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Market Competition and the organizational demand for skills

Empirical evidence from Swiss Industrial and Service Enterprises

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1. Introduction

As one of the most ubiquitous condition of social life, competition is present whenever two or more actors aspire to reach the same singular goals (e. g. winning a game) or to increase their share of the same scarce resource (e.g. customers, votes, territories, etc.). While social psychology has accumulated considerable evidence about the behavior of competing individuals within small groups (e. g. Deutsch 1949; Johnson & Johnson 1989) as well as the correlates of intergroup competition (e.g. Sherif et. al 1954/1961) Bornstein et. al 1999), it falls into the realm of organizational sociology to analyze competitive relations between mesosocial voluntary associations (e. g. social movements organizations or political parties) on the one hand and corporate actors like firms, schools and hospitals (or macro-entities like nation-states and international alliances) on the other.

Such research efforts can easily be justified by considering how fundamentally the economic sector of modern societies is determined by competitive intercorporate relations, how deeply processes of political participation and regime formation are shaped by the competition between political parties, and how insufficiently historical developments would be understood without taking into account the rivalry between feudal landowners, nation-states or larger (e. g. imperial and colonial) territorial actors.

The perennial tendency to keep the scientific analysis of these different specimens of competition within the boundaries of highly segregated special disciplines (economics, political science etc.) has hitherto hampered the development of a more generalized theory which would be applicable to all types of collective social actors alike. On the other hand, organizational research since the 1960ies has produced much empirical evidence and theoretical argumentations which could contribute to such an ambitious endeavor. In particular, several studies have addressed the question how external competitive relations impinge on organizational behavior and intraorganizational structures and processes – by way of causal determination or at least by restraining the options for strategic choice and tactical actions.

Only marginally (if at all), such studies have touched the question raised in this present paper:

How does the occurrence and intensity of competition relate to the level of human resources: to the composition of organizational staff and to the level (and kinds) of required skills?

Evidently, this question has become increasingly salient recently insofar as many current (economical as well as technological and socio-cultural) developments have the common effect of increasing the pace and intensity of competition faced by companies in all economic sectors. For instance, tariff barriers and other protective governmental regulations become eliminated in the course of neoliberalist policies; new firms from emerging countries are entering markets hitherto comfortably managed by few well-established corporations; the pace of technological innovation and product obsolescence has increased; and customers and business partners have become more demanding and more ready to articulate dissatisfactions. (Adler & Docherty 1997). During the 1990ies, economic recession has contributed to a shrinkage of many markets, so that competitive intensity (particularly in the realm of prices) has increased.¹

¹ For a discussion of the relationship between market contraction and competitive intensity, see: Gimeno et. al. 1997).

Thus, many firms currently operate under conditions of “hypercompetitiveness” (D’Aveni 1994) which forces them to commit many resources to continuous environmental scanning and learning processes, to reconsider permanently all their structures, commitments, planning schemes and operational activities, and to implement time-limited fast-response strategies in order to adapt to short-term unforeseen developments and events (Hamel/Prahalad 1989; Hill 1988).

In addition, it can be assumed that in comparison to previous decades, competitive relations have nowadays more direct repercussions on the role of individual employees, and thus on the level of required skills. For instance, downsizing has the effect that a larger percentage of employees have to deal with customers and other extraorganizational concerns. Likewise the tendency to disaggregate monolithic enterprises into rather autonomous divisions or profit centers has the effect that more members have to adopt a commercial perspective because they have become incumbents of “boundary roles”. And finally, modern lean production and “total quality” philosophies aim at committing every employee to an “entrepreneurial spirit”: thus aspiring a condition where all activities of all members are continuously oriented at the firm’s most salient and invariant goal: *prevailing within an environment of ever more intensive competition*.

2. The “open system” and “contingency” perspective of formal organizations

Since several decades, there is a general trend that economic firms have to commit ever more attention, energy and resources to extraorganizational concerns, because environmental conditions are getting more complex, volatile and unpredictable, and more decisive for the company’s chances of survival and growth.

Thus, societal pressures to conform to ecological standards, nondiscriminatory practices and many other legal regulations have increased, customers and other stakeholders are better organized and more inclined to articulate grievances or even file suits, and outsourcing and “just-in-time” strategies have created a more densely-knit web of interdependencies among different firms. And most importantly: creating values for customers and clients has become the major goal around which all business activities are organized, and the implementation of such customer-oriented strategies demands that these ideas are understood and practiced on all organizational levels and by every single subunit and individual employee (Adler/Docherty 1997; Horte et. al 1996).

Given the increasing salience of all these environmental factors, firms may institutionalize a general “market-oriented” philosophy which gives priority to external adaptation at the cost of internal organizational concerns (e. g. job stability or work satisfaction) (Gordon 1986; Budros 1997).

Since the early 1960ies, organizational sociology has reacted to these developments (or in some way even anticipated them) by developing “open systems” models of formal organizations: conceiving them as reactive and adaptive (and less frequently even as proactive) entities within a challenging environmental field. These approaches contrasted with earlier stages of organization sociology which were characterized by a neglect of such environmental relations. For instance, classical *socio-technical systems theory* was focusing almost exclusively

on intraorganizational aspects, especially on the role situation of the shop floor worker, (Adler & Docherty 1997). Doing this, it followed the classical Marxist approach which defined the worker as the major “stakeholder” of business organizations. Extraorganizational relationships were regarded solely as the prerogative or interest of management, which was supposed to have a perspective completely different than that of ordinary workers (Adler/Docherty 1997).

While such “introverted” perspectives always tended to see its objects as specimens of a modal single type of “bureaucratic organization” (in the tradition of Max Weber and Taylorist “administrative science”), these new environmentally oriented approaches have brought a major shift toward comparative analyses: by proposing a manifold of typologies which classify organizations according to their modes of environmental relations (like “mechanic” vs. “organic management” (Burns & Stalker 1961)). When Hickson tried to make an inventory of these taxonomic typologies as early as 1966, he found more than 20 highly similar variants: all of them contrasting “more bureaucratic” (= formalized / centralized / specific) and “less bureaucratic (=informal / decentralized / diffuse) kinds of organizational structures (Hickson 1966). Concerning the environment, all of them also stressed the same crucial dimensions: particularly the degree of uncertainty, variability and heterogeneity of environmental events and developments, or the degree to which means-end relationships of organizational behavior (particularly in the production sector) were explicitly known (e. g. Perrow 1967).

All these approaches have converged in the rather diffuse, but influential “contingency” paradigm which asserts that there is not one single “best type” of formal organization, but a range of different types optimally adapted to different environmental configurations.

The major substantive hypothesis of contingency theory can be summarized by the simple statement that coping with high complexity engenders higher levels of informality and decentralization.

The larger the heterogeneity, variability and unpredictability of external stimuli, demands and pressures that impinge on an organization, the more it has to develop a structure where many individuals and subunits are capable and allowed to scan the environment, to collect and transmit information, to react rapidly to changed circumstances and to participate in collectively binding corporate decisions.

Conducting one of the earliest empirical studies to substantiate these relationships, Simpson and Gulley have found out that voluntary associations with multiple goals and adaptation problems are more likely to develop a highly decentralized internal structure, and to involve a large percentage of membership in its major activities. In addition, they tend to maintain more complex processes of intraorganizational communication in order to keep up with the larger quantity of inflowing information (Simpson & Gulley 1962).

Later studies (mainly focusing on industrial enterprises) have confirmed that as environmental changes become more manifold, less predictable and more rapid at the same time, it becomes increasingly important that all subunits and all individual employees in the corporation are capable and motivated for change:

“Coping with complexity and rapid, often stochastic, change requires focus on goals, responsibility, and discretion throughout the entire organization, understanding of the company and its context and coping with the dynamics, i.e., change and learning.” (Adler & Docherty 1997).

As a result, control structures become decentralized, in order to empower all employees for making decisions in accordance with their own understanding of the company's interests and goals:

"Power shifts from the hierarchy to the control of the product by all. Power is based on skill, knowledge, and experience of the matter at hand. It requires putting complex systems into a human scale, i.e., creating an understanding of the world of work in a way all members of the organization can grasp. Employees accept the authority to make decisions related to their work as it is directed toward a shared vision of the purpose of the enterprise. It is dependent on understanding where the company is going, why it is that way, and importance of the workers' role. (Adler & Docherty 1997)

Consequently, a high basic level of intelligence and skill is necessary across all categories of workers and employees, and the need for higher educated personnel rises. In particular, employees have to be able to accumulate their own experiences on the job and to engage in autodidactic endeavors of advanced training (e. g. Industry Canada 1998).

Transcending this one-sided focusing on "complexity", a major synthesis of an environmentally oriented organization theory has been proposed by Lawrence (1981) who argues that all economic firms experience two types of insufficiencies which engender highly divergent strategies of adaptations:

1) Scarcity of information:

Firms have to cope with uncertainties because they have not sufficient knowledge about their environment and its future developments on the one hand and about internal means-end relationships on the other. Such uncertainties force them to keep their resources in a highly liquid condition: so that they can easily adapt to unpredictable circumstances by real-locating their capital, by migrating to other contexts, by exchanging their personnel, by buying new technology and by redefining internal procedures and organizational structures. In addition, they have to promote higher levels of functional differentiation: so that more specialized roles and subunits are available for expanding or redirecting the range of tasks and activities.

2) Scarcity of resources

Typically, firms operate under conditions of constraints concerning the availability of personnel, raw materials, production facilities and all other costly resources. Particularly under conditions of intensive price competitiveness, they have to minimize costs and to maximize efficiency in order to survive and maintain their markets. This usually implies that existing resources are highly specified and committed: by freezing money in long-term equipment which has to "pay out" during its use, by hiring staff with highly specialized skills that have to be updated or modified by expensive training investments every other year; and by optimizing production processes by working out routinized and standardized procedures implemented for long periods of time. In short: they have to give priority to goals of intraorganizational optimization: thus reducing their potential to mobilize liquid "slack resources" when unpredicted new circumstances arise.

As both contradictory strains are usually present, each firm has to find ways to equilibrate efficiency and adaptation needs at the same time.

When *uncertainties are relatively low and resource constraints high*, organizations are likely to become highly formalized and centralized “machine bureaucracies”; when *uncertainties are considerable and resource scarcities insignificant*, they will tend toward loosely structured “adhocracies” of the “organic management type” (Lawrence 1981). When *both strains are very intensive*, they may tend toward “simple structures” characterized by small, unstable organizational units; and when *both are low or absent*, optimal conditions exist for the unfolding of “professional bureaucracies” (typically found in subsidized public service organizations and governmental administrations) (Lawrence 1981).

Within this conceptual framework, competition can easily be characterized as an environmental condition which is difficult to cope with because it generates substantial uncertainties on the one hand and resource scarcities on the other.

Like many other approaches within the paradigm of “contingency theory”, the theoretical model Lawrence proposed was (at least implicitly) heavily indebted to the “social neodarwinist” approaches which focus on ecological and evolutionary studies of “commensalistic” organizational populations (e. g. Hannan & Freeman 1977; 1978; Brittain & Freeman 1980).² In the meantime, several students of the topic have emphasized the shortcomings of such biologist views which see organizations mainly as adaptive actors vis-à-vis a dominant environment determining their chances of survival and growth.

Instead, it has been stressed that while such one-sided adaptations are unquestionably frequent and of high importance, organizational environments can also be *dependent variables*: insofar as firms

- a) *choose specific strategies* which then lead to specific correlative environmental conditions (e. g. by deciding to rely on specific products, technologies or raw materials or by cooperating with other firms);
- b) *intentionally select specific environments* (e. g. by choosing plant locations, by deciding to enter certain market niches or to appeal to certain segments of customers etc.);
- c) *shape actively their environments* (e. g. by buying out dangerous competitors, erecting barriers of entry, exerting pressures on governmental (regulative or subsidizing) agencies etc.

**In fact, contingency theory has never succeeded in eradicating the basic heretic question:
Do organizations really adapt?**

As Baum and Singh (1996) have noted, not all organizational sociologists share the premise that organizations are adaptable social systems capable and motivated to design their structures and processes in optimal accordance with environmental needs.

On the one hand, the “*Lamarckian adaptionists*” try to demonstrate that organizations respond to external threats and opportunities by revising their internal procedures and structures – even if they do this intuitively or even accidentally: more by trial and error processes than by rational analysis and design. (e.g. Chandler 1977; Pfeffer & Salancik 1978; Rumelt 1986; Thompson 1967).

On the other hand, the “*Darwinian selectionists*” assert that economic evolution proceeds by a constant replacement of unfit organizations by fitter ones. They perceive firms as rather inert and/or randomly moving entities more likely to be wiped out than to adapt successfully when environmental circumstances change to the worse. (e. g. Amburgey, Kelly & Barnett 1993; Hannan & Freeman 1977, 1984; 1989):

² In their book publication “Organizational Ecology of 1989, Hannan & Freeman have summarized the results of 15 years of empirical research.

“....even when actors strive to cope with their environments, action may be random with respect to adaptation as long as the environments are highly uncertain or the connections between means and ends are not well understood. It is the match between action and environmental outcomes that must be random on average for selection models to apply.” (Hannan & Freeman 1989:22).

Consequently, studying organizational change mainly means: focusing on the differential birth and death rates of various organizational forms (Boone & Witteloostuijn 1995).

The two perspectives can be reconciled by making use of the empirical regularity that new branches often start by a selectionist phase characterized by the rapid foundation and elimination of many small firms (“r-selection”), while more mature market niches are often occupied by rather few highly experienced players which have learned to survive by coping actively with environmental problems – or simply by dominating markets (“K-selection”; Hannan & Freeman 1977; 1992; Brittain & Freeman 1980).

Thus, in contrast to the older “contingency theory” of organizations that has given priority to the unilateral influence of the environment on intraorganizational processes and structures (Burns & Stalker 1961, Hambrick, 1983, 1985; Miller & Friesen, 1984), newer research studies focus on more bilateral causal relationships conditioned by strategic organizational action. (e. g. Swamidass & Newell 1987). More specifically: by deciding about entering new product markets, cooperating with other firms, outsourcing specific tasks, migrating to other countries, changing production technologies or modifying the skill demands of their employees, firms basically change their environments instead of adapting to given environmental conditions. The more degrees of freedom they have in making strategic choices, the more environmental-structure – relationships can be reduced to insignificance (Porter 1980; Miller 1986; 88).

There is consensus that whenever we see organizations adapting to their environment, a very complicated process takes place co-determined by many intervening factors. (Kieser & Kubicek 1983: 355). Thus, change is not happening automatically, but has to be implemented intentionally by managerial decisions and implementations. This implies that “adaptive” strategies can well be objectively dysfunctional (e. g. when environmental problems and opportunities are not adequately perceived and interpreted); that they may occur as discontinuous events, with too much delay – or never at all.

Concerning the *causal relationships between environmental and organizational change*, it is important to notice that such change does not always take place in the form of explicitly decided and implemented measures of reorganization. Particularly when a firm is very small, change can happen without formal reorganization measures because the few employees can easily adapt on an informal level: by changing cooperation patterns, leadership procedures and communication intensities according to current needs.

The larger an organization, the less it can effectively change without implementing formal measures: e.g. by hiring additional employees, by subdividing or merging subunits, redefining role duties and competences, or by switching explicitly to new “firm philosophies” and strategic goals. Thus, it is not surprising to find that smaller companies show much lower correlations between any variables of intraorganizational structure and any indicators of external performance (Pelham & Wilson 1995).³

³ This also accords with the early finding of Simpson & Gully that only larger voluntary associations show high correlations between the complexity of external pressures and various aspects of intraorganizational structure (e. g. decentralization, membership involvement and the intensity of internal communication).

Most often, adaptive processes cannot be realized fully, but only in a piecemeal fashion, because traditional habits cannot be broken and/or management lacks the will or power needed for a systematic implementation (Cooper 1996; Miller & Chen 1994). Thus, Burgelman (1991) argues that most organizational changes are “induced” processes highly compatible with existing strategies, activities and structures; while only few of them are “autonomous” measures apt to enlarge the firm’s domain and to renew its adaptive capabilities (e. g. when it initiates new production lines or enters new markets) (Burgelman 1991).

On a general level, reorganizational measures may be inhibited by the basic fact that organizations have a vital interest to be stable actors in order to be highly reliable to their customers and suppliers and in order to exploit fully the cost-saving qualities of routinized procedures (Hannan & Freeman 1989:74; Boone & Witteeloostuijn 1995). In addition, all change involves risks because the consequences of acting differently are more difficult to predict than consequences of keeping activities as they are. (Greve 1998). Thus, a major precondition facilitating organizational change is the capacity and motivation of a firm to tolerate risks: a variable highly dependent on subjective preferences on the one hand and objective capabilities (e. g. buffering slack resources) on the other (Miller & Chen 1994; Greve 1998).

It has also been argued that most organizations are not able to adapt optimally to their environmental circumstances because they lack sufficient knowledge about their internal capacities and shortcomings. For instance, they are not well informed about the competencies of their personnel and about the potential savings which could be realized by rational reorganization:

“To date, the development of tools for analyzing environmental opportunities and threats has proceeded much more rapidly than the development of tools for analyzing a firm's internal strengths and weaknesses.” (Barney 1995).

The more informal and decentralized an organization, the more it is prone to experience such handicaps because informality means that little systematic information about intraorganizational structures and processes can be collected, and decentralization implies that much information remains on the level of specific subsystems, so that top managers remain insufficiently informed. Because of such shortcomings, low potentials for rational environmental adaptation have been found in samples of Canadian day care facilities (Baum and Singh 1996) and in Californian wineries (Delacroix & Swaminathan 1991).

Finally, it has to be considered that any successful adaptation presupposes a certain pool of uncommitted “discretionary resources” which can be dedicated to the required new processes of decision-making, planning and implementation. While competitive challenges may be necessary to stimulate higher levels of performance and encompassing endeavors of adaptive reorganization, the constraints they generate for the firm should not be so heavy that organizations lose all capacities for autonomous actions. Instead, they should have the “slack” needed to conceive and try out new activities, to become temporarily absorbed by learning processes, to initiate product innovations and market campaigns which can easily fail, or to survive periods of fundamental reorganization during which much energy is absorbed by elaborating and implementing new structures and norms (Kieser & Kubicek 1983). Thus, Lawrence rightly argues that organizational learning and innovation processes will be most likely when intermediate (instead of high) levels of environmental constraints (in terms of informational uncertainties and/or resource scarcities) prevail (Lawrence 1981).

3. The impact of competition on organizational behavior and intraorganizational characteristics

3.1. Competition as a general precondition for autoplasmic adaptive behavior

The theoretical paradigm of “contingent organization” presupposes that organizations are forced (or at least: positively induced) to adapt rationally to their environment because if they don’t, they would be punished by being eliminated or at least by reduced profits and weaker chances of further growth. This “social darwinist” view is based on the premise that there are heavy environmental constraints which cannot be eliminated by organizational action: so that organizations have to accept them as given structural conditions which limit (or even: determine) their courses of action. Of course, such conditions are best fulfilled in highly competitive environments which offer no opportunities for “exit” strategies” (e. g. by getting governmental subsidies or by becoming a monopolist player).

But as decades of organizational research have shown, larger companies have often a large variety of options for alleviating competitive pressures: e.g. by mergers, informal alliances by creating interlocking directorates, joint ventures or other arrangements of interorganizational affiliation (Selznick, 1949; Thompson, 1967; Pfeffer & Salancik, 1978; Burt, 1983). On the other hand, organizations can escape by migrating to specialized niches where competition is (still) low or absent. It has been found that small firms are often more disposed to fill such new niches because they are better able to adapt flexibly their whole internal organization (Carroll 1984; Pelham 2000). This flexibility may be seen as a functional substitute for their lower ability to cope actively with given market conditions (and even more: to their total inability to dominate existing markets).

Thus, the whole following discussion does exclusively apply to firms which are not *escaping from*, but actively *coping with* a given competitive situation: because exit options do not exist or because they are considered as more costly or risky than remaining within the existing field of competition.

3.2. The high significance of firm-specific factors

A firm’s capacity to be profitable on its product market is a result of many different causal factors, some of them associated with the structure of the whole industry, others with characteristics of the “industrial district” where the firm is located; but most of all: with the specific firm’s capabilities and resources (Marsden 1998). Empirical studies show that such particular factors on the level of the single organization (and its staff) far outweigh the influence of overall industry factors (Rumelt 1991).

It has further been substantiated that from the point of view of competitiveness and profitability, the most precious assets a firm possesses are most often not its tangible resources (like land, buildings, raw materials etc.), but highly *intangible external resources* (like customer goodwill, patents trademarks and copyrights) on the one hand and *intangible internal resources* (like staff skills, management capacities and efficient forms of organizational cooperation) on the other (Marsden 1998).

While many authors stress the importance of extrinsic factors (including licenses and joint ventures) (Hamel & Prahalad 1989), others put the emphasis on the acquisition of intrinsic capacities (e. g. by collective learning) (Argyris 1994; Senge 1990).

These two views may easily be reconciliated by taking time factors into account: When fundamental new action capacities have to be acquired within as very short time, there is no alternative than “buying” such capacities on external markets; when more time is available, endogenous developments (e. g. by advanced training of employees) may be more profitable and efficient (Marsden 1998). On the other hand, a heavy reliance on external factors proves unwise when the environment is very unstable. Thus, the increase in environmental instability and volatility which has occurred in the last decades has brought a shift from external to internal assets:

“...we have the claim that changes in the business environment have rendered the positioning approach irrelevant and that the only sound basis for sustainable competitive advantage is the development and exploitation of those resources and capabilities which are, or will become, the core competences of the organisation. Indeed, the claim is made that core competences are more critical than the external environment as a basis for strategy determination, because the environment is in too much of a state of change to base any strategy on it.” (Marsden 1998).

3.3. General impacts of competition on intraorganizational processes and structures

While competition has always been acknowledged in economic theory as a condition heavily determining a firm’s behavior and performances (e. g. Weiss 1963; Bain 1968), its impact on staff characteristics and intraorganizational structures – a genuinely sociological issue – has long been neglected. With the exception of two early publications of Arnold Rose 1955 and Simpson & Gully (both studying voluntary associations), research on the causal correlates of competition has mainly been initiated in the 1970ies: particularly with Rushing’s comparative studies of profit and nonprofit hospitals (Rushing 1973;74;76) and Pfeffer & Leblebici’s study of small manufacturing organizations.

On a most general level, it has been found that competition increases the degree to which organizations turn their attention toward their external environment (instead of focusing introvertedly on their own internal affairs). This is exemplified by the empirical study of Rushing who found that only competitive hospitals were likely to increase their medical personnel in accordance with rising numbers of patients (Rushing 1974).

As a consequence of this shift toward environmental concerns, intraorganizational structures and processes are affected in at least four different ways:

First, by necessitating more attention to environmental circumstances, competition induces a higher degree of organizational activation.

As Arnold Rose has established in his early comparative study on voluntary associations, organizations which face external competition (or even opposition) mobilize more internal resources and maintain a higher basic level of internal communication (e. g. in terms of more frequent assemblies, board meetings etc) In particular, Rose has observed there is an increasing meeting activity on the leadership level, which may indicate the heightened need for speedy, flexible decisions. (Rose 1955),

In addition, competitive associations were more likely to stabilize a high activation level by establishing a large number of paid full-time roles, while noncompetitive organizations were

better able to rely exclusively on unpaid volunteers (Rose 1955). As a logical consequence, they then become more dependent on the constant inflow of money – which may again reinforce their need to fight fiercely for competitive success (e. g. for securing regular revenues by gaining and keeping a high number of paying members).

Secondly, general needs for high adaptability increase the need for rather generalized human skills.

While a condition of generalized insecurity may lower the need for highly specific qualifications (because these may quickly become obsolescent in a rapidly changing environment), it raises the need for employees with rather high levels of generalized learning skills: so that they are capable of participating in advanced training courses (or of learning additional matters by themselves):

“Adaptability assumes a certain threshold of skills, underpinned by the habit of learning itself. When schools fail to foster the ability to learn, they defeat the possibility of life-long learning. As technology and foreign competition continue to raise standards of performance and skill expected of Americans, those people without basic skills will not be able to reach even the first rung of the value ladder.” (Doyle 1990).

In concrete terms, this may imply that highly competitive firms articulate higher needs for personnel with at least a minimal skill level (e. g. basic vocational training or advanced general education), because such people are more likely to bring along such generalized abilities (and motivations) for further learning.

In a major recent empirical study including ca. 750 firms from eight European regions, it has been shown that about three out of four enterprises considered a “skilled workforce” as the most important factor for sustaining their competitive advantage (Schienstock/Kautonen/Roponen 1998). This accords with Aaker (1989) who found that reputation for quality was rated as the most important basis for competitive advantage by the managers questioned. Likewise, a comparative survey in the Finnish Tampere region has shown that

- 1) firms see the skills of their employees as the most important resource enabling them to compete successfully on their markets;
- 2) firms with higher skilled personnel were more likely to introduce process innovations as well as product innovations.⁴

In fact, the survey showed that particularly process innovations were extremely rare in firms with a low level of skills.

Generally, increased global competition seems to induce firms of all size to increase their innovativeness (e. g. by expanding their budget in R & D). This implies a growing need for many different types of skills and qualifications: particularly for rather diffuse creative and entrepreneurial talents and social competencies (not essentially related to educational knowledge and formal degrees):

“With regard to the qualification needs we found some interesting results. For companies in the Tampere region some kind of “new thinking” associated with creativity and entrepreneurship is more important, while the improvement of professional skills is ob-

⁴ “Main findings from the firm survey of the Regis project. Regional Innovation Systems: Designing for the future”. <http://www.uta.fi/laitokset/tyoelama/regis/survey.html>

viously seen as a less pressing problem. The need to develop the technical, international and social skills of their workforce is also stressed by companies.”⁵

The rather informal character of these skills – as well as the increased environmental volatility which hampers forecasts and planning procedures – may be responsible for the finding that most Finnish firms rely more on “ad hoc ” training procedures than on longer-term systematic courses.⁶

Table 3.1: Percentages of firms advocating different training needs for their employees (Finnish study in the Tampere region 1997)⁷

Creativity / entrepreneurship	Technical skills	International skills	Social Skills	Management skills	Professional skills
62%	58%	50%	43%	33%	36%

This high importance of informal skills accords well with the notion that one of the most significant competitive assets of a firm consists in its pool of “tacit knowledge” which is not acquired by regular education (and thus cannot be important by recruiting employees with specific formal certificates and degrees). As a general rule, the most profitable and enduring competitive advantages of a firm stem from particularistic resources which cannot be copied and transferred: so that they are not available to other firms. This is easily seen when different bases of skills and knowledge are compared. When production processes are based completely on completely explicit scientific knowledge (like chemical recipes for the production of medical drugs) or on professional skills transmitted in formal schooling, firms have no stable advantages because exactly the same competencies can be acquired by any other firms. On the other hand, there are firms which can exploit “monopolistic rents” almost forever, as they rely on implicit knowledge which remains in their “private possession” because it is transmitted only by means of informal socialization processes within the organization. (Itami 1987; Ghemawat 1991).

The gains stemming from such exclusive “invisible assets” (Itami) can far outweigh the handicaps stemming from the fact that fluctuations are costly and rapid expansion of staff may be impossible because every new employee has to engage in time-consuming “learning-on-the job” processes (and informal socialization by peers) in order to master such skills

Some main consequences associated with Advanced Manufacturing technologies (AMT) seem to originate from the fact that their efficient use depends very heavily of such tacit knowledge: so that only a minority of all firms is able to exploit fully these new technological potentials:

“.....tacit knowledge becomes crucial to implementing AMT. For example, work flows and system sub-routines that have evolved to accommodate fast design/engineering changes or product modifications are likely to be firm-specific with cross-functional patterns that have become ingrained over an extended period. Successful design, placement and flow of flexible manufacturing cells, for example, are more contingent on the firm-specific work flows and organizational routines than on the advanced nature of the equipment. Procedures such as materials handling, coding schemes and the creation of

⁵ dito.

⁶ dito.

⁷ dito.

component/product families in a given AMT system also represent highly tacit skills, because their use largely depends on the insight, heuristics and experience of the people involved.” (Lei/Hitt/Goldhar 1996).

Similarly, the importance of tacit knowledge raises when organization switch from highly formalized bureaucratic structures to decentralized, loosely-coupled structures, because explicit written rules and programs have to be substituted by more informal, less visible norms and procedures (Lei/Hitt/Goldhar 1996).

This salience of tacit knowledge loosens the degree to which competitive success is connected to higher (formal) skill levels among employees, because even individuals without vocational education may be able to acquire it, while highly educated employees may not grasp it because they are too much oriented toward transorganizational (e. g. professional) sources of knowledge and information.

Third, decentralized decision making structures are needed in order to react to rapidly changing needs of customers and to sudden unforeseen moves of significant competing enterprises.

Thus, Moore and Duncan have found that under high competition, New Zealand firms are more profitable when their degree of centralization is low, while centralized firms work more successful in less competitive contexts. (Moore & Duncan 1989). Similar findings have been reported by Neghandi and Reimann (1972) and by Bose and Jones (1974).

As a possible explanation, it is argued that under high environmental pressures, highly centralized firms risk to be maladaptive, because too many tasks are delegated upwards to a permanently overloaded peak. Less decentralized firms may be better able to satisfy customers because their employees are freer to orient their activities toward the client’s needs.

In fact, only decentralized organizations may be able to institutionalize many “boundary roles” able to collect relevant information about their environment and to use this knowledge for reacting quickly to changing market conditions and their competitor's actions. On the other extreme logical extreme, monopolistic firms can easily give priority to concerns of internal efficiency, because their customers cannot escape when they are dissatisfied with the quality of the products or the level of services – a phenomenon well known from the world of public administration.⁸ In such cases, organizations do better to cultivate an introverted orientation: giving more priority to smooth, efficient internal functioning than to customers or other environmental sources of trouble.

By aiming to combine increased adaptiveness with high levels of system integration, “*team empowerment*” has the double advantage of making command chains shorter and decision processes swifter on the one hand, without creating too much individual discretion and leeway on the other. At the same time, teams are social group contexts capable of socializing employees into the company’s culture and making them acquainted with highly specific skills and practices: so that newcomers become swiftly assimilated “on the job”: without expensive measures of formal education and training.

“Increased control in primary work groups over purpose, context, and system dynamics increases the group members' understanding of their local business logic. This understanding increases their potential or capacity to contribute to organizational learning in the sense defined by Cole (1994), namely to identify, standardize, and diffuse best prac-

⁸ See for instance Mohr 1975 who has substantiated this lack of adaptive motivation in the case of public health agencies.

tice. Their sensitivity in perception is greater and thereby their ability to identify best practice is heightened, both in terms of the range of situations scanned and the radicalness of or deviation of perceived best practice from their own established practice.” (Adler/Docherty 1997).

Also in cases where price competition prevails, teams can be media for diffusing and institutionalizing cost-saving strategies in the whole enterprise, so that all employees become more committed to the overarching goals of increasing efficiency:

“The key to successful confrontational strategy and lean management lies in the existence of a committed, motivated, and managerially aware workforce. It is not sufficient to simply launch cost reduction programs. Without the right organizational context, these programs will not work. In Japanese firms, the workforce is usually organized into self-guided teams, or groups, and it is these teams that actually achieve the firms' cost reduction objectives. Consequently, the way in which the teams are motivated helps to determine the success of the firms' cost reduction programs.” (Cooper 1996).

Fourth, finally, it is widely acknowledged that competition increases the need for powerful mechanisms of organizational control and integration.

When firms operate in a competitive environment, they quickly learn when their organization is insufficient: when resources are wasted, when the same work is done twice because of lack of internal communication, when tasks cannot be readily completed because the contributions of different subunits are not coordinated, when buildings or machines are suboptimally used because there is no sufficient overview and planning of activities; when employees produce too little because they are not sufficiently equipped or supervised; when managers cannot solve urgent problems because they have not acquired the necessary knowledge and skills, when customers get angry because they experience poor organizational services.....

All these shortcomings are costly, and they have to be minimized by means of efficient management and techniques for coordination, planning and control.

“....an organization facing a highly competitive setting cannot afford to make many mistakes, nor can it be substantially less efficient than its important competitors. The greater external pressures on an organization under conditions of competition leads to a demand for even more interlocking of organizational behaviors and more coordination and control within an organization.” (Pfeffer & Leblebici 1973: 270).

Thus, Arnold Rose has found that competitive organizations show a higher tendency to formalize their structures and activities: e.g. by relying on written statutes, rules and protocols. Such formalization provides them with an easy access to intraorganizational information – which may be highly functional for optimizing coordination and for securing an efficient use of internal resources.

Similarly, Rushing has found that hospitals in noncompetitive settings are much more likely to expand their activities without investing in correlative mechanisms of organizational integration (e. g. by increasing the clerical component and the administrative ratio), while competitive clinics show a clear tendency to increase complexity and integrative components at the same pace (Rushing 1976). This also accords with the findings of Lawrence and Lorsch that the most successful firms are those which combine high levels of systemic differentiation and integration (Lawrence & Lorsch 1967: 53).

These integrative needs can become so dominant that competitive organizations have to streamline their activities and to reduce the number of different subunits and roles, because the higher their internal differentiation, the higher the correlative needs for integration. Such endeavors then may easily override countervailing decentralization tendencies associated with high levels of innovation, heterogeneity and change.

Thus, Pfeffer and Leblebici have empirically demonstrated that many relationships asserted by organizational “contingency theory” hold only under conditions of less intensive competition (for instance the positive impact stemming from the number of products (and product changes) on the number of organizational subunits, on the decentralization of managerial competencies and on the specification of decision making procedures) (Pfeffer & Leblebici 1973). In contradiction to the propositions of Moores and Duncan (1989), this reasoning implies that when competition is intensive, centralized organizations show a better performance – even when they engage in highly variable production processes and face considerable environmental uncertainties. Of course, competitive firms too have to cope with such complexities, but they react to them mainly by elaborating their hierarchy, not by decentralization:

“The tall structure, with its increased review and control of decision making, it utilized when change or heterogeneity is confronted by an organization in a competitive environment. Conversely, horizontal differentiation, or departmentalization, is employed when the organization is in a less competitive environment.” (Pfeffer & Leblebici 1973)

3.4 Price competition and quality competition: two highly divergent challenges with contradictory organizational implications.

As consumers always want “the best offer for the lowest price”, firms have a certain leeway to which extent they compete by *lowering the prices* or by *raising the quality* of their products or services. (Veliyath & Fitzgerald 2000). While in most cases, a mixed strategy will prevail, price competition certainly dominates when products cannot be differentiated qualitatively (e. g. in the case of gasoline or standardized silicon chips (Marsden 1998)); and quality competition is stressed when prices are not flexible (e. g. because of interfirm cartelization or governmental regulations).

Generally, it is difficult to cope with intensive price competition and high quality competition at the same time, because these two conditions demand highly divergent measures of adaptation. Thus, price competition often forces firms to downsize in order to reduce costs at the short-term; but because dismissals most often lead to less personnel in the R & D sector, the firm’s capacities to innovate are weakened and its chances for longer-term perspectives of survival and growth may be reduced (Bruton/Keels/Shook 1996). In other cases, high price competition induces firms to substitute higher-paid skilled personnel by cheaper unskilled employees: thus reducing their general capacities to deliver high-quality products and to implement strategies of quality improvement (Budros 1997).

Leaving aside such exogenous contingencies, it can be generalized that price competition and quality competition are correlates of two diametrically opposed market structures.

a) Price competition dominates in “stable markets”: characterized by “mature”, basically invariant products and consolidated, steady consumer demands.

As the products- as the technologies used for fabrication - remain basically the same, market rivalry of suppliers focuses on price competition. Thus, survival and market shares become highly dependent on rationalizing processes and minimizing costs. Vice versa, high price competition imposes a need to focus on a small range of highly standardized mass products, on highly institutionalized production procedures and on consolidated, "mature" market conditions: so that all organizational processes can be streamlined in a cost-minimizing way (Hambrick 1983; Ward/Bickford/Leong 1996). Insofar as price competitors are innovative, they will focus on *process* rather than *product* innovations (Porter 1980; Miller 1986). Environmental stability is most important when the costs of expensive capital investments have to be regained.

"A cost leadership strategy works best under conditions of environmental stability in which neither customers nor competitors substantively alter their aggregate behavior. Such environmental stability serves to ameliorate the risk associated with large fixed investments in process and plant needed to sustain low unit costs with mature products." (Ward / Bickford/ Leong 1996)

As a consequence, successful price competitors are likely to maintain rather bureaucratized structures characterized by extensive formalization and centralized decision making procedures:

"The characteristic organizational structure of cost leaders is a highly centralized machine bureaucracy, with a key role played by the technical specialists who design the manufacturing and logistic systems. Important structural decisions regarding capacity and technology are made centrally. Relatively few substantive decisions are made by lower or middle management, who are charged with following plans, maintaining the large investment in plant and equipment and running facilities to take full advantage of scale economies." (Ward/Bickford/Leong 1996)

Given their high needs for intraorganizational stability, price competitors are more likely to search new market outlets for given production lines than to change procedures in order to keep existing markets (Ward/Bickford/Leong 1996).

b) Quality competition reigns in dynamic environments in innovative and unconsolidated markets

At the other extreme, there are highly volatile markets characterized by new products rapidly changing because of technological innovations on the one hand and constantly shifting market conditions and consumer preferences on the other. Under these conditions, competition focuses on optimizing product quality as well as the quality of customer services: goals which demand continuous efforts in environmental scanning, knowledge acquirement and technological innovation

"If management regards the environment as stable or static, attention will be highly focused on rationalization, productivity, and profitability. Within the automobile industry, this strategy is often referred to as 'Fordism.' If management regards the environment as characterized by change and turbulence, it will give high priority to competence development and the abilities to adjust, develop, and innovate. Within the automobile industry this strategy is often referred to as 'Toyotism'." (Adler/Docherty 1997).

Given two firms facing the same current market conditions, they can nevertheless follow divergent strategies according to their horizons of time. The short-term oriented firm A will

prefer price competition for optimizing its sales in the face of current competitors and for maximizing this year's profit; while firm B will prefer product development and innovation in order to conquer additional markets and/or to remain competitive in the middle- and longer-term future (Howard 1990).

3.5 The highly divergent behavioral consequences of price and quality competition for the coping firms

On a most general level, price competition and quality competition diverge highly in the degree of specificity of the adaptation problems to which they give rise.

For economic enterprises of any kind, price competition may generate extreme worries, but it is always a precisely defined problem apt to evoke rationally designed coping strategies:

First of all, the problem itself can easily be identified in objective measurable terms: there are competitors trying to produce the same product with less costs and sell it more cheaply.

Secondly, there is a highly consensual, determinate way how the problem shall be solved: (reduction of costs). And *thirdly*, coping strategies can be rationally chosen because (a) it is often known ex ante that certain measures are apt to reduce costs and/or (b) when a measure is taken, its effect on costs and prices can quickly be assessed.

When competition is about "quality" (of products or services), the situation is usually much more diffuse. *First*, 'higher quality' is an imprecise multidimensional concept; its real meaning is not objectively defined, but depends on the perceptions and evaluation of the customers. (Sherman 1992; Cooper 1996; Veliyath & Fitzgerald 2000). *Secondly*, it is not very clear in which way the problem shall be solved: there are innumerable steps to be taken to change products and services: e.g. to shorten the delays in shipping, to increase the spectrum of available variants, to lengthen the lifetime of products, to establish better support line etc etc. – and nobody can know exactly how investments in these different aspects will pay out. And *third*, the causal effects of the measures taken cannot be easily assessed. For instance, when improved products are better sold, this may be caused by a series of intermingled factors (e. g. because in the meantime, the brand has become more popular or the customer preferences have changed).

If measurements are possible at all, unrealistically high investments in technology, organization and personnel have to be made in order to establish the necessary procedures:

"....increased resources are necessary to measure the quality of output or the performance of agents. Sorting, grading, labeling, trade marks, warranties, licensing, time and motion studies and a variety of other techniques to measure the performance of agents are all, albeit costly and imperfect, devices to measure the characteristics of goods and services and the performance of agents. Despite the existence of such devices the dissipation of income is evident all around us in the difficulty of measuring the quality of automobile repairs, in evaluating the safety characteristics of products and the quality of medical services, or in measuring educational output. The problems of evaluating performance are even more acute in hierarchies because of the difficulties of achieving low cost measurement of the multiple dimensions of an agent's performance." (North 1996)

3.6 The broadened scope of quality competition

The high prevalence of quality competition is illustrated by a transnational company survey encompassing eight European regions, where Schienstock et. al have found that “high product quality” was the foremost factor to which most firms attributed their advantage in competing with rival enterprises (Schienstock/Kautonen/Roponen 1998). Similarly, Chaston and Mangles (1997) have found that the most important influences on performance included optimization of employee productivity, development of new products, investments in continuous improvements of product quality and measurement of customer quality expectations. But the term “quality” has assumed a much broadened meaning than in the past. While in traditional industrial competition, the term referred almost exclusively to intrinsic attributes of the physical product (e. g. its durability, its precise and reliable functioning etc.), it now tends to encompass all stages of a firms activity: from the criteria applied in the choice of raw materials and production procedures (e. g. ecological considerations) right to the support services offered after customers have bought it and set it in operation. The raising salience of post-selling quality performance has been illustrated by the aforementioned comparative study which has found that about 40% of all firms defined “after sales services” as their essential competitive advantage. (Schienstock/Kautonen/Roponen 1998).

3.7. The new ubiquity of price competition

When trade relations become global, price competition becomes more ubiquitous because local and regional protection breaks down. In particular, most firms from highly developed countries like Switzerland are increasingly challenged by cheaper competitors from low-wage countries. In the past, many Swiss firms could reduce competitiveness by producing high quality products, because no other firms in other countries were able to reach the same levels. In fact, the label “Swiss Made” was a long time sufficient to provide the reputation of high quality – a collective reputation from which all singular branches and companies could profit without having to generate their own individual reputation.

Thus, the rather high competitive success of many Swiss firms in foreign markets may at least partially be attributed to the “structural competitiveness” of Switzerland as an “industrial district”: i.- e. as a territory endowed with many advantageous traits vis-à-vis other geographical regions.⁹

In the last decades, more and more firms from more and more countries acquired such capacities, and given the lower level of wages in most world regions, many of them are no better disposed to keep selling prices low. As a consequence, most firms have recently experienced an environmental change in a way that they are now forced to cope with intensive quality and price competition at the same time.

This trend has also been substantiated in the Finnish Tampere region:

“Companies in the Tampere region concentrate on high quality niche markets in the first place. They see quality and time of delivery as their competitive advantage. These niche markets, however, do not present a safe segment any longer. More companies from all over the world have learned to produce high quality. What is now needed is to produce

⁹ For a discussion of the “industrial district” theory see Sabel et. al. 1987; Pyke and Sengenberger 1994; Schienstock et. al. 1998.

*high quality and user-friendly products at a reasonable price and to deliver them on time.*¹⁰

In order to escape the cumulative pressures of quality and price competition, firms are forced to outperform competitors in other respects: by being quicker than other in introducing new products or by being more flexible to react to changed customers needs:

“Nowadays companies from all over the world can manufacture products of high quality at low costs, sell them for a reasonable price and deliver them within a short time period. Success within the global market mainly depends on the capability of companies to rapidly and continuously produce new products and services; innovativeness is the number one factor in global competition.” (Schienstock/Kautonen/Roponen 1998)

3.8 Some factors influencing a firm’s capacity to cope with intensive competition

3.8.1 Firm size

Since the time of Karl Marx, it is common wisdom that the evolution of private capitalism tends to produce larger enterprises, because big firms are better able to survive in economic competition. Within the Fordist paradigm of industrial organization, this relationship has primarily been elaborated with respect to *price competition*. Thus, it has been argued that for many different reasons; larger firms are better able to minimize costs by realizing of “economies of scale”: e. g. because they can exercise monopsonic power on suppliers or because they are better able to make use of highly routinized mass production technologies (which result in a downgrading of required skills). More recently, it has been observed that larger firms have a similar edge in exploiting “economies of scope”: associated with the basic fact when producing good A, a firm may have lower costs of producing related goods B,C,D.

For the case of *quality competition* instead, contradictory theoretical argumentations have been proposed. On the one hand, Piore and Sable have asserted that small firms practicing craft-like production styles are better able to cope with the newer trends towards customized high-quality products, because they have more flexibility to adjust outputs (quantitatively and qualitatively) to such new demands (Piore & Sabel 1984). On the other hand, it is also widely acknowledged that larger firms have higher capacities to develop large amounts of specialized knowledge and skills, and to maintain collaborative relationships with universities or other innovation-oriented institutions (Schienstock/Kautonen/Loponen 1998).

In addition, they can engage in risky innovative endeavors with less fears because conventional procedures can be maintained at the same time (within other subunits of the same organization).

“...larger organizations, although less likely to attempt core changes in the first place, are less likely to die during a core change attempt. Largeness can buffer organizations from the disruptive effects of core change by helping, for example, to maintain both old and new ways of doing things during the transition or to overcome short-term deprivations and competitive challenges that accompany the change attempt.” (Baum & Singh 1996).

¹⁰ “Main findings from the firm survey of the Regis project: “Regional Innovation Systems: Designing for the future.” <http://www.uta.fi/laitokset/tyoelama/regis/survey.html>

Empirically, various studies have shown that larger companies are more likely to innovate. Thus, the Finnish study in the Tampere region has shown that firms above 200 employees are much more prone to innovate by introducing new products as well as new production procedures).¹¹

On the other hand, larger firms are often characterized by traditional Taylorist structures which go along with a high percentage of unskilled labour – a factor hampering innovativeness in many respects (Schienstock/Kautonen/Roponen 1998). Thus, it has been observed that while large firms cultivate develop and maintain highest expertise and skills in most areas, they are often not capable of exploiting it fully for their own purposes. Instead, many experts – frustrated by lacking opportunities to realize their ideas and be promoted – leave the firm in order to found new “spin-off” enterprises. These small new firms then are often developing and licensing innovations (which then might be bought back later by the larger firms) (Brittain & Freeman 1980).

Additionally, several empirical studies have shown that while larger firm may be more capable of providing the capital and human resources necessary for improvements or innovations, they are often heavily handicapped by rigid internal structures and a tendency to focus more on internal than on environmental matters. Thus, larger firms have been found to maintain a lower degree of market orientation and to show signs of complacency and inertia which makes them unfit for risky measures of change (March 1981; Aldrich & Auster 1986; Hitt et al. 1990). Their mere structural complexity leads to reduced capacities for information processing and slower speed in executing formally decided measures and plans (Galbraith 1977; Pelham 2000). By contrast, smaller firms can be expected to react more flexible to environmental stimuli of any kind, because more employees occupy boundary roles¹², because their structures are less bureaucratized and their communication systems less complicated (Katz 1970; Feigenbaum & Karnani 1991 etc.):

“Small is beautiful. It is much easier for the new venture founder to attend to the myriad of details in running a totally competitive business unit as long as it is still small with only a handful of employees. Perhaps, one of the reasons new ventures are able to blossom early, is the fact that the very nature of their smallness permits adaptability and rapid response.” (Slevin & Covin 1995).

Consequently, while larger firms may draw more advantages from their institutional embeddings and their capacity to control salient environmental factors, such advantages may be more than offset by their smaller capacity to maintain intensive environmental relations:

“Although large firms can dominate commodity markets based on cost or financial advantages, larger industrial manufacturing concerns may be at a disadvantage, compared to smaller firms, in their ability to learn from their market environment due to lessened contact between senior managers and customers as well as customer contact personnel. This lessened level of contact can lead to internally focused operations and production/technical orientations that may fail to adjust to changing market conditions. This internal focus, combined with significant sunk costs and bureaucratic inertia, could

¹¹ “Main findings from the firm survey of the Regis project: Regional Innovation Systems: Designing for the future” 1997. <http://www.uta.fi/laitokset/tyoelama/regis/survey.html>. For similar relationships in other European regions, see Schienstock/Kautonen/Roponen 1998).

¹² This is an implication of Peter Blaus axiomatic theory which states that the larger a system (of any kind), the smaller its periphery in relationship to its total size. (Blau 1977: 19ff).

render large firms more vulnerable to changing industry conditions because of the difficulty they have modifying strategy.” (Pelham 2000).

This reasoning also implies that size is an intervening variable moderating the relationship between firm strategies and achieved performance. Thus, when a small firm focuses on a market-oriented strategy, it is more likely to gain significant competitive advantages than a bigger firm, because it is better able to adjust its whole internal organization to the external strategic needs (Pelham 2000).

“...market orientation may provide small firms with a potential competitive advantage over larger firms where layers of management and bureaucracy make understanding customers more difficult and also increases the difficulty of promoting a cohesive customer-oriented culture.” (Pelham 2000).

Many larger firms try to exploit such advantages by segmenting themselves into smaller divisions, thus combining the functional advantages of smallness and bigness at the same time:

“The creation of small profit centers reduces the growth of organizational bureaucracy yet allows the firm to respond quickly to changes in the competitive environment. Firms that have adopted the confrontation strategy cannot afford either the extra costs of unnecessary bureaucracy or the slowing of the firm's reflexes that such a bureaucracy causes. By keeping the effective firm size small, empire building becomes almost impossible, and a firm can maintain its ability to adapt quickly to changes in competitive conditions.” (Cooper 1996).

Finally, it has to be considered that quality competition offers to many small firms excellent chances for survival and growth which are less available to larger enterprises. Many firms try to reduce competitive pressures by migrating to less contested niches. They typically do this by developing and producing highly specific products addressed to highly specified customer segments. The smaller the firm, the more probable that it finds such a highly specific small niche which offers a sufficiently large and stable base of subsistence. The bigger firms need larger markets which are less likely to be uncontested (or to compete simultaneously in different market niches which are unlikely to be all equally uncontested).

Niche specialization means that a firm tries to exploit quasi-monopolistic rents by conquering a leader position within a narrowly defined field. This usually implies that it commits all resources to raise the quality standard of its production and products by optimizing its technology and organization and by internalizing highly professional skills.

“The niche differentiator often requires a more highly skilled workforce than others in its industry. This is particularly true of the niche quality differentiator, which often counts on production people to have the know-how to build a high quality product in the absence of formal process controls used in high volume settings. Although various mechanisms are available to achieve quality, total quality management (TQM) programs are currently favored by a wide spectrum of firms, including niche manufacturers.” (Ward/Bickford/Leong 1996)

3.8.2. Expanding or shrinking markets

For three different reasons, firms operating on expanding markets are better able to react rationally to competitive challenges and to implement successful adaptive change.

1) When niches contract, innovative behavior is hampered by the prospective than whenever it fails, the organization risks to be wiped out completely. On the other hand, expanding markets provide “buffers” because even when experimental new procedures turn out bad, the mere market expansion makes it probable that the company still can still survive. Corroborating this hypothesis, Baum and Singh (1996) have found that competing Day care and nursery schools were more successful in environmental adaptation under expansive than under contractive conditions.

2) During phases of growth, organizations are usually quite free to enlarge existing and/or build new structures and the recruit additional personnel in strict accordance with their changing needs. In addition, expanding firms have also better chances to upgrade their skills by hiring highly qualified employees, because they can offer secure jobs and promising careers (Russell 1997). And finally, their employees may be better motivated to engage in advanced training because given their long-term employment, they can reasonably expect that such investments will pay out. During periods of decline and contraction however, adaptations are hampered by factors of many sorts: e.g. by ossified habits and traditions, by lacking flexibility of leadership, by legal norms inhibiting the dismissal of employees, by poor opportunities to hire qualified personnel etc. Thus, Freeman and Hannan have found that expanding schools enlarge their administrative component quite in pace with their growing absolute size, while shrinking schools tend to keep their clerical apparatus too large (Freeman/Hannan 1975; Pfeffer 1978).

3. *Growing markets* allow for more specialization. When firms are operating in expanding environments, they have better chances to survive in highly specialized niches, because it is more likely that such specialized niches are also submitted to growth (Romanelli 1989). Thus, they are better equipped to commit their resources irreversibly to highly specified purposes: so that they can maximize their efficiency in a way compatible with very intensive price competition. On the other hand, they are also well able to survive when they sacrifice efficiency for remaining more flexible and innovative, because when markets expand, inefficiencies are not punished so harshly as in shrinking environments (Romanelli 1989). Thus, they have more leeway to follow very different strategies, so that they will develop highly divergent procedures and organizational forms (=high statistical dispersion).

In *shrinking markets*, by contrast, firms do better to keep their resources in a more liquid, reversible condition, because they may face the contingency of having to give up their traditional product lines altogether and to switch to completely new products (and corresponding markets). But exactly this strategy may be blocked because price competition is so high that firms have to be completely committed to highly routinized, efficiency-oriented procedures.

Finally, it has also been observed that expansive and contracting conditions have highly divergent influences on the average level of skills. When firms have to downsize their staff because they are competing with little success (and/or within *shrinking markets*), they may still be forced to upgrade the skill level of their labor force (either by selectively dismiss unskilled personnel or by substituting less skilled by more educated employees).

The reason is that the total organizational activity has to be allocated to fewer heads, so that each average worker has to be able to cope with a larger variety of different tasks. Consequently it is more likely that any role also entails more complex problems which necessitate to hire workers with a higher basic level of knowledge and skills. In a Canadian case study conducted by Bob Russell, this increased role polyvalence has been found to be the major factor for higher skill demands in reorganizing firms (Russell 1997).

Thus, when firms switching to lean production procedures may need higher skills, this may not be primarily caused by increased task complexity and higher qualifications demanded for functioning in “empowered teams”. Instead, the more trivial reason may lie in the “horizontal expansion of jobs” (each comprising a larger spectrum of rather undemanding single tasks) (Russell 1997). *Expanding markets*, by contrast, provide optimal opportunities for implementing standardized procedures and for buying capital-intensive mass production technologies – so that roles can be more specialized and taylorized and a shift toward lower skilled personnel may be observed.

3.8.3. Age of the Organization

For two reasons, it may be expected that older organizations are less likely to react adaptively to competition.

First, older organizations are more likely to have highly consolidated and rigidified structures, so that they are less disposed to react to any external stimuli with internal change and innovative procedures (Hannan & Freeman 1984; Davis & Stout 1992). Miller argues that as organizations age, their very early success makes them assume more simple structural forms which may diminish their capacities for future adaptive change:

“....a troublesome paradox exists: the sources of dangerous simplicity may underlie initial success and, thus, may be doubly difficult to combat. Indeed, it is very hard to distinguish between the concentration and passionate dedication so necessary for success and competitive advantage and the simplistic fixations and extremes that lead to failure.” (Miller 1993: 119).

Thus, Baum and Singh have found in their comparative study of daycare facilities that older organizations were more likely to experience disruption when their market niches changes (Baum & Singh 1996).

Secondly, older organizations are less likely to succumb because they enjoy higher “social legitimation” (Hannan & Carroll 1992) and because they are more integrated into supporting institutional environments. For instance, they are more likely to enjoy a high public reputation, to be supported by highly loyal employees, to profit from a high status among customers; to be embedded in supportive elite networks, to enjoy the help of public agencies, to have a high standing on the labour market, and to get bank credits when needed (DiMaggio & Powell, 1983; Mintz & Schwartz, 1985; Podolny, 1993; Barnett 1997).

As a consequence, social Darwinist selection processes in economic markets don’t guarantee the “survival of the fittest”, because with increasing age, survivors are increasingly protected from direct impacts of environmental competitive pressures.

“The net result is that the strong-survivor hypothesis is self-defeating. Environmental selection increases competitiveness, but by increasing concentration, it triggers the rise of large, impervious, but increasingly impotent organizations.” Barnett 1997).

Thus, many older firms tend to become overstaffed without being punished immediately for these inefficiencies. This is seen in the regularity that many of them have to regain their competitive capacities by downsizing when environmental competition pressures suddenly increase (Budros 1997). Even younger organizations may share competitive weaknesses when they are “spin off’s” of older firms: because they are likely to have “inherited” their mother’s shortcomings (Barnett 1997).

Empirical studies indicate that the increasing survival chances associated with higher age accrue disproportionately to larger organizations. In fact, smaller firms seem to suffer from a “liability of obsolescence” which leads to increasing risks of mortality over time (Ranger-Moore, 1991; Barron, West, and Hannah, 1994; Baum, 1996).

4. Methodology and Data Sources

4.1. The sample and the two Surveys

The data used in the following empirical analyses stem from two surveys conducted in 1996 and 1998 by the Economic Department of the Federal Technical University in Zürich (Switzerland), both of them comprising several thousand private enterprises of the industrial and the tertiary sector. The aim of the *first survey (in spring 1996)* was to collect information about the firm’s market conditions on the one hand and their innovative behavior strategies on the other. Based on the Federal census of economic enterprises of 1991, a sample of 5377 businesses (stratified according to branches and size categories) was selected, of which 1748 firms (=32.5%) have returned the filled-out questionnaire. The *second survey (in spring 1998)* has focused on the composition of the firm’s work force and skill requirements and their activities in the realm of primary as well as advanced vocational education. It comprised a revised and enlarged sample constituted on the basis of the Swiss Federal business census of 1995. The questionnaire was sent to the personnel managers of 7170 enterprises, and the return rate was 30% (=2132 cases). As a consequence of the rather low return rates on the one hand and the diverging composition of the two survey samples on the other, only 885 companies have participated in both surveys. They constitute the final sample on which the following statistical analyses are based. Control tests indicate that the composition of this sample does not deviate heavily from the original stratified sample: which means that it comprises a rather equilibrated collection of businesses from 28 different economic branches – and in each of those firms of very different size (Table 4.1).

Table 4.1: Frequency distribution of firms in the total sample: according to size categories and economic sectors

Economic sector:	Firm Size			Total
	30 or less	30-200	201 or more	
Industry / Construction	233	246	79	558
Services	183	106	38	327
Total	216	352	118	885

4.2 Operationalizing the intensity of competition

In the first survey conducted in 1996, the informants were asked to give a judgment on the intensity of competition the firm currently faces on its sales markets:

- a) in their realm of prices
- b) in the realm of non-price aspects (=quality standards of products, services or technological factors).

On both dimensions, informants had to choose a scale value ranging from 1 (very low) to 5 (very high). While all the firms were able to locate themselves on the price competition scale, forty of them (=4.5%) didn't give a judgment about the degree of non-price competition. As shown in Table 4.2, the distribution of the firms is highly skewed toward higher levels of competitive intensity, particularly in the realm of prices.

Table 4.2: Frequency distribution of firms on the two scales of "intensity of competition" (percentage values)

	Value on the "intensity of competition"-scale					Total
	1	2	3	4	5	
Price Competition	3.0 (26)	6.5 (57)	16.0 (141)	26.6 (234)	48.0 (422)	100% (880)
Quality competition	5.1 (43)	15.7 (132)	33.9 (285)	27.8 (234)	17.5 (147)	100% (841)

4.3. On the measurement of the dependent variables

In the second survey conducted in 1998, informants were asked to indicate the firm's size of staff on five levels of occupational qualification:

- 1) employees with full academic degrees;
- 2) employees with advanced vocational diplomas or certificates officially acknowledged by the federal government (e. g. diplomas in accounting, engineering, marketing etc.);
- 3) employees who have finished an ordinary vocational education (an apprenticeship usually taking three or four years);
- 4) unskilled or semi-skilled personnel (without any formal vocational degrees);
- 5) personnel enrolled in apprenticeship or other training programs.

In addition, they were asked whether the firm had the intention to increase, maintain or decrease the number of personnel in these same five categories (within the following two years: 1988-99). These data are only available for a reduced sample, because various managers (particularly of larger enterprises) were not able to provide precise figures, and even more of them were uncertain about the firm's future employment perspectives.

Table 4.3: Staff on different skill levels: current percentage figures and direction of envisaged future change

Skill level:	Percentage of current staff	(N =)	Envisaged change in the coming two years (% of firms)			(N =)
			expansion	stagnation	shrinkage	
Academic degrees	4.88	(800)	19.8	76.9	3.4	(618)
Advanced voc. degrees	11.80	(800)	36.6	61.2	2.2	(725)
Apprenticeship	45.54	(801)	39.2	54.7	6.1	(786)
Unskilled	31.51	(799)	12.1	49.3	38.5	(687)
Trainees, Apprentices	6.69	(801)	15.9	76.6	7.5	(624)

When overall percentages are calculated, it is seen that almost half of all employees are located on the apprenticeship level, while more than 30% are unskilled and less than one out

of six has acquired any higher educational degrees (Table 4.3). This distribution is a characteristic outcome of the Swiss “dualistic” system of primary vocational education which is based on a mix between practical in-house training and theoretical education in external vocational institutions (Geser 1999).

In addition, the prevalence of formal advanced training was measured by asking respondents a) whether the firm made use of internal or external programs for advanced training; b) how many employees were enrolled in such courses.

It was found that 71% of all firms made use of internal programs and 53% of external educational institutions (and 40% of both). Among all the firms which made use of any formal mode of advanced training, the average enrollment rate was 39%.

In order to grasp the level of informal on-the-job training (as an indicator of job complexity), informants were asked how much time new incumbents of operative production roles usually needed to get fully skilled in their respective job, and whether this introductory time has recently increased, decreased or remained on the same level. The time indicated ranged from one day to two years, with an arithmetic mean of 68.5 and a median of 40 days. Most respondents held that this initial training period has recently increased (42%) or at least remained on the same level (51%).

Finally, we wanted to know which skills were considered to be “essential” or at least “important” for average incumbents of operative roles.

Evidently there are two very different categories of highly essential skills: one centering on specialized vocational knowledge, and the other clustering around highly informal “key qualifications” (Schlüsselqualifikationen) related to personal action capacities (flexibility and autonomy) on the one hand and to social competencies (particularly communicative skills) on the other (Table 4.4).

Table 4.4: Importance given to various skills for ordinary operative workers in the production department (Percentages of firms).

Type of skill:	Degree of importance					(N =)
	Absolutely essential	Very important	Important	Rather unimportant	Totally unimportant	
General education	2	13	51	28	5	(792)
Foreign Languages	7	14	24	40	17	(771)
Computer skills	12	17	35	25	11	(765)
Vocational skills	26	45	23	6	1	(783)
Long work experience	13	43	37	7	0	(805)
Manual dexterity	18	36	30	14	2	(771)
Organization skills	6	25	49	16	4	(808)
Communicative skills	19	45	33	3	1	(826)
Conflict-coping skills	9	36	44	9	1	(815)
Creativity, innovativity	8	31	43	17	1	(815)
Personal autonomy	23	52	23	2	0	(840)
Flexibility	26	47	25	2	0	(823)

5. Empirical Results

5.1. Prevalent patterns and antecedents of price and quality competition among Swiss firms

5.1.1 Combination patterns and interrelationships between price and quality competition: substitution, complementarity or mutual independence?

Given the highly divergent adaptation and coping strategies related to price and quality competition, it might be expected that firms are hardly able to persist in environments where both of them are on a very high level, and that for reasons of organizational consistency, they are eager to look out for niches where one of the two challenges is insignificant or absent.

On the other hand, it is evident that many recent developments in the world economy have the effect that more and more firms have to become (or remain) highly competitive simultaneously on both dimensions. For example, many export-oriented industrial firms face the challenge of having to offer highest quality goods and to compete harshly with low-price competitors (e. g. from emerging countries) at the same time, and current reorganization models (focusing on “lean production” or “total quality management”) are designed to ease incompatibilities between enhancing product quality and diminishing costs.

By crossing the two frequency distributions, it becomes evident that Swiss firms spread so widely on the nine-cell table that no expected negative relationships can be seen. In fact, the correlation between price and quality competition is insignificant in the *industrial sector* (Table 5.1) and even slightly positive in the *service branches* (where almost 12% experience highest pressures from both sides) (Table 5.2).

About 75% percent of all *industrial businesses* face markets where both quality and price competition are at least on a medium level, while less than one percent operate in an environment where both pressures are rather low. In the *service sector*, significantly more businesses report low competition. Most of them offer their service on rather narrow domestic markets where they often enjoy local monopolies or the protection of cartel prices.

Table 5.1: Percentages of firms with different combinations of price and quality competition: firms in the industrial Sector (N=459)

Degree of price competition	Quality Competition			Total
	low	medium	high	
low	0.7	3.7	.7	4.8%
medium	9.6	29.0	5.9	44.4%
High	10.2	31.2	9.4	50.8%
Total	20.5%	63.6%	15.9%	100%

	Value	df	Sign (2-tailed)
Pearson Chi-Square	3.121	4	.538

Table 5.2: Percentages of firms with different combinations of price and quality competition: firms in the Service Sector (N=308)

Degree of price competition:	Quality Competition			Total
	low	medium	high	
low	4.2	6.8	2.3	13.3%
medium	10.7	28.6	7.1	46.4%
High	5.2	23.4	11.7	40.3%
Total	20.1%	58.8%	21.1%	100%

	Value	df	Sign (2-tailed)
Pearson Chi-Square	13.384	4	.01

5.1.2 Firm size and firm age as concomitants of competitive intensity

Given that intensive price competition is mainly found in mature branches and under consolidated market conditions, it could be expected that highest levels are reached by well established older and larger firms: businesses dedicated to the traditional paradigm of Fordist mass production. On the other hand, maximum quality competition should be prevalent among recently founded firms, particularly smaller enterprises still in their stages of initial growth.

Some of these hypotheses are well borne out by Table 5.3 which shows highest degrees of price competition for larger firms operating at least since 1984 and middle-sized businesses founded 1955 or before; and highest levels of quality competition for the youngest firm cohort (founded after 1983) with less than 30 employees.

Table 5.3: Intensity of competition*: comparing firms of different size and age.

Period of foundation	(N =)	Degree of price competition			Degree of quality competition		
		Firm size			Firm size		
		< 30 empl.	31-200 empl.	> 200 empl.	< 30 empl.	31-200 empl.	> 200 empl.
-1900	(114)	3.68	4.33	4.30	3.12	3.32	3.35
1901-30	(142)	3.80	4.28	4.44	3.20	3.30	3.52
1931-55	(177)	3.88	4.39	4.32	3.32	3.42	3.42
1956-71	(182)	4.11	4.14	4.61	3.41	3.55	3.08
1972-83	(141)	4.00	4.18	4.44	3.33	3.27	2.89
1984-96	(111)	3.74	4.00	3.40	3.59	3.27	3.20

* Average values on a scale from 1 (very low competition) to 5 (maximum competition).

However, it is less easy to explain why lowest price competition is prevalent among the oldest small firms on the one hand and among the most recent large firms on the other. Referring to the first of these two samples, we might follow the “social Darwinist” hypothesis that smaller firms are unlikely to survive for long when competition is very high, because they face too many challenges which they cannot effectively master because of their scarce resources. In other words: very old small firms are likely to belong to a “fortunate” category of rather protected enterprises which have evaded competition by specializing on uncontested smaller niches (e. g. firms enjoying local monopolies or secure long-term supply contracts

with larger firms). In fact, these same firms also show rather low levels of quality competition. Symmetrically, large firms of recent origin may also be likely to profit from rather uncompetitive market conditions, because otherwise, they would not have been able to grow as rapidly as they did. In fact, their fortunate position is additionally highlighted by their low values of quality competition (a condition even more pronounced among larger enterprises founded between 1956 and 1983).

With the exception of the youngest firm cohort, the intensity of price competition increases significantly with firm size within all categories of age (Table 5.3). Thus, it is evidently not true that larger Swiss firms enjoy more competitive protections (e. g, related to their highly consolidated market reputation, their monopoly power or their higher degrees of institutional embeddings). This result may mirror the general regularity that most sizable Swiss firms have to compete internationally because their production is too voluminous for the small domestic market. Additionally, it may also explain why size and quality competition are also positively related among older enterprises. Instead, new firms show the expected negative correlations typical for dynamic new product lines and expanding, yet unconsolidated customer markets (Table 5.4).

Table 5.4: Correlations between firm size and intensity of quality competition: comparing older and younger firms.

Correlation between:	Period of foundation					
	1930 or earlier		1931-1971		1972 or later	
	Corr.	Sign.	Corr.	Sign.	Corr.	Sign.
Firm size / Quality competition	+.13	.046	+.04	.420	-.13	.040
(N =)	(246)		(338)		(240)	

5.1.3 Is price competition affecting organizational growth or decline?

Given the rather high competitiveness of Swiss firms (especially on international markets), we don't expect that high levels price competition generally causes them to stagnate or falter. Nevertheless, the assumption remains reasonable that high challenges on the price front may result in shrinking nominal sales: because even when constant volumes are marketed, they will generate less revenue when they have to be sold at sinking prices.

As the crosstabulations of Table 5.5 show, the expected negative correlations between price competition and firm expansion are limited to the *tertiary sector*. Here, the share of expanding businesses reaches maximum (and the rate of shrinking as well as stagnating firms lowest) levels when price competition is weak or inexistent, while exactly the reverse conditions hold when intensive price pressures prevail.

In the *industrial sector* however, a slight relationship in the opposite direction can be seen. In particular, firms with decreasing earnings are most frequently found in markets where price competition is low, and expanding businesses are most often found when medium competition prevails. Thus, industrial firms seem to behave like certain individuals who have to be challenged by certain medium environmental pressures in order to be driven to high performances, while they become lazy and unproductive when no such pressures exist, or when pressures are so overwhelming that no resources for effective coping strategies are left.

Table 5.5: Level of price competition and development of earnings: firms in the industrial and in the service sector (percentage values).

Development of earnings (1995-97)	Industrial firms			Service firms		
	Degree of price competition			Degree of price competition		
	low	medium	high	low	medium	high
Decrease	47	25	35	20	32	43
Stagnation	21	26	28	31	25	21
Increase	32	49	37	49	43	37
Total (N =)	100 (91)	100 (111)	100 (206)	100 (90)	100 (79)	100 (112)
Pearson Chi-Square	Value	df	Sign.	Value	df	Sign.
	6.94	4	.139	12.068	4	.017

Table 5.6: Level of price competition and development of earnings: smaller and larger firms in the industrial and in the service sector (percentage values).

Development of earnings (1995-97)	Small firms (> 30 employees)			Large firms (< 200 employees)		
	Degree of price competition			Degree of price competition		
	low	medium	high	low	medium	high
Decrease	33	34	41	27	6	39
Stagnation	29	32	28	9	24	18
Increase	38	35	31	64	70	43
Total (N =)	100 (125)	100 (96)	100 (148)	100 (11)	100 (33)	100 (49)
Pearson Chi-Square	Value	df	Sign.	Value	df	Sign.
	3.076	4	.545	11.986	4	.017

This productive “stimulation effect” stemming from medium price competition levels becomes most pronounced in the sample of larger firms which are significantly less likely to shrink when middle (instead of high or low) levels price competition prevails. Instead, smaller enterprises are more likely to contract when price challenges are high and to expand when they are low (Table 5.6). This conforms well to the hypothesis that smaller firms are less able to cope actively with environmental challenges because they have less “slack resources” at hand.

Similar differences show up when younger and older companies are compared. While younger firms are most likely to expand and least likely to shrink when price competition is medium or low, older firms develop most positively when they are exposed to moderate competition (Table 5.7). Again, a possible explanation may lie in the fact that older enterprises are better equipped to cope actively with competitive challenges – a hypothesis which can be based on two very different arguments:

1) Older companies have already proven that they possess significant performance capacities – otherwise they would not have survived such a long time.

2) Older firms are more embedded in their societal environment (e. g. by having easier access to bank loans or by enjoying a higher public reputation), so that they can mobilize more resources (and make investments in more risky strategies) when they are under (not too intensive) external pressure (Hannan & Carroll 1992; Barney 1997 etc.).

Table 5.7: Level of price competition and development of earnings: older and younger firms in the Industrial and in the service sector (percentage values).

Development of sales (1995-97)	Older firms (founded before 1955)			Younger firms (founded after 1971)		
	Degree of price competition			Degree of price competition		
	low	medium	high	low	medium	high
Decrease	28	22	44	23	23	34
Stagnation	32	29	29	27	24	24
Increase	40	48	27	50	52	44
Total (N =)	100 (50)	100 (58)	100 (107)	100 (66)	100 (65)	100 (85)
Pearson Chi-Square	Value	df	Sign.	Value	df	Sign.
	10.974	4	.027	3.400	4	.493

In the preceding introductory chapter, it has been argued on theoretical grounds that price competition and quality competition demand highly contradictory measures for successful adaptation, so that at least some firms may be quite unable to expand successfully when both of them are intensive (see 3.5). Thus, while price competition for itself has evidently no considerable impact on organizational development, we may still argue that growth opportunities are hampered when high price and quality competition are simultaneously present. In fact, the percentage of unsuccessful (=shrinking firms) reaches a maximum (40%) when the intensities of both price and quality competition are high, and a minimum (18%) when both of them are low (Table 5.8a). On the other hand, maximum percentages of *expanding firms* are found in niches where high quality competition and low price competition are combined (Table 5.8b). Evidently, many Swiss firms get stimulated to high performances when they are challenged to produce high-quality goods – but only when they don't face heavy restrictions to minimize current costs. Symmetrically, absence of quality competition may work as a disincentive: making firms less fit for survival and growth when they face intense competition on the level of costs and prices.

Table 5.8a: Percentage of firms with *shrinking sales* under different combinations of price and quality competition.

Degree of price competition	Degree of quality competition		
	low	medium	high
low	18%	33%	27%
medium	37%	24%	21%
High	36%	35%	40%

Table 5.8b: Percentage of firms with *expanding sales* under different combinations of price and quality competition.

Degree of price competition	Degree of quality competition		
	low	medium	high
low	46%	27%	54%
medium	46%	46%	50%
High	29%	42%	32%

5.2. Competitive intensity and staff qualifications

5.2.1 The general impact of price and quality competition on the qualificational composition of staff

For three reasons, it can be expected that the current as well as the envisaged composition of firm staff (in terms of different skill levels) covaries with the degree of price and quality competition to which a company has recently been exposed.

First, competitive environmental relations have a *direct* impact on the problems and role duties with which many members are confronted. Thus, advanced technical qualifications may be needed for reaching and maintaining high quality levels of products and services; sophisticated social skills are indispensable for persuading customers who can choose among many other attractive offers; and creative management performances are necessary in order to outperform competitors in timely innovations and marketing endeavors.

Secondly, competitiveness has an *indirect* impact on staff roles by determining the form of organizational structures and processes a firm has to adopt in order to cope effectively with environmental challenges. Thus, intensive price competition may engender deskilling because companies are induced to apply “Fordist” production methods relying on highly specialized and undemanding Taylorist roles. And vice versa, intensive quality competition may catalyze the adoption of “lean production” and “total quality” methods: with the effect that almost all employees have to possess rather sophisticated skills.

And *thirdly*, additional statistical covariances may be caused by the fact that competitiveness is a correlate of a more complex pattern of interdependent forces and conditions. As hypothesized above, high price competition can be a concomitant of a “mature” market structure which engenders a low need for innovations because products are not changing in quality or functionality anymore. Symmetrically, intensive quality competition is often embedded in dynamic phases of product development and rapidly changing market structures which will induce high needs for sophisticated personnel even if competition is weak or inexistent.

As seen in Table 5.9, industrial enterprises as well as service firms tend to have lower shares of academic personnel and higher percentages of unskilled employees when intensive *price competition* prevails. In both sectors, the rise of unskilled personnel doesn’t go along with a reduction of apprenticed employees, so that no substitution between these two lowest skill levels seem to take place. Only in the service sector, however, price competition seems to engender a partial substitution of academic staff by employees with advanced vocational diplomas, while industrial firms reduce the share of both qualification levels to a similar degree.

Table 5.9: Mix of staff skills and degree of price competition: contrasting firms in the industrial and in the service sector.

Percentage of personnel with	Industrial sector			Service sector		
	Degree of price competition			Degree of price competition		
	low	medium	high	low	medium	high
Academic degrees	4.0	3.3	3.0	10.2	7.3	6.9
Advanced diplomas	11.6	12.7	10.8	12.2	13.9	13.9
Apprenticeship	45.7	42.7	43.1	45.3	52.4	45.7
Unskilled	34.0	37.1	38.7	20.8	19.8	25.8
(N =)	(91)	(116)	(220)	(91)	(85)	(117)

Quality competition has also highly similar impacts in both economic sectors. In almost perfect symmetrical opposition to price competition, it goes along with a significant expansion on the two highest skill levels and a lower percentage of unskilled employees. All these effects are somewhat more pronounced in the industrial than in the service sector. As in the case of price competition, the demand for apprenticed staff seems to be unaffected by the degree of competitive environmental pressures (Table 5.10).

Table 5.10: Mix of staff skills and degree of quality competition: contrasting the industrial and the service sector.

Percentage of personnel with	Industrial sector			Service sector		
	Degree of quality competition			Degree of quality competition		
	low	medium	high	low	medium	high
Academic degrees	2.3	2.4	4.4	6.8	7.2	9.9
Advanced diplomas	8.5	11.6	12.7	12.7	13.1	14.3
Apprenticeship	44.1	43.5	43.5	45.9	47.6	48.2
Unskilled	40.7	38.0	35.1	26.0	22.3	20.9
(N =)	(88)	(139)	(188)	(57)	(91)	(128)

These intersector convergences support the provisional hypothesis that causal relationships between competition and staff skill levels may be of a highly general nature, because they don't seem to be moderated by product- or technology-related factors. Of course, much more detailed analysis on the level of specific industries and services would be necessary to corroborate such a far-reaching conclusion – analyses which cannot easily be done with the existing sample because not enough cases are available for the various specialized branches.

5.2.2 The general impact of price and quality competition on envisaged changes in staff competition

It might be hypothesized that current competitive pressures have rather limited impact on current staff, because the size as well as the composition of employees is mainly determined by conditions of the past and cannot be easily modified when factors of competitiveness are changing (e.g. because hiring and firing is hampered by various laws and informal traditional norms). Instead, present competition may well determine whether firms have the intention of increasing or decreasing their staff, and if they do, which skill levels will be predominantly affected. When they face intensive *price competition*, cost pressures may force them to implement general downsizing strategies involving all staff categories, and/or to introduce

more standardized production methods which allow them to substitute expensive highly educated members by cheaper personnel on lower levels of skill. Such deskilling may be more common in the industrial than in the tertiary sector, because the production of physical goods lends itself better to routinized technical procedures than the production of services (particularly when these are offered to other businesses).

On the other hand, *quality competition* will engender expansion measures on the level of higher wage groups, because high skills are crucial for improving and maintaining high quality standards, and because cost minimization is not a predominant concern.

Table 5.11: Envisaged growth of labor force on different skill levels: contrasting firms operating under different degrees of competition (firms in the industrial sector)

Percentage of firms which envisage an expansion of staff with	Degree of price competition			Degree of quality competition		
	low	medium	high	low	medium	high
Academic degrees	14.1	20.5	20.1	15.8	20.9	25.0
Advanced diplomas	33.3	41.4	38.5	28.9	42.3	43.9
Apprenticeship	42.7	48.7	46.7	43.9	50.1	43.1
Unskilled	11.1	14.4	16.2	17.1	14.6	17.3
(N =)	(74)	(101)	(174)	(76)	(119)	(145)

As can be seen in Table 5.11, the first of these hypothesis is not borne out for firms of the industrial sector, because firms coping with low price competition show no consistent lower tendency to envisage a net expansion of their staff. To the contrary, price competing industrial businesses are more likely to expand personnel on all qualificalional levels. This may indicate that they are in fact successfully competing (or that they intentionally expand in order to be able to save costs by realizing more economies of scale).

On the other hand, at least service firms conform somewhat to the second hypothesis insofar as they react to high price competition by a reduced tendency to increase academic personnel, and by a heightened inclination to hire additional staff on the second-lowest level of skill (Table 5.12).

Looking at quality competition, high intensity is associated with increased expansion of academic personnel in the industrial as well as the service sector, and in industry as well with a significant growth of employees with advanced vocational diplomas. On the other hand, the need for more unskilled personnel is not consistently affected (Tables 5.11 and 5.12).

Table 5.12: Envisaged growth of labor force on different skill levels: contrasting firms operating under different degrees of competition (firms in the service sector).

Percentage of firms which envisage an expansion of staff with	Degree of price competition			Degree of quality competition		
	low	medium	high	low	medium	high
Academic degrees	26.4	22.6	17.7	15.6	21.2	25.6
Advanced diplomas	34.3	39.0	34.5	39.0	35.9	37.5
Apprenticeship	31.7	24.7	40.0	33.3	27.3	28.8
Unskilled	10.0	5.4	8.6	7.0	6.1	10.0
(N =)	(69)	(71)	(85)	(45)	(70)	(105)

Contrary to the popular theories asserting an irreversible shift from the secondary to the tertiary sector, it is evident from these data that in the case of Switzerland more industrial than service firms have been in the course of expansion in the period 1997-1999, particularly on the two lowest levels of skill. It might be suggested that intensive price competition inhibits the adjustment of skill levels to market requirements because cost-cutting pressures are so imperative that there is just not enough money available for hiring additional high wage employees. This assumption is corroborated by Table 5.13 which shows that significant positive correlations between quality competition and upskilling intentions only exist when the level of price competition is low.

Table 5.13: Correlations between intensity of quality competition and the planned expansion of staff on different skill levels: contrasting firms operating under different degrees of price competition

Quality competition / Percentage of firms which envisage an expansion of staff with	Degree of price competition	
	high	low
Academic degrees	+.06	+.19*
Advanced diplomas	+.06	+.26**
Apprenticeship	-.08	+.12
Unskilled	-.01	-.15
(N =)	(461)	(146)

* $p < .05$ ** $p < .01$

5.2.3 Firm size as an intervening factor

The theoretical expectations concerning the impact of price competition on staff skill levels is borne out only for smaller businesses, which tend to reduce academic employees and increase unskilled personnel when cost pressures are very high. (Table 5.14).

Table 5.14: Mix of Staff Skills and degree of price competition: contrasting smaller and larger firms.

Percentage of personnel with	Smaller firms (<30 employees)			Larger firms (>200 employees)		
	Degree of price competition			Degree of price competition		
	low	medium	high	low	medium	high
Academic degrees	8.1	5.8	4.5	2.6	6.3	4.4
Advanced diplomas	11.8	16.2	12.8	7.8	13.2	12.2
Apprenticeship	46.1	47.8	48.4	46.2	45.3	39.7
Unskilled	24.1	22.7	27.5	38.1	32.1	38.9
(N =)	(124)	(103)	(165)	(10)	(31)	(50)

Contrarily, larger firms show lowest shares of highly skilled staff (academicians as well as employees with advanced degrees) when price competition is low. But considering extremely few large firms face low levels of price competition, no secure conclusions from these figures can be drawn. In fact, the expected differences show clearly up when firms on medium and high competition levels are compared. On the other hand, the impact of quality competition is much more pronounced in larger than in smaller firms. Thus, the share of highly skilled personnel reaches extremely low levels in large enterprises exposed to low quality competition, while their percentage of unskilled employees is correlatively very high (Table 5.15). In

smaller businesses, the skill level is generally higher regardless of environmental conditions, and (with the exception of academic personnel) the effects of intensive quality competition – while pointing in the predicted direction – are too weak to warrant any valid interpretations.

Table 5.15: Mix of Staff Skills and Intensity of quality competition: contrasting smaller and larger firms

Percentage of personnel with	Smaller firms (< 30 employees)			Larger firms (>200 employees)		
	Level of quality competition			Level of quality competition		
	low	medium	high	low	medium	high
Academic degrees	4.4	4.3	8.4	2.4	4.5	6.6
Advanced diplomas	13.3	12.3	15.1	5.9	14.6	13.6
Apprenticeship	47.2	46.8	47.6	38.4	43.0	43.8
Unskilled	25.9	25.7	22.7	48.3	33.8	31.6
(N =)	(76)	(127)	(164)	(22)	(33)	(34)

All together, the findings support at least partially the hypothesis that larger firms have more leeway to adapt their human skills to environmental competitive conditions. When a firm is small, it still needs a certain nucleus of skilled employees for securing its primary functions even when product quality requirements are not very pronounced, and given its small absolute size, this nucleus will easily constitute a rather significant percentage of the whole staff. By contrast, larger firms can make use of various economies of scale (e. g. because the same highly-skilled persons can easily serve a much larger organization), and given their larger production output, they have far better possibilities to introduce Taylorist (= routinized and skill-saving) methods of production.

5.2.4 Organizational age as an intervening variable

On the lowest skill levels, older and newer firms show no differences in the way they adapt to the two modes of competition. Both samples show a similar tendency to *increase* the share of unskilled staff when intensive price competition prevails, and to *decrease* it when quality competition is dominant (Tables 5.16 and 5.17). This indicates that recently found firms are as well as traditional enterprises disposed to apply “Taylorist” methods of deskilling when they are forced (or allowed) to minimize costs in the sphere of human resources.

Table 5.16: Mix of staff skills and degree of price competition: contrasting older and younger Firms

Percentage of personnel with	Older firms (founded before 1930)			Younger Firms (founded after 1971)		
	Degree of price competition			Degree of price competition		
	low	medium	high	low	medium	high
Academic degrees	4.5	2.5	3.6	13.8	7.1	5.4
Advanced diplomas	9.0	11.9	10.3	12.3	15.8	12.7
Apprenticeship	52.7	47.0	44.7	42.5	46.6	41.8
Unskilled	23.4	33.1	35.5	26.8	23.2	34.8
(N =)	(22)	(92)	(111)	(26)	(112)	(91)

Table 5.17: Mix of Staff Skills and Intensity of Quality Competition: Contrasting Older and Younger Firms

Percentage of personnel with	Older firms (founded before 1930)			Younger Firms (founded after 1971)		
	Degree of quality competition			Degree of quality competition		
	low	medium	high	low	medium	high
Academic degrees	2.1	3.7	4.0	4.5	6.5	11.9
Advanced degrees	8.4	12.3	9.6	12.4	13.9	17.4
Apprenticeship	46.9	45.4	51.2	44.6	44.4	42.7
Unskilled	37.3	32.5	28.2	32.5	28.1	24.7
(N =)	(54)	(126)	(36)	(45)	(130)	(47)

On the other hand, they diverge highly in the degree to which they adapt their labor force on higher levels of skill. When newer firms face low price competition or high quality competition, they primarily expand their highest skill segments (employees with advanced or academic degrees), while older firms mainly increase their second-lowest skill segment: personnel with ordinary vocational education.

This finding is highly consistent with Stinchcombe's hypothesis that under all environmental circumstances, older firms are perpetuating structural attributes they have acquired "genetically" at the time of their birth; and that one of these traits is a rather low share of highly educated staff (Stinchcombe 1965).

Thus, we might cautiously conclude that older firms are characterized by internal inertias which limit their capacity to upgrade their performances by make use of higher educational knowledge. Instead, they tend to shift these burdens on personnel with rather low vocational education. By doing this, they may well be able to offer "solid reliable quality" typically associated with craft-like productions, but not well capable of implementing any product or process innovations which have to be considerably based on sophisticated R & D.

5.2.5 Market dynamics and organizational development as intervening variables

The same competitive conditions may affect organizational structures, strategies and processes very differently under conditions of current (or envisaged) expansion, stagnation or decline. Thus, firms operating in *shrinking markets* have little leeway to adapt on the level of personnel, because future earning perspectives are not bright enough to hire expensive additional employees. Downsizing firms in particular have little opportunity to change their staff composition in the direction of higher skills, because dismissals have often to be made by other criteria than qualification (e. g. by rules of seniority). Under *expanding conditions*, firms have much more room for rational adaptation because they can decide precisely what kind of additional personnel they want to recruit; and they will be quite well disposed to commit themselves to highly paid employees (who usually have to be guaranteed long-term security of their jobs). Consequently, it is not surprising to find that the share of highly qualified personnel is highest under conditions where quality competition is high and price competition is low (Table 5.18a/b).

Table 5.18a: Percentage of *employees with academic degrees* in firms with different combinations of price and quality competition: contrasting firms in expanding vs. shrinking markets.

Degree of price competition:	Firms in expanding markets			Firms in shrinking markets		
	Degree of quality competition			Degree of quality competition		
	low	medium	high	low	medium	high
low	8.8	2.5	14.7	4.5	4.2	2.6
medium	10.3	5.8	4.1	3.5	1.5	2.1
high	1.6	8.0	5.7	1.9	2.6	5.8
(N =)	(36)	(50)	(94)	(86)	(119)	(165)

Table 5.18b: Impact of price and quality competition on the percentage of employees with academic or advanced degrees: contrasting firms in expanding and in shrinking markets (Linear Regression Models).

		Non-standardized B	Stand. BETA	t-value	Sign.	Adjusted R Square (sign.)
Expanding Markets (N = 179)	Constant	21.205		2.952	.004	.054 (.007)
	Price competition	-2.977	-.150	-2.041	.043	
	Quality Competition	3.456	+.189	2.584	.011	
Shrinking Markets (N= 367)	Constant	7.732		2.130	.034	.013 (.092)
	Price Competition	.434	+.032	.622	.554	
	Quality Competition	1.390	+.106	2.031	.043	

Under such circumstances, firms evidently are at the same time *urged* to upskill their staff (in order to secure high-level quality) and also *able* to adapt in this way (because cost pressures are rather low). Symmetrically, lowest shares are found when intensive price (and cost) pressures combine with low quality-related competition.

In shrinking markets, firms of almost all categories hold a lower percentage of academic staff. They also minimize such expensive employees when prices are highly contested and quality competition not too intensive, but – diametrically opposed to expanding markets – they keep them also on low levels when quality competition is high. Symmetrically, low-skilled work forces as a correlate of *low* quality competition are also somewhat most frequently found in firms operating in expanding markets (Table 5.19a and 5.19b).

This can easily be explained within the framework of traditional theories of industrial organization. The traditional Fordist paradigm implies that when firm have to cut costs in order to maintain competitive prices, they do this by implementing “Taylorist” structures resulting in higher formalization, centralization and role specialization and (at least on subordinate levels) in a general downgrading of demanded skills. In addition, this view implies (at least implicitly) the assumption that markets are ever expanding, so that it pays out to invest in such heavy-handed strategies of reorganization (there are good chances that the resulting rigid structures can be maintained), and that the resulting large-scale mass production will be absorbed.

When markets are stagnating or shrinking, these conditions are no longer fulfilled. Instead, high price competition may enforce lean (or “Toyotist”) production styles which allow to produce craft-like customized goods (demanding rather highly skilled personnel) on reasonable low levels of total cost. Therefore, it is to be expected that only expanding firms in expanding markets show a clear tendency to react to price competition with a major deskilling

of their staff. This hypothesis is clearly borne out in Table 5.19a and 5.19b which show highest effects of price competition on the share of unskilled personnel when markets are in expansion. Under shrinking conditions, the degree of quality competition evidently has no impact when price competition is low, and when it is high, the theoretically expected effects are visible, but rather weak (Tables 5.19a and 5.19b)

Table 5.19a: Percentage of *unskilled employees* in firms with different combinations of price and quality competition: comparing firms in expanding and shrinking markets.

Degree of price competition	Firms in expanding markets			Firms in shrinking markets		
	Degree of quality competition			Degree of quality competition		
	low	medium	high	low	medium	high
low	34.6	16.6	21.9	26.1	35.5	28.2
medium	35.9	28.4	23.0	37.5	29.2	30.8
high	52.3	31.1	28.8	41.6	33.8	35.3
(N =)	(36)	(50)	(94)	(86)	(119)	(165)

Table 19b: Impact of price and quality competition on the percentage of unskilled employees: contrasting firms in expanding and in shrinking markets. (Linear Regression Models).

		Nonstandardized B	Stand. BETA	t-value	Sign.	Adjusted R Square (sign.)
Expanding Markets (N = 179)	Constant	30.448		3.351	.001	
	Price competition	4.013	+.158	2.175	.031	.069
	Quality Competition	-5.181	-.222	-3.062	.003	(.002)
Shrinking Markets (N= 367)	Constant	30.975		4.390	.000	
	Price Competition	2.557	+.098	1.888	.060	.017
	Quality Competition	-2.494	-.097	-1.875	.062	(.042)

Overviewing all these findings, it seems safe to conclude that expanding markets provide a more propitious environment than shrinking markets for adapting the labor force to external competitive needs.

In the following, this same hypothesis is additionally tested by analyzing the joint impact of competition and market conditions on the expansion of staff envisaged for the subsequent time period (1998-00). While it has to be expected that firms which operate in expanding markets are more likely to envisage a general expansion which implies additional recruitments on all levels of skill, we additionally expect that they are more responsive to their environmental conditions. Again, the main reason is that expanding companies are better able to optimize their staff because they are basically free to hire exactly the personnel they need, while shrinking firms risk to get an ever more maladaptive staff mix because various rigid norms and nonfunctional selection criteria (e. g. seniority, age, family status) have to be observed when employees are dismissed.¹³ Furthermore, we might guess that they are focusing this upsizing disproportionately on higher levels of skill, because market expansion in itself typically goes along with many complex problems (e. g. dealing with new products and cus-

¹³ Some firms even try „painless“ strategies by not replacing employees who voluntarily leave – what implies that downsizing results cannot be controlled and predicted at all.

tomers, facing unpredictable new competitors etc.) which require the application of sophisticated knowledge and skills.

As shown in Table 5.20, all these theoretical expectations are basically borne out. Thus, very few firms in contracting markets intend to hire additional academic staff in the coming years, and this reluctance does not diminish when they have to cope with intensive quality competition. Under expanding conditions, about a quarter of all enterprises plan new academic recruitments when quality competition is low, and half of them when it is very high. On the other hand: while staff with advanced diplomas is also less often increased when markets are shrinking, a similar positive correlation with quality competition holds as in expanding markets.

Table 5.20: Level of Quality Competition (1995) and expected growth of labor force on different skill levels (1998-00): contrasting firms in expanding and in shrinking markets

Percentage of firms which envisage an expansion of staff with	Expanding markets			Shrinking markets		
	Degree of quality competition			Degree of quality competition		
	low	medium	high	low	medium	high
Academic degrees	26.4	27.7	50.0	10.5	17.1	8.1
Advanced diplomas	47.1	52.4	56.4	24.4	36.0	32.6
Apprenticeship	41.7	44.9	37.5	41.6	41.6	33.3
Unskilled	24.2	14.7	13.9	11.4	11.3	16.3
(N =)	(34)	(94)	(36)	(67)	(176)	(37)

When firms in contracting markets want to grow, they are most likely to do this on the second-lowest skill level (employees with apprenticeship), particularly when quality competition is so low that no additional staff with advanced degrees is necessitated.

Finally, it is interesting to note that intentions to supplement additional *unskilled personnel* are most prevalent when firms operate in expanding product markets under low quality competition, and that they decline sharply when quality competition is high. In shrinking markets, firms seeking unskilled staff are almost as infrequent as those seeking employees with academic degrees (Table 5.20).

To summarize, it can be concluded that “market development” has to be treated as a causal variable and as an intervening variable at the same time. As a *causal factor*, it offers an environment which (1) facilitates changes in skill mix on all levels, but (2) necessitates to concentrate new recruitments on rather high levels of skill. And as an *intervening variable*, expanding markets seem to widen the space enterprises have available for far-reaching adaptations on the level of human resources, while shrinking markets provide constraints which reduce a firm’s capacity to deal effectively with high levels of quality competition.

5.2.6 Domestic vs. international market orientation as an intervening variable

While domestically oriented and exporting firms tell us that they are exposed to roughly similar degrees of quality competition, the factual pressures resulting from it may nevertheless not be the same. Thus, export-oriented businesses are much more likely to face the world’s most qualified and dangerous competitors existing within their field: challengers equipped with far higher staff skills and far superior resources for R & D.

In fact, the findings show that the theoretically expected relationships between quality competition and staff skill levels are significant exclusively in the case of outspoken export businesses selling more than 60% of their total output abroad. While firms with the next lower export rates (30-60%) still show weaker (statistically not significant) correlations pointing in the same direction, fully domestic enterprises don't show any statistical relationships at all (Table 5.21). These highly consistent results strongly corroborate the hypothesis that export orientation is a necessary precondition for quality competition to have any influence on the composition of a firm's human resources.

Table 5.21: Correlations between the intensity of quality competition and the percentage of different skill segments in the firm's labor force: contrasting firms with different share of exports (Pearson Correlation Coefficients).

Degree of quality competition / percentage of personnel with	Percentage of goods/services exported			
	0	1-30%	31-60%	> 60%
Academic degrees	+0.05	+0.11	+0.22	+0.23*
Advanced diplomas	+0.02	-0.01	+0.04	+0.25**
Apprenticeship	+0.04	-0.01	+0.14	+0.06
Unskilled	-0.07	-0.07	-0.12	-0.23*
(N =)	(252)	(174)	(61)	(112)

* $p < .05$ ** $p < .01$

5.2.7 Comparing successful and less successful firms

In order to identify functional relationships between competition pressures and optimal forms of organization, it is useful to look at the more successful firms, because these are most likely to be adequately adapted to their current environmental challenges. In the case of unsuccessful businesses, on the other hand, at least one reason for failure may lay in their lack of adaptive responses on the level of human resources, caused by inertia, inadequate perception of needs, managerial deficiencies, or many other reasons.

As our survey contains no data about cash flow, profits or other conventional measures of economic success, we have to rely on the *recent development of sales* as a near proxy. Thus, we assume that firms which have increased their turnover in recent years are "successful", despite the fact that their expansion can have exogenous sources (e. g. a general expansion of markets in their specific branch).

Similarly, we suppose that shrinking firms are more likely to be maladjusted, while acknowledging that even optimally structured businesses may be doomed when their markets are in general contraction. For example, the rather low direct correlations between quality competition and skill levels may be explained by the fact that many firms do not adapt "rationally" to their perceived environmental conditions: either because they maintain traditional low-skill technologies and structures, or because they don't find (or have not yet found) enough high-level employees on the labor market. If this is true, we could still find that firms failing to adapt would be "punished" by lesser economic success, while adaptive enterprises would be honored by increased opportunities to expand their sales.

On the empirical level, this hypothesis would imply that within the subsample of highly successful firms, quality competition is positively related to the skill level of staff, while no such correlations can be found in the case of stagnating or even contracting enterprises.

In accordance with these theoretical argumentations, successful (=expanding) firms show by far the highest correlations between intensity of competition and staff skill structures: thus supporting the hypothesis that they are most responsive to their specific environmental conditions. In this general respect, they contrast sharply with the shrinking businesses which show no significant correlations at all (Table 5.22).

Table 5.22: Correlations between the intensity of competition and percentage of different skill segments in the firm's labor force: comparing expanding and shrinking firms (Pearson Correlation Coefficients).

Intensity of competition / percentage of personnel with	Price competition			Quality competition		
	Development of sales (95-97)			Development of sales (95-97)		
	expansion	stagnation	shrinkage	expansion	stagnation	shrinkage
Academic degrees	-.13*	-.10	+.08	+.21**	+.06	+.10
Advanced diplomas	-.05	+.04	-.04	+.14*	+.21*	-.01
Apprenticeship	-.07	-.03	-.01	-.03	-.05	+.03
Unskilled	+.17*	+.11	+.04	-.15*	-.17*	+.02
(N =)	(276)	(194)	(105)	(265)	(189)	(102)

* $p < .05$ ** $p < .01$

Secondly, all statistical relationships among expansive firms are corroborating our theoretical expectations. Thus, high price competition is associated with fewer academic staff and more unskilled personnel, while the effects of high quality competition are exactly reversed. Evidently, the impact of quality competition seems more pervasive, because it also encompasses stagnating businesses and personnel with academic degrees.

Table 5.23 shows that in the case of quality competition, firm success has different correlates in the two economic sectors. In the case of industrial firms, the percentage of academic personnel seems to be a critical success factor when quality competition is high, while no negative effects seem to be associated with high shares of unskilled employees. In the tertiary sector, analogous tendencies can be found, but with reversed weights. When service firms operate under tight quality competition, their success seems to depend much less on a large share of *highest-skill*, but much more on a lowered percentage of *unskilled* employees. Evidently, there are no conditions under which the size of middle-skilled segments is associated in any way with economic success or failure.

Table 5.23 Correlations between percentage of staff on different skill levels (1997) and expansion/shrinkage of firm sales (1995-97): contrasting industrial and service firms under different levels of quality competition

Expansion of Sales / percentage of personnel with	Industrial firms		Service firms	
	Degree of quality competition		Degree of quality competition	
	high	low	high	low
Academic degrees	+.25**	+.09	+.13	+.06
Advanced degrees	+.17*	+.08	+.16	-.16
Apprenticeship	-.06	-.04	+.04	+.09
Unskilled	-.11	-.00	-.23*	+.16
(N =)	(163)	(193)	(111)	(128)

* $p < .05$ ** $p < .01$

On a theoretical level, it is evident that both types of competitions constitute highly different environmental constraints, so that firms which want to cope successfully with them are forced to follow highly divergent – even contradictory – strategies – on the level of their activities as well as on the level of personnel recruitment and organizational structure.

When intensive price competition creates an incentive to lower costs by hiring less skilled personnel, we may well assume that such strategies are only viable when lower skills are not harmful to sales because quality competition is low. And vice versa: when high quality competition makes it instrumental to expand employee segments with advanced and academic education, such upgradings can only be made when the minimization of costs is not imperative (because price competition is moderate or absent).

In fact, the correlation coefficients in Table 5.24 are highly compatible with these two arguments. They clearly demonstrate that

- 1) under intensive quality competition, the positive impact of academic personnel on firm success (measured as expansion of sales between 1995 and 97) is only significant when price competition is low;
- 2) under intensive price competition, higher shares of unskilled personnel have only a positive impact on business expansion when quality competition is low (Table 5.24).

Table 5.24: Correlations between percentage of staff on different skill levels (1997) and expansion/shrinkage of firm sales (1995-97): contrasting firms under different combinations of competition.

Expansion of Sales / Percentage of personnel with	Price competition high		Price competition low	
	Degree of quality competition		Degree of quality competition	
	high	low	high	low
Academic degrees	+.06	+.01	+.23**	+.10
Advanced degrees	+.19*	-.01	+.10	-.03
Apprenticeship	-.01	-.16*	-.07	+.04
Unskilled	-.09	+.16*	-.13	-.02
(N =)	(149)	(172)	(148)	(158)

* $p < .05$ ** $p < .01$

Thus, it can be concluded that at least on the level of human resources, both types of competition necessitate highly incompatible, mutual interfering strategies of adaptation, so that when both competitions are intensive, firms are in a rather ambiguous situation because no skill mix exists which would maximize survival and growth.

5.3. The scope of advanced training

While all firms try to cover their basic needs of qualification by recruiting personnel with the desired formal vocational education, this strategy alone will never be sufficient to procure all skills needed for optimal organizational performance.

First of all, the knowledge gained in formal vocational education is likely to be rather generalized, so that it does not take into account the highly particular needs of any concrete enterprises: needs related to their highly divergent production technologies, organizational char-

acteristics, marketing strategies, customer relationships etc etc. This gap is especially pronounced in the case of businesses with highly idiosyncratic technological systems (e. g. oil refinement or energy producing plants) or highly particularistic clients (e. g. private banking). As an implication of lean production methods and “total quality management” (aiming at continuous improvements of all procedures by means of intensive intraorganizational communication), the significance of this firm-specific sphere of knowledge seems to increase.

Secondly, formal vocational skills have been acquired sometimes in previous years, so that it is subject to obsolescence caused by technological and organizational as well as economic and cultural change. While firms in well-established branches and stable products (e. g. nourishments or textiles) may still offer roles which can be handled well by even older employees, more innovative businesses need new skills not (yet) provided in formal vocational education.

And finally, firms may not be able to recruit the optimum mix of skilled personnel:

- a) because strict job security standards preclude the possibility to get rid of inadequately qualified older employees in order to substitute them with more fitting younger personnel;
- b) because the needed personnel is not available on the current labor market.

Both of these reasons have been particularly salient for many Swiss firms in the last years (even in times of recession), because unemployment rates have remained low and particularly the supply of specialized technical personnel has been continuously short.

Given these insufficiencies, firms have to rely on additional (and partially also substitutive) strategies to secure all the needed qualifications. Almost all of them will rely on the most informal and least costly means: letting new entrants acquire experience “on the job” or charging supervisors and senior collaborators with the task of giving them the necessary advice and instructions. While such informal procedures are universally applied even in highly traditional settings in order to close the “gap of specificity” between generalized vocational skills and the highly idiosyncratic needs of the firm, they are not adequate when additional skills (e. g. related to new technologies or product markets) have to be produced. In such cases, formalized programs of advanced training become imperative: programs initiated and carried through either by the firm itself or by extraorganizational institutions.

Table 5.25 demonstrates that within our sample, more than 80 percent of all firms use such formalized procedures for upgrading their human resources. In both economic sectors, we observe that smaller firms are most likely to be completely unengaged or to commit themselves either to internal or external programs exclusively, while larger enterprises prefer to combine internal and external procedures.

Table 5.25: Percentages of firms making use of internal or external programs of formalized advanced training.

Mode of formalized advanced training	Industrial Firms			Service Firms		
	Firm size			Quality competition		
	Small (<30)	Medium (30-200)	Large (>200)	Small (<30)	Medium (30-200)	Large (>200)
None	29	16	2	24	14	9
Only internal	35	38	28	25	30	27
Only external	14	8	7	18	11	4
Both	22	38	62	34	44	60

The size factor seems more crucial in the industrial sector where 29% of all small firms (but only 2% of the largest) are totally unengaged on these formal levels of advanced training.

What relationships between the intensity of competition and the scope of advanced training have to be expected?

First of all, it can be hypothesized that high quality competition makes it necessary to enlarge such involvements, because – as stated by TQM¹⁴ philosophy – reliably high quality standards can only be maintained when most employees possess rather high specific skills (including an adequate understanding of the production process as a whole). *Secondly*, it might be guessed that too harsh price competition may curb a firm's capacity to provide advanced education, because such programs are costly (in terms of teaching expenses as well as in terms of lost working hours).

By combining these two propositions, we may deduce that involvement in advanced training reaches highest levels when quality competition is intensive and price competition low, while it will be lowest when the reverse conditions hold.

As shown in Table 5.26, both of these theoretical expectations are neatly borne out. In fact, the linear regression analysis strongly suggests that price and quality competition act as two independent countervailing causal factors. Following the notion of "slack resources" (as a prerequisite for advanced training) one step further, we could guess that such resources are particularly scarce when firms operate in shrinking markets where they have to expect diminishing earnings, while they may be sufficiently high even under intensive price competition when expanding markets promise rising sales. Additionally, firms with a pessimistic outlook (as well as their employees personally) may find commitments in advanced training less profitable because they judge it to be unlikely that such investments will ever have a sufficient return,

Table 5.26a: Percentage of staff included in programs of advanced vocational training and degree of competition (total sample)

Degree of price competition	Degree of quality Competition		
	low	medium	high
low	33%	40	43
medium	34	33	34
High	26	26	34

Table 5.26b: Impact of price and quality competition on the percentage of staff included in programs of advanced training (Linear Regression Models).

	Nonstandardized B	Stand. BETA	t-value	Sign.	Adjusted R Square (sign.)
Constant	36.183		6.487	.000	.022
Price competition	-3.197	-.11	-2.981	.003	(.007)
Quality Competition	2.737	.10	2.604	.009	

Again, these hypotheses are consistently corroborated by the percentage figures of Table 5.27a. As to be expected, enrollment in advanced training is generally lower under shrinking

¹⁴ Total Quality management

market conditions, and it is particularly low when such pessimistic perspectives coincide with a market where price competition is high and quality competition medium or low. On the other hand, highest percentages of staff are participating when markets are expanding and the most fortunate competitive constellation (low price and high quality competition) prevails.

Table 5.27a: Percentage of staff included in programs of advanced vocational training and degree of competition: contrasting firms in expanding and in shrinking markets.

Degree of price competition	Expanding markets			Shrinking markets		
	Degree of quality competition			Degree of quality competition		
	low	medium	high	low	medium	high
low	34%	45	54	28	32	36
medium	27	36	34	35	36	33
High	37	28	36	22	27	34

Nevertheless, there is no indication that price competition effects are neutralized when markets are in expansion; to the contrary, they are most pronounced in these cases (at least when quality competition is medium or high).

As can be inferred from the linear regression models, market expansion seems to be an intervening variable amplifying the impact of both types of competition on enrollment; while market shrinking seems to depress enrollment largely independent of competitive circumstances (Table 5.27b).

Table 5.27b: Impact of price and quality competition on the percentage of staff included in programs of advanced training: contrasting firms in expanding and in shrinking markets. (Linear Regression Models).

		Non-standardized B	Stand. BETA	t-value	Sign.	Adjusted R Square (sign.)
Expanding Markets (N = 179)	Constant	34.469		2.800	.006	
	Price competition	-4.249	-.13	-1.697	.093	.051 (.015)
	Quality Competition	5.789	.19	2.524	.013	
Shrinking Markets (N= 367)	Constant	28.375		3.730	.000	
	Price Competition	-1.257	-.05	-.22	.386	.010 (.183)
	Quality Competition	2.430	.10	1.708	.089	

Apart from market development, major differences might also be expected between export firms and firms focusing on domestic markets:

1) When exporting firms are exposed to high price competition, they are likely to be under extreme pressures to reduce costs (in order to succeed against cheap competitors from low-wage countries). Thus, their resources for advanced training may be very restrained.

2) When high quality competition prevails on international markets, it is likely that extremely high upgradings in performance have to be achieved in order to prevail against firms with much higher human resources and expenses for R&D. As a result, very high enrollment rates should be expected.

In order to test these hypotheses, two extremely contrasting subsamples (firms with pure domestic markets and firms very high shares of exports (more than 60%)) are compared. In

accordance with theoretical expectations, Tables 5.28a and 5.28b demonstrate that the causal effects of both price and quality competition are higher for heavily exporting businesses than for purely domestic firms – while the average involvement rate isolated from competitive effects is almost the same.

Table 5.28a: Percentage of staff included in programs of advanced vocational training and degree of competition: contrasting firms selling on domestic and on international markets.

Degree of price competition	Mainly international markets			Only domestic markets		
	Degree of quality competition			Degree of quality competition		
	low	medium	high	low	medium	high
low	30%	43	46	33	40	39
medium	33	32	32	37	33	36
High	20	26	34	27	27	35

Table 5.28b: Impact of price and quality competition on the percentage of staff enrolled in programs advanced training: contrasting firms selling on domestic and on international markets (Linear Regression Models).

		Non-standardized B	Stand. BETA	t-value	Sign.	Adjusted R Square (sign.)
Mainly international Markets (N = 179)	Constant	34.425		3.943	.000	.035 (.006)
	Price competition	-3.921	-.14	-2.376	.018	
	Quality Competition	3.348	.13	2.224	.028	
Only Domestic Markets (N= 367)	Constant	35.475		4.780	.000	.020 (.036)
	Price Competition	-2.671	-.10	-1.851	.065	
	Quality Competition	2.881	.11	1.968	.050	

Thus, international markets seem to function as amplifiers: by dramatizing the differences between high price low-quality competition firms (with minimal involvement rates of 20%) and businesses confronted with reverse conditions which show the highest values of all sub-samples (46%). Any firm's commitment to advanced training will not only be conditioned by environmental (e. g. competitive) conditions, but as well by various intraorganizational factors. In particular, it might be suggested that involvement rates co-vary positively with the skill level of the labor force, because higher-skilled employees are usually better able to acquire new knowledge: particularly in programs which heavily rely on theoretical materials and on self-directed learning. Very often, high educational certificates are not demanded because they go along with specific knowledge and competences, but because they indicate that a person has been (and will continue to be) motivated and capable of internalizing and mastering considerable packages of knowledge and/or because besides specific contents, generalized "learning-to learn" capabilities have been acquired). In addition, positive correlations may also result from the fact that intraorganizational programs for advanced training can be more encompassing when a large number of highly educated employees are available for teaching purposes.

In accordance with these hypotheses, Table 5.29 clearly indicate that when competitive intensity is controlled, enrollment figures are still positively related to the percentage of staff

with academic or advanced vocational degrees, and negatively correlated with the share of unskilled employees.

Table 5.29: Correlations between the percentage of staff involved in advanced training programs and the percentages of different skill levels among employees: according to the degree of price and quality competition.

Percentage of personnel with	Degree of price competition		Degree of quality competition	
	high	low	high	low
Academic degrees	+.12*	+16*	+.22**	+.09
Advanced degrees	+.18**	+.26**	+.17**	+.09
Apprenticeship	+.09	-.03	+.11	+.03
No vocational skills	-.20**	-.27**	-.26**	-.20
(N =)	(313)	(169)	(286)	(131)

* $p < .05$ ** $p < .01$

But it also shows that the strength of these correlations is systematically related to the mode and intensity of competition. Evidently, correlations are *more* pronounced when price competition is low than when it is high; but *less* pronounced when quality competition is low (rather than high). The *first* of these regularities is easily explained by considering that intensive price competition reduces the availability of slack resources, so that *capacities* for advanced training are generally reduced (e. g. higher skilled employees are too much absorbed by regular production activities, so that they have no time for teaching). And the *second* finding conforms well to the assumption that low quality competition reduces the *need* for advanced training, because upgrading performance is not an imperative goal.

Similar to recruitment practices, programs of advanced training are not automatic responses to competitive (or other environmental) circumstances, but deliberate firm policies which may be enacted too late or not at all, or which may even go in a counteradaptive direction.

Thus, correlations between competitive intensities and shares of involvement may well be diminished by all firms not behaving in such a “rational” manner. Nevertheless, such maladaptive businesses may be punished by stagnating or even shrinking earnings, while “adaptive” enterprises may be rewarded by growth. If this argumentation is true, the expected correlation between competition and enrollment should turn out to be higher in the subsample of successful firms. For testing these proposition, correlations between competitive intensity and advanced training enrollments were calculated separately for expanding, stagnating and shrinking firms. These hypotheses are only weakly borne out by the findings in Table 5.30.

Firms in the service sector are conforming insofar as expanding businesses show the expected positive correlation between quality competition and enrollment, while stagnating and shrinking firms even tend to the negative. But industrial enterprises evidently not behaving in this way, and responsiveness to price competition seems generally unrelated to business success. Thus, we might provisionally draw the conclusion that enlarging advanced training helps service enterprises to succeed when competition demands to upgrade quality standards, while similar advantages are not accruing to industrial producers.

Table 5.30: Correlations between the intensity of competition and the percentage of staff enrolled in programs of advanced training: expanding and shrinking firms in the industrial and the service sector (Pearson Correlation Coefficients).

Intensity of Competition/ Percentage of staff in ad- vanced education	Price competition			Quality competition		
	Development of sales (95-97)			Development of sales (95-97)		
	expansion	stagnation	shrinkage	expansion	stagnation	shrinkage
Industrial Sector (N =)	-.01 (129)	+.01 (88)	-.17 (100)	+.02 (125)	+.14 (84)	+.13 (97)
Service Sector (N =)	-.12 (103)	-.13 (59)	-.01 (74)	+.24* (96)	-.15 (59)	-.08 (70)

* $p < .05$ ** $p < .01$

5.4 The scope of introductory training

In addition to the various formal and informal qualifications internalized in antecedent processes of socialization and education, every job also requires highly specific role-related skills which can only be acquired by practicing it for a certain time. Thus, routinized behavioral habits are necessary in order to handle the specific tools and machineries with maximum efficiency and reliability and a minimum of fatigue, and detailed knowledge about organizational procedures and informal collaboration networks has to be gathered in order to solve problems effectively and in accordance with established rules.

Of course, the average time needed for acquiring these operative skills depends on a multitude of different variables: with environmental conditions and technological factors as well as with cooperative arrangements within work units and cultural and structural characteristics of the encompassing organization. Thus, quite extended introductory phases are needed in organizations which provide a large variety of hand-tailored services to a variety of highly different customers (e. g. advertizing agencies or business-counseling firms) or in rather small traditional production settings where handicraft-like production methods are still in use. On the other hand, minimal initial work experience is required in common retail stores selling standardized consumer items or in highly "Taylorized" firms engaged in large-batch mass production on the basis of highly specialized and simplified roles.

In order to tap this most specific dimension of work skills, our managerial informants were asked how many days of initial work experience were needed on the average for filling out "typical roles on the operative level" within their firm, and whether this introductory time period has become longer or shorter within recent years. By focusing on roles of lower operative levels, it can be expected that the learning time indicated will co-vary mainly with the overall organizational methods applied in the production department, but much less with the conditions in more specialized functions (e. g. in administrative or marketing units) and on higher (e. g. professional or managerial) levels.

Consequently, we have good reasons to speculate that

1) Intensive price competition goes along with rather short introductory periods (particularly when quality competition is low, because cost-saving Taylorized production methods (facilitating flexible hire-and-fire policies) will prevail.

2) Intensive quality competition will cause longer learning time because average operative roles demand rather sophisticated skills and because firms rely on TQM-methods which imply a sharp increase in “tacit knowledge” particular to the specific firm.

As seen in Table 5.31, these expectations are only partially borne out. In the industrial sector, two consistent regularities stand out: introductory time is evidently lowest when quality competition is absent and price competition is moderate or high; and the positive effect of quality competition on operative role complexity is much higher when price competition is moderate than when it is high.

Table 5.31 Average number of working days new entrants need for becoming efficient and routinized workers. under various competitive conditions: contrasting industrial and service enterprises.

Degree of price competition	Industrial sector			Service Sector		
	Degree of quality competition			Degree of quality competition		
	low	medium	high	low	medium	high
low	96	75	57	49	44	95
medium	51	77	107	108	68	76
High	54	64	63	53	70	83

* Summative index based on the 12 skills shown in Tables 4.4 (scale from 0 to 12).

On the other hand, rather long periods for acquiring work experience are also needed when competitive pressures in both dimensions are low. This indicates that apart from competition, there may be a second basic cause for extended learning periods: traditional handicraft-like production methods which have best survived in rather “protected” businesses little affected by competitive pressures. Such traditional residuals may be less present in the service sectors where low learning requirements prevail when both modes of competition are absent. Service firms also show pronounced positive effects of quality competition but (diametrically opposed to industrial companies) only when price competition is either high or low. In contrast with industrial firms, they also don’t seem to “Taylorize” their roles structures when price competition is high.

The effects of both quality and price competition are very much amplified when firms operate in expanding markets, while they almost vanish when they face stagnating or shrinking conditions. (Table 5.32).

Table 5.32 Average number of working days new entrants need for becoming efficient and routinized workers under various competitive conditions: contrasting firms in expanding and shrinking markets.

Degree of price competition	Expanding markets			Stagnating/Shrinking markets		
	Degree of quality competition			Degree of quality competition		
	low	medium	high	low	medium	high
low	73	71	83	67	55	64
medium	69	71	136	79	73	64
High	37	83	99	53	64	60

In particular, very simple operative roles seem to prevail when growing markets go along with low quality and high price competition. This accords well with the hypothesis that ex-

panding markets offer best chances to introduce Taylorist production methods, because large-scale mass production is possible and even highly expensive investments in complex technologies and organizational designs are likely to pay out in the near future.

On the other hand, such role-simplifying strategies seem to be much hampered when firms operate on international markets. Under all competitive conditions, exporting firms report longer periods of initial role socialization than firms which sell their products or services exclusively on domestic markets (Table 5.33). This may at least partially be due to the fact that most exporting firms sell their services or products to other corporations: i. e. highly qualified customers which usually articulate higher quality demands than typical individual consumers.

Table 5.33: The impact of competitive intensity on the number of working days needed for becoming a fully productive, efficient worker: contrasting exporting and non-exporting firms.

Degree of price competition	Exporting firms			Non-exporting firms		
	Degree of quality Competition			Degree of quality Competition		
	low	medium	high	low	medium	high
low	120	67	81	46	54	64
medium	57	81	95	98	56	83
High	61	61	74	46	75	63

Finally, it is not surprising to find that “Taylorist” reaction strategies to high-price / low quality competition are much more pronounced in the case of larger firms (Table 5.34). Evidently, certain levels of large-scale production have to be reached in order to make investments in such cost-saving methods economically feasible. In smaller firms, deskilling is hampered by the fact that everybody around has (at least sometimes) also to deal with more sophisticated tasks.

Table 5.34: The impact of competitive intensity on the time needed for becoming an efficient and routinized worker. (number of working days): Contrasting smaller and larger firms.

Degree of price competition	small firms (less than 30 employees)			large firms (more than 200 employees)		
	Degree of quality competition			Degree of quality competition		
	low	medium	high	low	medium	high
low	74	53	75	95	33	43
medium	75	74	104	58	70	109
High	61	68	77	33	57	88

Concerning the amount of introductory training, informants were additionally asked whether the average time needed to become a fully productive worker has recently increased, decreased or remained on the same level. Given that 41% of all businesses reported an increase (and only 6.6% a decline), the conclusion is warranted that within most economic settings, work roles are currently becoming more complex and demanding (e. g. because of measures of downsizing or lean production) while conventional “Taylorist” strategies of role simplification are restricted to rather few (mostly larger-sized) firms.

In full accordance with theoretical expectations, firms which face intensive quality competition are most likely to have complexified their roles, particularly in cases where price competition is low or absent. (Table 5.35).

Interestingly, expanding firms seem well able to adjust role demands to high quality competition even when price pressures are very high, while stagnating and shrinking businesses are only responsive when price competition is very low (Table 5.36). Seen from another angle, these findings may indicate that when a firm operating under high quality competition and price competition is still able to install more demanding work procedures, it is probably highly productive and likely to expand.

Table 5.35: Percentage of firms in which the time needed for mastering operative work-roles has recently increased: comparing industrial and service firms facing different intensities of competition.

Degree of price competition	Industrial Sector			Service Sector		
	Degree of quality competition			Degree of quality competition		
	low	medium	high	low	medium	high
low	42	33	61	13	39	50
medium	31	48	44	57	33	42
high	40	53	51	19	44	42

Table 5.36: Percentage of firms in which the time needed for mastering operative work-roles has recently increased: comparing expanding and nonexpanding firms facing different intensities of competition.

Degree of price competition	Expanding firms			Non-expanding firms		
	Degree of quality Competition			Degree of quality Competition		
	low	medium	high	low	medium	high
low	35	53	59	19	24	55
medium	38	48	47	43	42	42
high	40	55	60	32	40	37

5.5 The Impact of Competition on the importance of various skills

By focusing exclusively on the formal level of vocational education, the antecedent empirical analysis was severely insufficient to grasp the full impact of competitiveness on the requirements for skills. First of all, it has to be acknowledged that preferences for formal certificates are also (and in some cases foremost) determined by status considerations and/or specific occupational traditions, not by functional necessities associated with specific environmental conditions, work problems and organizational roles. And secondly, many essential work skills are “informal” in the sense that they can either be acquired outside formal educational settings (e. g. foreign language or computer skills) or not be systematically acquired at all (e. social competencies and character-related skills).

In order to understand more fully how competition impinges on the work skill requirements on the level of specific roles, our managerial informants were asked to evaluate the importance of 26 different work skills for average employees working in their company on the operative level (on a five-point scale ranging from 0 (= absolutely unimportant) to 4 (=absolutely indispensable)).

While knowing that competitiveness may have a more direct and stronger impact on particular boundary roles (particularly on the managerial level), we may still hypothesize that pure

intraorganizational functions and lower operative levels may also be affected – at least insofar as they are shaped by their organizational strategies, structures, procedures and technologies which are in turn determined by the competitive environmental conditions.

On a most general level, we may hypothesize that high *price competition* lowers the requirements and narrows the range of required skills, because it gives rise to cost-saving (Taylorist) production strategies which are associated with rather specialized, routinized and undemanding roles. In particular, we expect that more generalized skills not immediately related to the job should get lower ratings, because they have no place in rigorously structured production systems where the skill demands of all work roles are invariant and explicitly known in advance.

Quality competition, on the other hand, can be expected to broaden the range and raise the level of required skills, because sophisticated workers are needed for upgrading quality levels of products and services and maintaining high regular standards during time. In particular, the new “Total Quality Management” methods imply that all employees on all levels are drawn into firm-wide learning processes in order to increase continuously their understanding of production processes as well as their personal qualifications: a strategy which in turn presupposes that employees are skilled enough to acquire additional skills.

As seen from Table 5.37, most of the respective correlations coefficients are disappointingly low or insignificant, at least some of these expectations are borne out.

Table 5.37: Correlations between intensity of competition and the importance of various skills for ordinary operative employees: industrial and service firms and total sample.

Type of skill:	Industrial Firms		Service firms		All firms	
	Price Comp.	Quality Comp.	Price Comp.	Quality Comp.	Price Comp.	Quality Comp.
General education	-.11*	+.11*	-.06	+.10	-.14**	+.11*
Foreign Languages	-.01	+.08	-.16*	+.06	-.11*	+.07*
Computer skills	-.05	+.10*	-.15*	+.05	-.13**	+.11*
Special vocational knowledge	-.08	+.08	-.02	+.03	-.06	+.04
Longer-term work experience	-.03	+.01	+.05	+.04	-.02	-.01
Manual dexterity	-.01	-.09	+.14*	+.04	+.11**	-.08*
Planning and organization skills	-.07	+.04	-.07	+.10	-.10**	+.06
Communicative skills	-.04	+.14*	-.14*	+.08	-.11**	+.08*
Skills to cope with conflicts	-.02	+.07	+.01	+.14*	-.02	+.10**
Creativity, innovativeness	-.09	+.07	+.02	+.08	-.05	+.09*
Autonomy, self-guidance	-.17**	-.04	-.03	+.03	-.11**	-.01
Flexibility	-.08	+.03	+.03	+.17**	-.04	+.11**
(N =)	(442)	(430)	(305)	(296)	(831)	(806)

* $p < .05$

** $p < .01$

Looking at the entire sample, high price competition has evidently the effect of lowering the salience of rather generalized skills which are only weakly related to the specific job: (general education, foreign languages, computer skills and communicative skills), while these same qualifications are more required under intensive quality competition. The lower demand for planning and organizing skills and for “self guidance” capacities underlines the assumption that intensive price competition goes along with Taylorist production methods associated

with highly controlled and restrictive roles. “Manual dexterity” (the skill most tightly associated with concrete work behavior) is the only qualification boosted by such conventional socio-technical systems.

Quality competition, the other hand, seems to raise the need for personal creativity and flexibility as well as for various social qualifications needed for the maintenance of highly communicative and team-oriented structures.

Many of these correlations vanish or become insignificant when the total sample is broken down into industrial and service organizations. Thus, the negative impact of price competition on the need for foreign languages and computer skills (and its positive correlation with manual skills) is seen exclusively in the tertiary sector, while its lowering effect on general education and self-guidance seems to be restricted to industrial firms. Similarly, quality competition seems to have divergent consequences: increasing primarily the need for computer and communicative skills in the industrial sector and the demands for flexibility and conflict resolution skills in the service branches (where dealing with customers is the foremost operative task). Interestingly, neither the salience of special vocational knowledge nor the requirements for longer-term work experience are in any way affected. These two items may well be seen as core competencies intrinsically related to the production of goods and services alike: so that they maintain their foremost significance irrespective of competitiveness (or other environmental factors).

Given that the general downskilling effect associated with Taylorist production methods, it might be expected that the total scope of required competencies is lower when intensive price competition prevails. On the other hand, this effect may well be weakened or neutralized when firms face high quality competition at the same time, because this would force them to maintain rather high skill levels despite the pressures to cut labor costs. Consequently, we expect lowest skill diversity when price competition is high and quality competition rather low.

For testing this hypothesis, we calculate a summative index which expresses how many (out of 12) competencies are considered to be “essential” or even “indispensable” for doing the average operative jobs. Conforming to our theoretical expectations, the results of Table 5.38 show that the required diversity of skills declines with increasing levels of price competition, and that this effect is most pronounced when quality competition is low.

In the industrial as well as in the service sector, price-competing firms are only able to perfectionize cost-cutting Taylorist procedures when they don’t face countervailing upskilling pressures stemming from quality competition. Older firms (founded 1930 or before) are most likely to keep skill demands minimal when they operate under medium or high price competition. This indicates that they have realized classical principles of Taylorist organization more pervasively than younger firms which seem to be committed to more homogeneous higher-skill work forces even when cost pressures stemming from price competitiveness are rather high.

As elaborated above (see 5.2.6), *export orientation* may be considered a salient intermediary variable which moderates the causal impacts of competitive intensity on the requirement for human skills. Thus, highly pronounced price as well as quality competition may create more profound problems for exporting firms than for enterprises which produce for domestic markets, because when competitors originate from many different countries, at least some of them are likely to be highly superior in efficiency, innovativeness or any other salient trait. Consequently, correlation coefficients between competitiveness and skill demands should be higher in internationally oriented than in pure domestic firms.

Table 5.38: The impact of competitive intensity on the average number of skills* which are rated to be “essential” or “indispensable” for ordinary operative employees**1) Contrasting industrial and service enterprises**

Degree of price competition	Industrial sector			Service Sector		
	Degree of quality Competition			Degree of quality Competition		
	low	medium	high	low	medium	high
low	6.2	5.0	5.5	6.5	5.9	7.0
medium	5.3	6.1	5.5	5.6	6.3	6.0
High	4.0	5.4	5.2	4.8	5.7	6.7

5) Contrasting older and younger firms

Degree of price competition	Old firms (founded before 1930)			New firms (founded after 1971)		
	Degree of quality competition			Degree of quality competition		
	low	medium	high	low	medium	high
low	5.8	4.9	5.6	6.1	6.5	7.1
medium	3.7	5.8	5.4	6.4	6.1	6.2
High	3.7	5.4	5.4	5.4	6.4	5.9

As shown in Table 5.39, this expectation is at least partially borne out. Thus, exporting firms are more likely to lower their demand for foreign language skills, computer knowledge planning and communicative skills, creativity and self-guidance capacities when they face high price competition.

Table 5.39: Correlations between intensity of competition and the importance of various skills for ordinary employees: contrasting exporting and nonexporting firms.

Type of skill	Exporting Firms		Nonexporting Firms	
	Price Comp.	Quality Comp.	Price Comp.	Quality Comp.
General education	-.11*	+11	-.11*	+.15**
Foreign Languages	-.13*	+10	-.06	+.06
Computer skills	-.12*	+.11*	-.08	+.11*
Special vocational knowledge	-.12*	+.06	-.06	+.05
Longer-term work experience	-.08	-.02	-.03	-.04
Manual skills	+.06	-.12	+.03	-.07
Planning and organization skills	-.15**	+.12*	-.04	+.02
Communicative skills	-.12*	+.09	-.04	+.05
Skills to cope with conflicts	-.07	+.13*	+.08	+.05
Creativity, innovativeness	-.12*	+.06	-.01	+.11*
Autonomy, self-guidance	-.17**	+.02	-.04	+.01
Flexibility	-.10	+.10	+.03	+.09
(N =)	(363)	(351)	(424)	(409)

* $p < .05$ ** $p < .01$

Instead, much less divergences are seen in the case of quality competition where only three out of 12 coefficients are significant in both subsamples.

Like in previous steps of our analysis, we may hypothesize that the correlative relationships between competitiveness and skill demands are weakened by those “irrational” firms which do not adequately perceive what skills are necessitated for adapting most successfully to their environmental conditions. Such informational deficiencies may be particularly severe here because managers cannot be supposed to have adequate insight into the specific work roles on the operative levels – especially in larger enterprises where they are physically and structurally quite removed from the subunits where the daily production of goods or services takes place.

Following these considerations, we can deduce that higher correlations would prevail in the subsample of more successful (=expanding) firms, because their market success may at least partially be conditioned by the fact that required job skills have been adequately perceived. In fact, this hypothesis is neatly corroborated in Table 5.40, at least for the case of price competition.

Table 5.40: Correlations between intensity of competition and the importance of various skills for ordinary employees: contrasting expanding and nonexpanding firms

Type of skill	Expanding Firms		Nonexpanding Firms	
	Price Comp.	Quality Comp.	Price Comp.	Quality Comp.
General education	-.20**	+08	-.11*	+.15**
Foreign Languages	-.18**	+.14*	-.06	+.06
Computer skills	-.17**	+.12	-.08	+.11*
Special vocational knowledge	-.10	+.04	-.06	+.05
Longer-term work experience	-.19**	+.17**	-.03	-.04
Manual skills	+.21**	-.12	+.03	-.07
Planning and organization skills	-.20**	+.17**	-.04	+.02
Communicative skills	-.12*	+.10	-.04	+.05
Skills to cope with conflicts	-.19**	+.07	+.08	+.05
Creativity, innovativeness	-.07	+.10	-.01	+.11*
Autonomy, self-guidance	-.17**	+.04	-.04	+.01
Flexibility	-.11	+.14*	+.03	+.09
(N =)	(285)	(275)	(445)	(436)

* $p < .05$

** $p < .01$

Thus, successful firms are much more likely to adjust their skill requirements to competitive relations: reducing their needs for a broad range of generalized skills on the one hand and raising it for manual dexterity on the other. Nonexpanding firms, on the other hand, show almost no reaction to price competitiveness, except by downgrading the importance of “general education”.

Concerning the impact of quality competition, no definite conclusions seem warranted: except by noting that successful firms are somewhat more prone to upgrade the salience of foreign language, organizational skills and flexibility, while stagnating or shrinking companies rely more on creativity and general education.

Thus, we might cautiously conclude that deskilling “Taylorist” rationalization strategies are (still) a highly functional for business success when price competitiveness is very pronounced, while “upskilling” strategies (e.g. associated with lean production methods) may prove not quite as functional when high quality standards have to be reached (or maintained).

6. Conclusions

Based on a contingency model of organizations which stresses the causal interrelationships between environmental constraints and intraorganizational structures, this paper has tried to corroborate the hypothesis that the degree of competition to which a firm is exposed in its sales markets has heavy impacts on its demand for staff skills and its disposition to upgrade such skills by advanced training.

Contrary to most previous studies which have treated “competition” as a one-dimensional concept, we have found good theoretical reasons to make an analytical distinction between the degree of price-related and quality-related competition, because they give rise to highly divergent problems and are likely to evoke quite contrary strategies of procedural and structural adaptations.

These hypotheses were clearly borne out by the empirical findings which showed that price and quality competition

- are two distinct environmental conditions with seemingly quite different antecedents, because they are only weakly correlated with each other;
- have highly contradictory effects on the dependent variables: so that almost zero overall effects are found when the two dimensions are not kept separated.
- display impacts which are highly differently mediated by a number of moderating variables (such as age or size of the firm).

Evidently, intensive price competition is the correlate of a cost-minimizing “Taylorist” strategy which is most prevalent in the segment of older and larger firms. Businesses of this sort rely heavily on unskilled employees, while showing little inclination to increase academic staff or to upgrade qualifications by advanced training. By contrast, intensive quality competition is most often found among younger and smaller enterprises: firms which then feel the need to make heavy investments in highly-skilled employees.

With increasing age, the firm’s sensitivity toward both competitive impacts seem to decline. Because of internal inertias or external “legitimation factors” which shield them from environmental impacts, they especially tend to maintain low percentages of academic personnel irrespective of their situational conditions.

There is an asymmetry in the causal status of both dimensions: in the sense that price competition acts as an overriding condition. Whenever it is high, firms seem to become insensitive to quality competition, because they may lack the “discretionary resources” needed for upgrading their skills.

For similar reasons, responses to quality competition are much more pronounced when firms operate in expanding (rather than shrinking) markets, and when they are themselves in a process of growth (rather than stasis or decline).

Firms operating in international markets also show increased sensitivities. Evidently, they are likely to be exposed to particularly challenging competitors on the price front as well as in the field of quality standards, so that they may face extinction when they are not ready (or not capable) to adapt.

While all firms certainly have the choice of adapting in the ways described or they may get punished when they don't. This conclusion is at least in accordance with the finding that successful (=expanding) businesses show higher correlations between competition and staff composition than unsuccessful (=stagnating or shrinking) firms.

Given the cross-sectional design of the empirical analysis, it is evident that no secure conclusions about the prevailing directions of causalities can be drawn.

While the time lag between the measurement of the *explanans* (1996) and the *explananda* (1998) is conforms with the older contingency paradigm which sees organizations as systems affected by given environmental conditions, there is still the possibilities that the correlations found can at least partially be explained the other way round: e. g. by the regularity that organizations are more likely to expose themselves to certain competitive market conditions when they possess a certain skill composition within their staff, or when they are characterized by a "learning culture" which encourages advanced training.

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