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**Turnover, Structure and Firm Specific
Learning in a Large Corporation**

by

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Ytterligere eksemplarfremstilling uten avtale
og i strid med åndsverkloven er straffbart
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Abstract

This paper studies learning in organizations by considering the acquisition of firm specific knowledge in a major Norwegian oil company. Firm specific knowledge is further divided by considering both task specific (firm specific technical knowledge) and task non-specific knowledge (intraorganizational knowledge). In the present study, the individual's level of knowledge with regard to each of the two domains is treated as an outcome (or dependent) variable. Based on self-report data from 980 managers and professionals I investigate the impact of formal structure, informal relationships, turnover and mobility on the acquisition of firm specific knowledge. The results support the assumption that tenure (time-based experience) and the number of internal transfers (job-based experience) are non-linearly related to learning. Inter-unit and intra-unit communication strongly effects the acquisition of intraorganizational knowledge, and to some degree firm specific technical knowledge. Task-force participation is somewhat related to firm-specific knowledge, otherwise formal structure have weak links to learning. Organizational units with high levels of turnover tend to have a higher speed of learning, that is, influx of personnel from other parts of the organisation increases firm specific learning.

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1. INTRODUCTION

Early research on learning in organizations focused on the increase in productivity with time or cumulative output (“learning curves”). Despite the empirical success and immense practical importance of this stream of research, it has largely ignored which competences individuals actually acquire. This paper investigates learning in organisations by considering the kind of knowledge and skills that can basically be acquired within the firm only – firm specific competence. Research on firm specific human capital dates back at least to Becker’s (1964) original formulation. However, because of its emphasis on technically related specificity this original approach has crucial limitations.

In addition to firm specificity, there is the degree to which the individual’s knowledge and skills are related to a particular set of tasks. This paper further divides firm specific competence by considering both task specific (firm specific technical knowledge and skills) and task non-specific competence (intraorganizational knowledge and skills) (Nordhaug, 1994). Intraorganisational competences are the non-task-specific competences related to one particular organisation and include knowledge about colleagues, culture, structure, procedures, networks and activities in different parts of the organizations. Firm specific technical competences are task-specific competences related to one particular organisation and include skills needed to complete specific tasks in the firm, competences needed to operate or maintain tailor-made equipment, knowledge about firm-specific work-practices and competences related to manufacturing unique products. In the present study, the individual’s level of knowledge and skills with regard to each of the two domains is treated as an outcome (or dependent) variable. The two types of firm-specific competences have not previously been operationalized for the purpose of field data collection.

Extensive research on learning has examined the relation between experience (usually as measured by tenure) and job performance (or indicators of improved knowledge and skills). The aim of this paper is to study the impact of organisational structure and employee mobility on the acquisition of firm specific competences (beyond what can be accounted for by time-based experience). I focus in particular on horizontal aspects of organisational structure, formal as well as informal, because direct linkages between employees are assumed to be an important channel or facilitator of learning. Similarly, employee mobility within the organisation is regarded as an effective way for the individual to learn about firm

idiosyncrasies. Although mobility is regarded as beneficial for the individual, turnover is frequently regarded as harmful to the organisation. In order to examine this apparent paradox, I also include unit turnover in the analyses. The empirical analyses are based on self-report data from 980 managers and professionals in a major Norwegian oil company.

2. THEORY

During the past couple of decades organizational knowledge and learning have become one of the major fields of organizational research. Despite the ever-growing body of literature on knowledge and learning, there is a still frustrating lack of conceptual clarity (Døving, 1996, 2003; Tsoukas & Vladimirov, 2001). Basically, knowledge is acquired through learning. Knowledge is about the real world, but the real world is large, diverse and complex, and each individual has limited capacity. Our knowledge thus tends to be partial – one subject is able to know only parts of the real world. I consequently assume that it is appropriate to partition a person's total knowledge to which domain it applies. In the context of work organizations research has traditionally been concerned with the degree to which knowledge is tailor-made to a particular organisation (Becker, 1964; Kalleberg & Reve, 1993). However, because of its emphasis on technically related specificity this original approach has crucial limitations. In addition to firm specificity, there is the degree to which the individual's knowledge is related to a set of particular tasks. I argue that combining the concept of firm specificity with the notion of task specificity provides a fruitful analytical approach to the analysis of competences in organizations (Nordhaug, 1994). These two dimensions are elaborated below. A discussion of the expected learning effects of organizational structure and mobility summarizes this section.

2.1 Firm specificity

Economists focusing on the relationship between employees and employers developed the concept of human resource idiosyncrasy or specificity. The distinction between general and firm specific knowledge and skills is a cornerstone in human capital theory as originally formulated in the 1950s and 1960s (Becker, 1964; Schultz, 1981). Later this distinction has been extensively applied in theories on internal labour markets and transaction cost theory (Williamson, 1975, 1985).

The notion of firm specificity is useful concerning the question of funding human resource development in companies. It also constitutes an important element in the description of external and internal labour markets. However, the classical distinction between firm specific and general or firm-non-specific knowledge and skills is generally too crude to grasp the complexity of competences in firms (Nordhaug, 1994; Nordhaug & Grønhaug, 1994). An important point in this context is the fact that firm specificity has primarily been linked to the

operation of physical production equipment that is unique to the single firm in question. The focus has accordingly been on technology-related firm specificity, the logic being that the presence of unique technology in firms requires tailored, firm specific skills to be developed among employees (cf. Flynn, 1988).

Consequently, what has largely been overlooked in the literature employing the concept of firm specific knowledge, skills, or competences, is that such human resources do not necessarily have to be linked to the execution of concrete work tasks associated with the technology unique to the firm. An important class of firm specific competences are not connected to a single task, but are broadly applicable across a number of different tasks. There is accordingly a need to supplement the notion of technology-related firm specific competences with the concept of organisation-related firm specific competences.

2.2 Task specificity

There has traditionally been a strong focus on generating task-specific competences in order to create maximum fit between competences and work tasks. Demands for flexibility and readiness for change implies that more attention needs to be devoted to task-non-specific competences and their significance for commitment, efficiency, competitiveness, and career mobility. Task-non-specific competences shift the focus from static fit to tasks to dynamic adjustment to changing conditions. Consequently, attention should be paid to the broad and important class of firm specific competences that are not connected to the execution of single, idiosyncratic tasks, but which can be activated in solving a large number of different tasks. Many types of competences are *not* tied to the technology of the firm but to such organizational aspects as political processes, organizational culture, and interpersonal networks that are, by nature, firm specific.

This aspect of firm-specific competence has, to some degree, been incorporated into parts of the resource-based theory of the firm (e.g., Barney, 1991; Grønhaug & Nordhaug, 1992; Colf, 1997), with some authors providing examples of competence classifications spanning several analytical levels (Sparrow, 1994). However, within most of these formulations competence resources have not been specified at the employee level. The significance of individual competences and the contribution of employee competences to core and organizational competences is a missing link in the macro-oriented approaches. This calls for an elaborate conceptual framework of individual competences.

Task specificity has been defined as the degree to which competences are linked to the execution of a narrow range of work tasks (Nordhaug, 1994). Low task specificity is characteristic of competences which are not tied to one particular task, but which are simultaneously relevant to a wide range of different tasks. Analytical skills, competence in cooperating with others, problem-solving capacity, communication skills, and the ability to delegate work are examples of task-non-specific competences. However, when task-specificity is high, competences are tied to one single work task or very few tasks, and they are irrelevant for the execution of other tasks. For example, typing on the basis of the "touch-method" can only be applied to the task of operating a standard keyboard. In contrast, cooperative competence may be utilized to accomplish or facilitate the execution of a wide spectrum of tasks. In the first case, the competence is highly task-specific, while in the latter task specificity is low.

If a competence can be used in one firm only, it is firm specific and, by definition, has no potential value for other employers. All competences that are not firm specific are general or non-specific and can be sold in external labour markets. Moreover, it is generally assumed that high proportions of firm specific competences in a company's labour force lead to long-term contractual arrangements between employees and employers, since an enduring relationship is then normally in the interest of both parties (Mitchell & Zaidi, 1990).

2.3 Competence classification

In order to give an overview of the classification that result from our preceding discussion, in Figure 1 the dimensions of firm specificity and task specificity have been combined. The four cells represent different variants of competence idiosyncrasy and thus dissimilar types of competences (cf. Nordhaug, 1994).

FIGURE 1. Competence classification

		Firm specificity	
		Low	High
Task specificity	Low	Meta-competence	Intraorganisational competence
	High	Standard technical competence	Firm specific technical competence

The first competence type is firm non-specific and can be utilized in the accomplishment of a variety of different tasks. It has been labelled meta-competence and encompasses a broad

spectrum of knowledge, skills and aptitudes. Examples are literacy, learning capacity, analytical capabilities, creativity, knowledge of foreign languages and cultures, ability to communicate and to cooperate with others, and ability to adjust to change (see also Campbell, 1994).

Competences that exhibit low task specificity and high firm specificity constitute a kind of "internal meta-competence" within an organisation, and are called intraorganisational competence. Illustrations include knowledge about colleagues, elements in the organizational culture, communication channels and informal networks within the firm, political dynamics within the organisation, and the firm's strategy and goals. Yet another illustration is familiarity with different subunits and their working conditions, which is clearly reflected in the aims of trainee programs and job rotation across subunits: "The HRM program in Philips is thus designed to develop managers with a broad overview of the company so that they can adapt their generalized knowledge to fluid situations. Cumulative knowledge of all aspects of a product division, from development to marketing, can be acquired through assignments to different areas of activity and levels of responsibility" (van Houten, 1990: 108).

High task-specificity and low firm specificity are characteristic of the standard technical competences that embrace a wide range of operationally oriented knowledge and skills. Examples are typing and stenography skills, knowledge of generic budgeting and accounting principles and methods, skills in computer programming, knowledge of standard computer software, and craft skills and professional task-oriented skills that can be applied across industries.

The last category, firm specific or idiosyncratic technical competences, is highly firm specific and task specific. They can be applied to solve one or very few tasks within one firm only, and they include knowledge and skills related to operation of unique technology and routines. Examples are skills related to the use of specialized tools crafted in the firm, knowledge about rationalization devices developed exclusively within the company, skills in repairing tailored technology and in operating specialized local filing or data systems as well as skills related to the administration and maintenance of organizationally idiosyncratic routines or procedures in general.

2.4 Firm specific competences

Above, I discussed two important and dissimilar classes of firm specific competence that need to be separated if more elaborate analyses of firm idiosyncratic knowledge and skills resources are to be conducted.

Technical firm specific competence may generate the strongest possible lock-in of employees in regard to both employers and jobs, because the value of this type of knowledge and skills is confined not just to one and only one employer but also to a narrow range of work tasks. The main significance of these competences lies more in their contributions to generating congruence between personnel and tasks than in their contribution to facilitating change within the organisation. Idiosyncratic technical competences can only be generated within the one firm and are developed through informal learning, job rotation, in-house training, apprenticeship arrangements and trainee programs.

As with meta-competences, the importance of intraorganisational competences has been discussed in the management and leadership literature but also within politically oriented organisation theory concerned with power relations (e.g., Cobb, 1986). The focus has been on internal networking capabilities, knowledge of and capacity to manage firm specific symbols, and familiarity with the culture of different parts of the organisation, as epitomized by such metaphors as “the manager as a political detective” (Yates, 1985: ch.3). In addition, the significance of knowing persons and coalitions and, not least, their respective idiosyncrasies and behaviours, is emphasized.

Intraorganisational competences are inextricably linked to the organizational culture of the firm, and vice-versa. Although it is common to think of corporate culture as a structural phenomenon, it is partly made up of the organizational interpretations shared by the employees. However, it clearly transcends the level of individuals, as is demonstrated by the fact that knowledge and interpretation systems continue to exist even after key employees have been replaced (Walsh & Ungson, 1991: 61).

Carnevale (1991:159) made the point that certain meta-competences may be useless if they are not combined with relevant intraorganisational competences. He particularly referred to the need to blend general leadership skills with knowledge about specific organizational

conditions, especially understanding of implicit and explicit power structures: to be effective inside the organisation, the employee needs to understand both.

Intraorganisational competences are acquired chiefly by everyday learning in the workplace through interaction with and observation of colleagues and teams. However, when firms take steps to manage the formation of intraorganisational knowledge and skills by implementing job rotation, trainee and mentoring programs, on-the-job coaching, internal executive-development programs, and campaigns aimed at disseminating core values and information about the organisation's goals, this is often explicitly intended to expand the amount of intraorganisational competence in their labour force. Probably the most characteristic example of formal training geared towards generating intraorganisational competence can be found in introductory courses and programs for recently recruited employees.

2.5 Everyday learning in the workplace

An individual's learning in a specific domain is assumed to be a function of accumulation of information related to that domain. Firm specific competences should thus partly be a result of the employees' interaction with and observation of colleagues. My basic proposition is accordingly that increasing interaction with and observation of colleagues leads to higher levels of firm specific competences (beyond what can be accounted for by experience as measured by tenure). In this study, I operationalized interaction with and observation of colleagues in two principal ways: organisational structures (formal and informal) and internal mobility (own and colleagues').

First, the type and extent of information the individual is exposed to is reasonably related to formal structure as well as actual communication and cooperation patterns. I included aspects of formal organizational design other than hierarchy. Vertical relations connect superiors and subordinates in a chain-of-command structure. Horizontal (or lateral) structures connect employees and units in other ways than through a common manager. Whereas vertical relations are multi-purpose channels, horizontal relations are often shortcuts designed for specific purposes. The kind and extent of horizontal relations varies across employees, these are the overlaid structures not generally shown on the organizational chart (Ghoshal & Bartlett, 1990). This study includes two types of formal cross-unit horizontal relations: Formal lateral professional networks (connecting employees within the same profession) and temporary cross-unit task forces (set up to solve a specific problem). In addition the study

includes regular cooperation within the department: One measure of cross-functional cooperation and one measure of intra-functional cooperation. Finally, I incorporated indicators of actual information flows, that is, measures of actual (formal or informal) communication within and across unit boundaries (cf Argote, 1999; Szulanski, 1996).

The second type of variables concerns the employee's own movements within the organisation (job changes) and colleagues' movement through the employee's department (turnover). Conventional wisdom holds that knowledge is absorbed and skills are developed along the career trajectory. In spite of widespread belief in the virtues of a variety of job experiences and job transitions, little systematic empirical research exists that test these beliefs (for exceptions, see Campion et al., 1994; Davies & Easterby-Smith, 1984; McCauley et al., 1994). Job rotation has for a long time been assumed to be an effective component in management development, but little attention has been paid to the consequences of transfer on individual competence. I therefore included the number and characteristics of job changes as career-related measures. In order to capture extent of exposure to corporate and unit environments, I distinguish between two types of job changes: Change of job within the unit (*job transitions*), and change of job that involves a transfer between units (*cross-unit transfer*).

Although mobility is, at least at moderate levels, regarded as beneficial for the individual employee, turnover is frequently regarded as harmful to the organisation. In investment terms, turnover implies that the firm's expenses in employee training are lost (Becker, 1964). Moreover, because the workforce is a prominent repository of organisational knowledge (Walsh & Ungson, 1991; Huber, 1991) turnover may also contribute to organisational forgetting or knowledge depreciation (Argote, 1999). Thus, there is apparently a conflict between the individual and the aggregate consequences of turnover. One reason for this paradox may be that one tends to focus only on the loss related to those leaving, not the gains related to those arriving. Firm specific competences are applicable and valuable across the entire corporation. Internal mobility may thus imply a loss of firm specific competences to other departments and units, but it may also imply a gain of firm specific competences from other units. The newcomers may then share knowledge and skills with the employers remaining in the unit, giving rise to a positive relation between turnover and individual learning. For the analysis at the level of individual employees I accordingly included turnover as an independent variable.

3. METHOD

3.1 Operationalization of firm specific competences

Empirical research on the firm-specificity of competences in organizations has typically been concerned with the degree or amount of investments in firm-specific competences among employees and related this to organizational and contractual properties. Typical measures of firm-specific learning at the job-level are the degree to which the employer has provided on-the-job training (Cohen & Pfeffer, 1986), and the number weeks and months of training (excluding education) which is deemed to be required for being able to perform a particular job (Kalleberg & Reve, 1993).

Although adequate measures of the learning required or training provided by the employer, these measures suffer from several shortcomings. First, they do not distinguish between the two different types of firm-specific competence emphasized in this paper, that is, intra-organizational and firm-specific technical competence. Second, these measures all reside at the job-level or the organizational level, not at the level of the individual employee. The measures referred to are better equipped to capture a firm's general or job-related training policy, and the assumed competence requirements of particular jobs than to map the actual development of firm-specific knowledge and skills. Moreover, it must be noted that until very recently the two types of firm-specific competences included in the present typology have not been operationalized for the purpose of self-report survey data collection.

In the present study, I constructed multi-item measures by sampling objects specific to competence domains (cf Arnold & Davey, 1992; Campion et al., 1994; Sonntag & Schäfer-Rausser, 1993). The employee was then asked to assess his or her degree of competence related to these objects. Intra-organizational knowledge, for example, could be measured with items such as "I am well informed about the activities of other units in this organisation". By letting the respondent rate clear and short statements about relatively specific issues the likelihood of misinterpretation is reduced. Each respondent's self-rated competence with regard to a sample of objects within the intra-organizational and firm-specific competence domain respectively, I then summarized into an index of competence with regard to each of these domains as a whole.

3.2 Independent variables

Two types of career-related factors were measured: duration of employment in the company and the current unit, and the total number of job changes within the company (see also Louis, 1980). Employees reported the number of different within-company jobs held, and the number of transfers between organisational units. In order to obtain an indicator of turnover for each unit, I calculated the average years in the unit and assigned this value to all respondents in that unit.

The second set of factors concerns the employee's relations within the unit and across units. I measured intra-unit relations in terms of the individual's extent of intra-unit cooperation. Each respondent reported the number of hours a day that she or he worked together with others (Roberts & O'Reilly, 1974). Number of hours a day was separated into two questionnaire items, one regarding the number of hours spent working together with co-workers with tasks different from the employee's own and the other regarding time spent with co-workers having similar tasks. I measured two types of cross-unit relations. Respondents reported their affiliation with a formal lateral network of professionals. Each network is dedicated to one functional specialty or professional field. In addition, respondents reported the number of cross-unit task forces they had been involved in during the past two years. This was intended to measure cross-functional and cross-unit experience through formal structures (Ghoshal et al., 1994). Finally I measured employee's actual communication within the unit (intra-unit) and across unit borders (cross-unit). I selected and adapted six different communication issues from Van de Ven and Ferry (1980; see also Ghoshal et al., 1994, Roberts & O'Reilly, 1974): professional exchanges, discussions related to specific tasks, requests for help or advice, receipt of reports and memos, getting help or advice from co-workers, and participation in meetings with more than two people.

3.3 Data collection

In order to test the operationalizations and hypotheses outlined above, I designed a cross-sectional study. I collected data by means of a self-report questionnaire distributed to a sample of managers and professionals in Statoil. Statoil is a vertically integrated petroleum company, incorporating exploration, production, transportation, processing and retailing as well as research and technology development related to these activities. The questionnaire was distributed to a stratified random sample of 2900 managers and professionals; 980 (34%) of these returned complete questionnaires.

4. RESULTS

Factor analyses revealed that two items intended to measure firm specific technical competence do not correspond well with remaining items. These items were accordingly not included in the overall measure of firm specific technical competence. I used regression analysis to investigate the impact of organizational structure and intraorganisational mobility on each of the types of firm specific competences. Organizational tenure, business degree, and manager were included as control variables. Participation in cross-unit task forces, organizational tenure and job history were transformed in order to account for non-linear relations. In order to examine the effect of structure and mobility beyond what can be accounted for by background variables (notably tenure), I first estimated a model including control variables only. Hierarchical regression results are displayed in Table 1.

TABLE 1. Hierarchical regression analyses with regard to firm specific competences

	Intraorg. competence		Firm specific tech. comp.	
	Model 1	Model 2	Model 1	Model 2
Cross-unit transfer ^a		0,16 ***		0,04
Job transitions ^a		0,04		0,03
Turnover		0,10 **		0,07 *
Cross-unit task forces ^b		0,05		0,09 **
Lateral relations ^c		0,03		0,04
Intra-functional cooperation		0,00		-0,01
Cross-functional cooper.		-0,01		0,01
Cross-unit communication		0,18 ***		0,13 ***
Intra-unit communication		0,15 ***		0,09 *
Org. tenure	0,04	0,03	-0,09	-0,09
Org. tenure ^a	0,20 ***	0,17 ***	0,16 **	0,16 **
Business degree ^c	0,13 ***	0,08 **	0,02	-0,01
Manager ^c	0,20 ***	0,13 ***	0,04	0,00
R ²	0,13 ***	0,27 ***	0,02 *	0,09 ***
R ² change		0,14 ***		0,07 ***
^a Hyperbolic transformation	*** $p < 0.001$	N = 754		
^b Square root transformation	** $p < 0.01$	Intercept omitted in table		
^c Dummy variable	* $p < 0.05$	Standardized coefficients		

These results indicate that cross-unit transfers, unit turnover and communication frequency contribute to the learning of intraorganisational competence. Among the control variables we observe that managers and employees with a business degree on average have a higher level of intraorganisational competence. A somewhat different pattern emerges with regard to firm

specific technical competence. Among the explanatory variables task-force participation, turnover and cross-unit communication are significant, whereas organisational tenure is the only significant control variable. If organisational tenure is excluded the number of cross-unit transfers also significant becomes. Organisational tenure has a strong positive relation with both types of firm specific competences, and we note that the hyperbolic version of the variable captures virtually all the variance indicating a diminishing effect of time-based experience. The hierarchical procedure reveals that the explanatory variables account for a substantial proportion of variance in firm specific competences.

We note that the multiple correlation coefficient is much larger for intraorganisational competence than for firm specific technical competence. This suggests that task-specific competences are mainly affected by variables not included in the present study, which in turn means that task specific competences are affected by a different set of variables than non-task-specific competences (that is, differential effects). This is consistent with Campion and associates' (1994) results where career-related variables achieved a very small R^2 with regard to technical competence but a substantially larger R^2 with regard to administrative and business competence. At the present stage of research, we can only speculate about these not-included variables.

Campion et al. (1994) found that job rotation affected administrative competence but not technical competence, whereas promotions did not have any effect on either. Effects of job history obtained in this study appears to be consistent with Campion and associates' findings and with Morrison and Brantner's (1992) findings that the number of previous jobs did not have any effect on learning in the current job. Campion and associates did not, however, find any effects of tenure, which is inconsistent with previous research (Morrison & Brantner, 1992) as well as with the present results. Moreover, the finding that turnover is positively related to firm-specific learning is consistent with Argote's (1999) finding that moderate turnover increased productivity (although Argote measured organisational performance).

These results largely support hypotheses about the effects of communication. Although findings are not perfectly comparable, the present findings are essentially consistent with previous research on organizational learning (Darr et al., 1995) and diffusion of innovations (Rogers, 1983). Contrary to conventional wisdom, I found minimal support for hypotheses about structural factors when controlling for actual communication. Results do, however,

suggest that structures, by facilitating interpersonal relations and triggering communication, have important indirect effects on learning.

Finally, the presence of non-linear relations (diminishing effects) is consistent with traditional learning curve research. Thus the well-known notion of diminishing returns to experience has been successfully extended to other indicators of experience than time and accumulated output. Moreover, the presence of diminishing effects support the basic assumption that learning occurs through accumulation (cf. Mazur & Hastie, 1978).

5. DISCUSSION AND CONCLUSIONS

The classical distinction in human-capital theory between general and firm specific skills is not adequate for analysing the evolution, change and demise of different types of competences. Adding the dimension of task specificity, allows for analytical distinctions between different competences and their development over time. This is illustrated by the transformation of employee competences into technology either in the form of physical equipment, routines, or written procedures (e.g., computer programs). It is reasonable to assume that highly task-specific competences (standard technical competences and firm specific technical competences) have a higher probability of being “materialized” over time as the relevant technology matures than competences exhibiting low task specificity. For instance, it is hard to imagine meta-competences becoming “transferred” into technology. Although efforts to create “artificial intelligence”, “expert knowledge systems” and successful chess computers may be interpreted as steps in such a direction, these clearly are exceptions.

The research reported here is based on developments in two areas. First, recent conceptual developments are concerned with the multidimensionality of knowledge and skills (Nordhaug, 1994; Sonntag & Schäfer-Rauser, 1993) as well as work performance (Motowidlo & Scotter, 1994). Second, concern with the specificity or multidimensionality of experience has also emerged (Quiñones et al., 1995). Although several researchers have proposed that different dimensions of performance outcomes have different antecedents (Murphy & Shiarella, 1997), virtually no research has investigated relations among multiple experiences and multiple competence outcomes.

The presence of non-linear relations (diminishing effects) is consistent with traditional learning curve research. Thus the well-known notion of diminishing returns to experience has been successfully extended to other indicators of experience than time and accumulated output. Moreover, the presence of diminishing effects support the basic assumption that learning occurs through accumulation (cf. Mazur & Hastie, 1978). The findings in particular indicate that the actual amount of experience makes a difference, a mere affiliation or relation to a source or domain of experience does not account for much of the learning taking place. A theory of competence acquisition in the workplace must take into account the quantitative aspects of learning.

The findings reported here further indicate that mobility is beneficial for the individual that is actually moving, but also for the employees not moving. This suggests that the individuals moving absorb knowledge from different jobs and organizational units, and that this knowledge is subsequently transmitted to other employees. Moderate levels of internal turnover is consequently useful for the organisation as whole.

There is virtually no previous research on competences as outcomes of learning in the workplace, and existing research is fragmented and has not been guided by a coherent or shared conceptual framework. The current fine-grained definition of competence outcomes has not been applied in previous empirical research. The question remains whether such a fine-grained typology adds value. One possible criterion of the appropriateness or value-added of a conceptual typology, would be that variables distinguished by the framework have differential relations with determinants and consequences (Motowidlo et al., 1997). Different competences may have different performance implications and may be acquired in different ways. Our statistical analyses revealed unique sets of antecedent variables for each outcome variable. In other words, if a variable derived from a specific typology is involved in a pattern of causal relations distinct from other variables derived from that typology, we can claim that the typology adds value compared to conceptual frameworks where those variables are not distinguished.

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