMJ*	1999
Empirical	5.43	Barnett and Hansen	*SMJ*	1996
Theory	5.20	Easterby-Smith et al.	*ML*	1998
Empirical	5.17	Barkema et al.	*AMJ*	1997

Note: *ML = Management Learning.*

studies of the facilitators of OL in a later section, 'Organizational Learning Facilitators'.

Learning Perspective

The question of whether learning leads to improved performance has attracted much research attention. This is because learning is a key process underpinning many aspects of management. For example, the 'learning school of strategy' (Mintzberg et al., 1998) employs concepts and theories of organizational learning to explain firm performance and behaviour. Many strategy researchers have also adopted a learning perspective within the resource-based view of the firm (Barney, 1991) and the knowledge-based view (Conner and Prahalad, 1996; Grant, 1996; Spender, 1996).

Research employing a learning perspective has found that learning impacts the performance of the firm and/or moderates the effect of other variables on firm performance in a number of ways. Organizational learning has been found to enhance the survival and effectiveness of acquisitions, diversifications and foreign entries (Barkema et al., 1996; Hayward, 2002; Pennings et al., 1994); to increase customer orientation (Hult et al., 2000); and to facilitate innovation (Ahuja and Lampert, 2001; McKee, 1992; Mezias and Glynn, 1993). Other researchers found that organizational learning facilitates the implementation of information systems and business process re-engineering (Caron et al., 1994; Robey and Sahay, 1996).

The empirical research has progressed past the question of whether learning automatically leads to performance to focus on when and why learning leads to performance. Consequently, the most interesting insights from the learning perspective are not about the learning–performance relationship, per se, but about the boundary conditions of the relationship. We discuss those boundary conditions in the following sections.

Learning Traps

Organizations that rely on excessive exploitation or exploration fall into self-destructive learning traps. These traps occur because organizations tend to overlook distant times, distant contexts and failures (Levinthal and March, 1993). Empirical research has not only extended and examined the concept of learning traps, but also offered some guidelines to overcome them.

Research has shown that organizations fall into three different learning traps: the familiarity trap (tendency to employ known solutions); the maturity trap (tendency to employ proven solutions); and propinquity traps (tendency to employ solutions closer to the known solutions) (Ahuja and Lampert, 2001). As a result, innovations made by older firms tend to make less impact than those made by younger firms (Sorensen and Stuart, 2000). Also, firms that continually exploit their existing knowledge in greenfield operations tend to fail (Vermeulen and Barkema, 2001).

Although learning traps are common, research has shown that firms overcome learning traps by employing emerging, novel and pioneering technologies (Ahuja and Lampert, 2001). Empirical evidence also suggested that firms can avoid learning traps by alternating between exploitative ventures like greenfields and

exploratory ventures like acquisitions (Vermeulen and Barkema, 2001) and between internal and external learning (Bierly and Chakrabarti, 1996).

Premature Learning

Another boundary condition in the learning–performance relationship is the length and depth of the organization's learning experience. Research has shown that organizations that do not have sufficient experience can apply inappropriate generalizations to future operations, undermining performance (Haleblian and Finkelstein, 1999). Haleblian and Finkelstein found that a U-shaped relationship exists between prior acquisition experience and acquisition performance, i.e. the initial benefits from experience quickly decrease and increase later as more experience is accumulated (Haleblian and Finkelstein, 1999). The same relationship was also found in other studies (Baum and Ingram, 1998; Ingram and Baum, 1997). Although the research in this area is not conclusive (Zollo et al., 2002), it points to an interesting phenomenon for future research, i.e. the problem of prematurely drawing lessons from experience.

Temporal and Spatial Boundaries to Learning

Researchers have argued that the meaning and utility of knowledge varies across time and space (Brown and Duguid, 2002). Not surprisingly, empirical research has found that organizational learning is not free from temporal and spatial boundaries. For example, research on the Manhattan hotel industry suggested that when a hotel joins a chain, the chain's local experience helps the newly joined hotel to survive whereas the non-local experience does not help (Ingram and Baum, 1997). Similarly, another study found that the experience of prior acquisitions was helpful only when transferred to a similar industrial environment (Finkelstein and Haleblian, 2002).

Other studies have questioned the extent to which prior context-specific experience is helpful. For example, Hayward (2002) found that a firm's prior acquisition experience enhanced the performance of a focal acquisition only when the focal acquisition was neither highly similar nor dissimilar, and neither temporally too close nor too distant from prior acquisitions. The usefulness of prior experience has also been found to decrease over time (Ingram and Baum, 1997). Together, these studies point to the need to define the boundary conditions for the usefulness of learning. In other words, there is a need to know what type of previous experience is useful for which situations and for how long.

In summary, there has been a substantial growth in empirical OL research and the number of citations suggests that it has also had a high impact. A vast majority of the empirical research was conducted by strategy researchers who employed learning theories to examine performance and related organizational phenomenon. These studies generated many interesting observations that can enrich the inquiry into OL, including learning traps, premature learning, and the spatial and temporal factors that impact learning effectiveness.

Learning from External Experience

Learning in an organization can occur in two ways: from the firm's own experience and from the experience of other firms. The former is referred to as

internal learning while the latter is referred to as external learning (Bierly and Chakrabarti, 1996; Dodgson, 1993). External learning occurs in the form of congenital learning (a new firm learning from the past experience of other firms in the industry), vicarious learning (firms learning from the experience of other firms) and inter-organizational learning (Huber, 1991; Lane and Lubatkin, 1998). In the following paragraphs, we discuss the research relating to these three types of learning and then briefly review the research on internal learning.

Congenital Learning

Learning from one's own experience may not always be productive because it tends to pay too much attention to short-term and local conditions. Therefore, learning from the experience of the industry can offset these risks (Baum and Ingram, 1998; Ingram and Baum, 1997). The above-mentioned study conducted in the Manhattan hotel industry found that industry experience, both at the time of a hotel's founding, i.e. congenital learning, and during the period of a firm's operation, i.e. vicarious learning, was negatively related to its failure (Baum and Ingram, 1998; Ingram and Baum, 1997). These studies have established that congenital learning occurs and that it can be useful for organizations in overcoming the traps associated with exploiting one's own existing knowledge.

Vicarious Learning

Vicarious learning from the experience of other firms is also an important type of organizational learning. Studies have found that hospitals acquired nursing homes in locations closer to those acquired by their competitors (Baum et al., 2000); and that radio stations introduced new changes in keeping with those made by their similarly-placed competitors (Greve, 1998). University colleges adopted the programmes introduced by like institutions, but not those introduced by large and prestigious colleges (Kraatz, 1998). Small banks, however were found to follow a different pattern, establishing new branches in the same areas as large banks (Greve, 2000).

Empirical studies have established that vicarious learning occurs. More importantly, they have raised the question: what is the basis on which a firm selects a source for vicarious learning? Several possibilities have been presented: size of the competitors (Greve, 2000); similarity of the competitors (Baum et al., 2000); and success of the response (Kraatz, 1998). It is possible that each of these operate under different conditions. For example, firms could learn from large competitors when technologies are poorly understood and when goals are ambiguous (House and Singh, 1987). Similarly, firms could learn from successful responses when the goals are clear and performance data are available. These issues need further investigation.

Inter-organizational Learning

Organizational learning occurs through vicarious learning and also when organizations interact with other firms through alliances and joint ventures. These inter-organizational relationships offer a much higher, and more relevant, learning

opportunity because of the interaction that exists in such relationships. However, research has also shown that a given firm does not have equal capacity to learn from all other organizations. Lane and Lubatkin (1998) found that a firm learned more from its partner when they had a similar knowledge base, organizational structure and dominant logic. Further, a firm's learning from its partner depended on its prior experience with that partner, as well as on its experience with other partners (Zollo et al., 2002).

Strategic alliances, collaborations and joint ventures have been found to be the primary vehicles for inter-organizational learning (Liebeskind et al., 1996; Powell et al., 1996; Zollo et al., 2002). Firms take learning prospects into account when considering a joint venture. For example, it has been found that firms select their partners based on the partners' knowledge base and their willingness to share it (Hitt et al., 2000).

Internal Learning

Research that has focused on learning from internal experience suggests that firms benefit from the cumulative experience. These benefits accrue in the form of productivity improvements (Darr et al., 1995) and increased availability of alliance partners (Gulati, 1999; Powell et al., 1996). In the context of international expansion, it was found that the longevity of a foreign expansion increases with previous experience in the host country (Barkema et al., 1996).

Although there appears to be a consensus that cumulative experience leads to learning, research has also suggested that firm-specific factors affect learning. In a study of various firms which adopted minimally invasive cardiac surgery, Pisano et al. (2001) found that even though cumulative experience had improved performance, the effect of individual firm characteristics was equally strong. Using qualitative data, they suggested that the differences were due to the procedures and systems, cross-functional communication, leadership and team work of the different firms (Pisano et al., 2001). This study points to the need to use better measures for organizational learning than proxies such as age and cumulative experience. Further, it points to the need to account for firm-level learning processes to better understand organizational learning.

In summary, the foregoing discussion suggests that research on learning from external experience has been vibrant and is in line with the direction suggested by Huber (1991). The research on learning from internal experience reveals that although cumulative experience leads to learning, firm specific factors affect such learning; an issue we review in detail in the following section.

Organizational Learning Facilitators

In concluding his review of the OL literature, Dodgson (1993) suggested that the organizational mechanisms that facilitate OL must be an area for research attention (Dodgson, 1993). Recently, the same concern was echoed by other researchers who suggested that large-scale empirical research be conducted to enhance our understanding of the antecedents of OL (Vince et al., 2002). In this section, we review the empirical research about four contextual factors that affect

OL: culture, strategy, structure and environment (Fiol and Lyles, 1985). Further, we discuss two other contextual variables that appeared in several studies: organizational stage of development and resource position.

Culture

Researchers suggested that cognitive diversity is an important condition for learning to occur (Bogenrieder, 2002). However, in a field study of nuclear and chemical plants, Carroll (1998) found that different logics operate in an organization: design logic, operator logic, executive logic and social scientists' logic. These logics have different purposes and clash with each other, hindering the evolution of consensus interpretation and blocking learning (Carroll, 1998). Besides these logics, organizational accountability has also been found to have a negative impact on learning (Morris and Moore, 2000).

Research has identified the aspects of culture that can facilitate learning, such as openness, transformational leadership (Hult et al., 2000), participative decision-making culture, learning orientation (Hurley and Hult, 1998), positive supervisory behaviour and organizational support (Ramus and Steger, 2000). This research underscores the need to further focus on the role of managerial support in learning and what managers can specifically do to extend support for learning. This question assumes added importance because most managers do not view themselves as facilitators of learning and/or believe that they lack the skills to facilitate learning (Ellinger and Bostrom, 2002).

The foregoing discussion suggests that some cultural aspects absolutely hinder learning while others facilitate it. However, some researchers have argued that the same cultural aspect could facilitate one type of learning while hindering another. For example, goal and supervision autonomy helps learning when the degree of exploration required is high, but hinders learning when the required degree of exploration is low (McGrath, 2001).

Strategy

The strategic posture of an organization influences organizational learning by providing a context for perceiving and interpreting the environment (Fiol and Lyles, 1985). In a study conducted in the pharmaceutical industry, firms that emphasized incremental and radical learning, as well as internal and external learning, were found to be more successful than other firms (Bierly and Chakrabarti, 1996). Other strategies that have been found to help organizations learn are: creating crises to establish a performance gap and shifting an organization's orientation towards innovation and learning (Kim, 1998); continually crossing the boundaries of technology and the firm (Rosenkopf and Nerkar, 2001); and sharing knowledge with national and global innovation systems (Spencer, 2003).

Structure

A study of restaurant chains in the USA found that governance structures also influenced organizational learning. Company-owned units learned from the par-

ent's experience and exploited that learning whereas franchisees explored new behaviour (Sorenson and Sorensen, 2001). In another study in the hotel industry, franchisee operating experience was positively related to failure rates (Baum and Ingram, 1998; Ingram and Baum, 1997). Based on their findings, Baum and Ingram suggested that research attention be directed towards the role of the franchise structure in organizational learning.

The composition and management of groups and teams within an organization also influence learning. For example, Pisano et al. (2001) found that firms that learn better than others differ on a variety of factors: formal procedures for learning, cross-functional communication and stability of team membership. While the type of organization structure and procedures affect learning within an organization, similarity between systems and structures facilitates learning between organizations (Lane and Lubatkin, 1998).

Environment

Environmental characteristics play an important role in learning and its influence on OL has been studied by a number of researchers. Pisano (1994) argued that the state of knowledge in the environment affects whether a firm needs to learn *before* doing, or learn *by* doing. Later, Powell et al. (1996) and DeCarolis and Deeds (1999) found that environment influences OL by determining a firm's access to knowledge resources such as talent, collaboration partners, and research institutions. Also, competitive environments have been found to enhance OL because they pose a threat to the existing position of an organization (Barnett and Hansen, 1996). However, learning and gaining experience are difficult when an organization's environment is dynamic (Grewal et al., 2001).

Environment affects not only a firm's learning, but also the benefits that can be derived from learning. For example, it has been found that the positive relationship between the intensity and diversity of experience and performance was greater when the environment was hostile (Luo and Peng, 1999). This research suggests that environment affects organizational learning by influencing a firm's access to resources, opportunities and threats.

Organizational Stage

Some studies indicated that the evolutionary stage of the organization impacts learning. For example, it has been found that bio-technology firms depended on other firms for learning during their early stage of development, but focused on internalizing the learning as they matured (Oliver, 2001). In a study of innovation in a joint venture, Van de Ven and Polley (1992) found that learning did not occur during the initial expansion phase of the project. This was because the members involved were concerned with impression management, lacked focus and failed to identify the setbacks. However, learning occurred during the project contraction phase when market tests triggered investor intervention and broke the project's escalating commitment to failing courses of action (Van de Ven and Polley, 1992).

The foregoing research suggests that the evolutionary stage of an organization influences its learning. Other research has found that this influence can be

managed if the organization's systems and procedures are appropriate for its stage of development. In a study of learning networks, Hanssen-Bauer and Snow (1996) found that each stage of the network evolution was associated with different learning facilitators. For example, learning in the launch stage was facilitated by the vision and focus of the leaders; learning in the maturity phase was facilitated by a broader set of individual and environmental influences (Hanssen-Bauer and Snow, 1996).

Resource Position

Some researchers have argued that the resource position of a firm is also an important factor facilitating learning. For example, one study found that firms that are large enough to absorb the high costs of learning, and already possess related knowledge, tended to incur the costs, and made efforts to learn new technology, even when there were significant learning barriers (Fichman and Kemerer, 1997). In contrast, another study found that universities with a high level of resources were slow to adopt new technologies (Kraatz and Zajac, 2001). These findings present an interesting question: does resource abundance facilitate or block learning?

In summary, empirical studies have established that contextual factors such as culture, strategy, structure and environment influence learning. Further, this research has begun to examine the relationship between type of learning and the particular nature of these contextual variables, underscoring the importance of other contextual variables such as stage of the organization and resource position. This work should continue, and be enhanced by the development and empirical testing of models of OL antecedents.

Discussion

In this paper, we have reviewed the OL literature published between 1990 and 2002, with a particular focus on the empirical research. We identified the papers for review using a citation search. The procedure that we adopted had some limitations. First, citation searches do not capture the impact of recent publications. We have tried to overcome this limitation by including recent publications from the journals that published the majority of the OL research. Second, the papers that were most highly cited were predominantly published in North American journals. As a result, research published in non-North American journals is under-represented. Researchers have noted that European journals tend to produce more qualitative research and research adopting more social and political perspectives (Koza and Thoenig, 1995). We found a predominant strategic focus in the North American journals. Future research could examine the underlying causes and implications of OL research from North American journals being the most highly cited. Third, the database that we used did not produce comprehensive listings for the initial years of the study, particularly for 1990 and 1991. However, this does not adversely affect our review because we built on many prior reviews that covered the field extensively for those periods (Crossan et al., 1995; Dodgson, 1993; Easterby-Smith, 1997; Fiol and Lyles, 1985; Huber, 1991;

Levitt and March, 1988; Miller, 1996). Fourth, we have not removed the self-citations from total citations and thus we have not eliminated the effect of individuals who research more, particularly by building on their prior work. Fifth, the citations to the papers included are not necessarily from other OL researchers. For example, Powell et al. (1996) received the largest number of citations. They used a learning perspective to explain the formation of strategic alliances in the biotechnology industry. Although the paper is cited by OL researchers, the majority of its citations are made by researchers in sociology, technology management, engineering, R&D, innovation, marketing, public administration, drug discovery and space technology. Clearly, Powell et al. (1996) have impacted fields beyond OL. This suggests that we may have included some papers that received a large number of citations from fields other than OL, and which may have had far less of an impact on the field of OL itself.

We recognize that the picture we presented in this review is limited by the accuracy of our citation search method. Yet, unlike choosing papers based on judgement, citation search is a unique mechanism for identifying the publications that belong to the field: as decided by the field itself. Defining the field with the help of influential publications and identifying the trends based on the content in such publications is a novel approach. Therefore, despite the limitations of the methodology, our review offers many interesting observations pertaining to the field. We now present these observations and provide some directions for future research.

Observations on OL Research

There was a phenomenal growth in OL research through the 1990s and early 2000s. The number of review papers published reflects this growth, and shows that the OL research community recognizes the need to take stock of the literature at regular intervals. Empirical research has grown substantially since 1996 and constitutes a major portion of the OL research published. Its impact on the field is also evident from the quantity of later research guided by the empirical studies. The majority of the empirical research is in the tradition of a learning perspective. These researchers have generally been able to use archival data and quantitative analyses because they were building on well-established concepts. Researchers who focused on exploring and developing our understanding of the learning phenomenon itself tended to use qualitative analyses, or a mix of both qualitative and quantitative approaches, to get closer to the phenomenon.

Research in the experiential learning stream has grown considerably to include various forms of learning from other firms' experience, such as congenital learning, vicarious learning and inter-organizational learning. This research suggests that external learning complements firms' internal learning and helps them to avoid learning traps. It raises questions related to the criteria that firms adopt when selecting a source for vicarious learning, and the conditions under which vicarious learning is more appropriate vis-à-vis inter-organizational learning and vice versa. Further, this research underscores the need to find measures of learning that are better proxies than cumulative experience and calendar age. These variables do not take into account the firm-level differences in learning, which has become a central issue in OL research. Empirical studies that examined

the role of contextual factors generated many interesting insights. In particular, the studies point to the need to research learning contingencies, i.e. what type of contextual variables facilitate what type of learning.

Prior reviews expressed several concerns about the field, particularly the lack of cumulative and integrative research, and the lack of research-based guidelines for enhancing the effectiveness of organizational learning (Huber, 1991). The quantity of research that has now employed a learning perspective reflects the efforts that have been made to synthesize and integrate the literature and to generate research-based guidelines for action. In other words, the field has moved from generating interesting questions to providing answers to organizational problems such as innovation, strategic choices and performance. Much ground has been covered in the field, raising even more questions for further inquiry. To this end, we present several specific research issues and a few broad directions for future research.

Directions for Future Research

The empirical research has provided many useful insights and raised various questions that need to be researched for a better understanding of the field. Some of the questions that occurred as a result of the empirical research in OL are:

- Although a learning perspective has emerged, researchers have not been clear on the underlying assumptions employed. Future research can benefit from a stronger and more cogent discussion on how learning can yield performance.
- The literature has acknowledged the presence of learning traps and suggested that they can be avoided by alternating between internal and external learning, and exploratory and exploitative learning. A clear empirical test of this argument needs to be conducted, with a view to developing guidelines for action.
- The research by Haleblian and Finkelstein (1999) warns against making inappropriate generalizations from experience. This issue needs investigation to determine when, and what kind of, experience hinders firm performance, and under which conditions. Also, this phenomenon needs to be compared and contrasted with learning traps, given that they both refer to the perils of using experience.
- Although learning is useful for firm performance, it is not clear what the boundaries of the relationship are, i.e. where prior learning would be useful and for how long. Future research needs to investigate these issues so that our understanding of the learning–performance relationship can be improved.
- Firms learn by processing their experience but they differ in their ability to process, which is an important component of organizational learning. Therefore, researchers need to develop better methods and measures of capturing OL, rather than relying on proxies such as age and experience.
- Vicarious learning is a complex phenomenon as noted by Huber (1991) and we need to better understand how firms choose their vicarious learning sources. Vicarious learning also needs to be compared and contrasted to inter-organizational learning. One feature that distinguishes inter-organizational learning from vicarious learning is the existence of a relationship between the

two organizations. Given that establishing and maintaining such a relationship takes resources, it would be useful to compare the relative effectiveness of vicarious learning and inter-organizational learning. This could help organizations to choose between vicarious learning and inter-organizational learning under various organizational conditions.

- Research on OL facilitators suggests that certain aspects of culture, strategy, structure and environment are useful for a type of learning. It is important to know what combination of structure, strategy, culture and environment provides an ideal platform for various types of learning such as vicarious learning.
- Some studies suggest that organizations that have plentiful resources learn more. Others suggest that abundant resources create inertia and block learning. This contradiction needs to be resolved to understand the effect of resource position on learning.

We provide several broad directions for future research in the following paragraphs.

Strengthening the Research on the Learning Phenomenon

Various factors within and outside the organization facilitate and/or inhibit organizational learning. Researchers have addressed the role of organizational factors such as support, trust, safety, accountability and culture. Similarly, the role of environmental factors such as competition and position in the industry has been addressed. However, a comprehensive model of the internal and external factors that facilitate organizational learning is not yet available. Further, a majority of the empirical research has analysed archival data. Given the progress the field has made in addressing antecedents and outcomes of learning, it is now possible to conduct large-scale, cross-sectional research. Such research would help to further validate OL research and enhance the generalizability of research findings. More importantly, such research would complement and guide the vast research that employs a learning perspective. In the absence of a vibrant research on the core learning phenomenon, research that adopts a learning perspective could be using outdated and unrelated concepts. In general, the research that uses a learning perspective includes variables such as age, experience and innovation adoption as proxies for learning. Strengthening the research on the learning phenomenon would generate better proxies and, in turn, yield better guidelines for firm action.

Revisit Organizational Theories

Theories and concepts of OL and the empirical findings from the learning perspective have the potential to complement established organizational theories. For example, institutional theory (DiMaggio and Powell, 1983) suggests that organizations imitate large and prestigious organizations. Evidence from OL research suggests that organizations do not necessarily imitate the actions of large and prestigious competitors, but imitate those actions of similar organizations, particularly the successful actions (Kraatz, 1998; Baum et al., 2000). Similarly, while network theory suggests that network centrality affects learning and performance, OL research shows that learning also affects the network centrality of a firm (Powell et al., 1996).

Population ecology theory argues that organizational inertia helps firms survive (Hannan and Freeman, 1984). However, it has been found that, through learning, organizations can find the organizational form that will give them selection advantage (Bruderer and Singh, 1996). Transaction cost economics explains the existence of firms from an efficiency standpoint. However, firms differ in their capability to learn and become more efficient (Hodgson, 1998). Therefore, it is necessary to revisit some of the organizational theories by incorporating the assumptions that firms learn and that they learn heterogeneously. Such revisiting will open an interesting avenue for future research to explore the intersections of organizational learning and organizational theory.

Temporal Issues

The need to research the 'time' dimension in organizational theory has gained prominence in recent years (Zaheer et al., 1999). Organizational learning research needs to pay particular attention to the temporal dimension to resolve some of its theoretical and practical issues. For example, the relationship between knowledge and learning has been nebulous. Some researchers have argued that organizational learning leads to organizational knowledge, yet organizational knowledge influences learning (Argyris and Schön, 1978; Miller, 1996; Vera and Crossan, 2003). This question of causality can be resolved by introducing the dimension of time.

Some empirical research has found that the value of experience diminishes over time (Darr et al., 1995), particularly in high-tech industries (Sorensen and Stuart, 2000). The empirical studies that have examined the relationship between time and OL have produced mixed results. Some researchers found that the positive effect of age-based experience on learning diminished with time (Grewal et al., 2001). Others found that time has no effect on the relationship between learning and performance (Luo and Peng, 1999). Therefore, the role of time in performance clearly warrants further research.

Two other promising areas of research relate to the processes that enable rapid learning, as well as the processes that enable individuals and organizations to reconcile different time orientations (Crossan et al., 2005). For example, improvisation, where time is the scarce resource, has been advanced as an important process of organizational learning (Crossan and Sorrenti, 1997).

Learning Levels

Organizational learning research has addressed the question of levels of analysis and explained that learning can occur at individual, group and organizational levels. Recent developments in the literature also suggest that learning occurs between firms, and within a network or industry. For example, it was found that populations of organizations together learned new technology (Attewell, 1992) and successful strategies (McKendrick, 2001). Ingram and Baum (1997) and Baum and Ingram (1998) argued that learning occurs at the industry level, which can prevent organizations from falling into learning traps. Other researchers have argued that organizations differ in their capacities to learn from different organizations and learning must be viewed at an inter-organizational level (Lane and Lubatkin, 1998; Zollo et al., 2002). Research should continue to investigate learning that occurs beyond firm boundaries, at the levels of inter-organization,

industry and population. This extension is important because researchers increasingly acknowledge the role of networks (Powell et al., 1996; Tsai, 2001), location (DeCarolis and Deeds, 1999), and national and global innovation systems (Spencer, 2003) in organizational learning.

Conclusion

Our review revealed several interesting developments in the OL literature: first, the growth of empirical research; second, the emergence of a learning perspective; third, the need to extend the levels of analysis to include inter-organizational, network and population; and fourth, the potential questions a learning perspective has raised about existing organization theories. OL research has moved from raising questions to providing answers to questions that are important to organizations. Exploiting these developments will facilitate further progress in organizational learning research, and should serve to support research in the broader domains of organization theory and strategy.

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Notes

1. Based on a review of the literature on 'organizational learning' and 'learning organization', Tsang (1997) argued that learning organization is prescriptive in nature, practitioner-oriented and lacked scientific rigor.
2. Please refer to Bontis et al. (2002) for a comprehensive list of definitions.

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