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The Competent Production Supervisor: A Model for Effective Performance

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The Competent Production Supervisor: A model for effective performance*

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Abstract

Applying non-parametric statistical analysis on data from 212 behavioral event and 44 repertory grid interviews, we develop a competency model for production supervisors in North East Italian firms. We identify four threshold and nine distinctive competencies. We offer insights on the relationship between these competencies and North East Italian firms' manufacturing capabilities. We provide insights on how to use competency tools to design skill development policies in industrial districts and implement effective human resource management practices in small and medium sized enterprises.

Keywords: production supervisors, competency, human resource development

1. Manufacturing: North East of Italy's core capability

During the last three decades, North East Italian firms have achieved market leadership in a variety of manufacturing sectors, including textiles, apparel, footwear, eyewear, air conditioning, industrial automation, furniture, goldsmith, food and winery, tannery and others. Firms like Benetton, Luxottica, Geox, Illy or industrial districts like those in Montebelluna (ski-boots), Belluno (eyewear), Vicenza (goldsmith and tannery), Udine (wood chairs and furniture), Padova and Verona (footwear and air conditioning), and Treviso (Apparel), have built a world leadership on their ability to design and produce innovative and quality products, to flexibly respond to market variability, and to remain competitive cost wise even *vis-à-vis* producers from low labor cost countries in East Asia and East Europe.

Thus, while manufacturing operations and jobs have rapidly declined or vanished in the US and other European Countries, North East Italian manufacturing employment has reached its peak in 2003, and at least up to 2003, skill shortage, not cost cutting, has been the major driver of production re-location from this region to East Europe and East Asia (Camuffo, Gerli, Romano and Vinelli, 2004).

This phenomenon and its causes have been widely researched in Italy and abroad (Locke, 1995; Corò and Grandinetti, 1999; Camuffo, Romano and Vinelli, 2001; Berger and Locke, 2002; Camuffo, 2003). Though diverse in terms of purpose, level of analysis and disciplinary perspective, these studies converge in identifying excellence in manufacturing as one of the drivers of this region's success. Moreover, they emphasize the role of network externalities, local institutions and social factors in shaping these capabilities, explaining how they grew and how skills and knowledge have been created, reproduced and diffused between and within firms (Belussi, Gottardi and Rullani, 2003).

However, while these studies focus on firms or industrial clusters as the unit of analysis, in small and medium enterprises (SMEs) organizational processes and management systems are usually not fully structured and a few key actors (the founder/owner, the family members, a few other managers or partners) play a dominant role. In these contexts, *individuals* – rather than organizational structures and management systems, represent the main and sometimes exclusive repository of knowledge, the prevalent nature of which being personal and tacit.

We study the personal abilities of production supervisors, who, as part of middle management, represent a key category of these individuals, play a relevant role in every production organization and are particularly critical in SMEs.

Using behavioral event and repertory grid interviews, we develop a competency model for North East Italian production supervisors. We use standard non-parametric statistical analysis to show what competencies they apply in performing their job, and which ones characterize superior performance. We offer insights on the nature of North East Italian manufacturing capabilities and provide a ground for human resource development and local labor market policies.

The study is organized as follows: section 2 briefly reviews management literature on the role and competencies of production supervisors and, more in general, middle managers within business organizations. Section 3 presents the competency-based framework and defines the theoretical model underlying the study. Section 4 describes the research design, data, sample and methods. Section 5 presents and discusses the findings. Section 6 draws some research and policy implications.

2. Production supervisors: role and competencies

Though a classic topic in organization studies (Roethlisberger, 1945), the role of production supervisors and, more generally, middle managers, becomes a “hot topic” in management literature in the early 1980s, when, eventually, a series of studies begin to analyze systematically these actors and the potential relevance of their contribution to organizational performance.

As regards the broader category of middle managers, Kanter's groundbreaking work (1982 and 1983) firstly launches the idea that “it's the folks in the middle” who make the difference in business organizations. In fact, while it is the top managers who come up with strategic visions and missions, it is middle managers who, designing products and services, interacting with customers, or supervising operations, have their hands on the “pulse of the organization”.

Interestingly, approximately at the same time, a series of empirical studies about the role of first-line production supervisors also begin to appear in the Harvard Business Review and in other business and economic journals (Bittel and Ramsey, 1982; McKersie and Klein, 1983; LaForge and Bittel, 1983; Bittel and Ramsey, 1983; Klein and Posey, 1984; Klein, 1984; Alpander, 1984).

Most of these studies focus on the different role production supervisors can play in processes of organizational change and workplace transformation, as driven by the introduction of new production technologies and by the challenge posed by the declining productivity of US plants *vis-à-vis* international (Japanese) competition. The empirical evidence provided by these and other, subsequent studies conducted also in Europe and Japan (Lowe, 1993; Camuffo and Micelli, 1997; Morris, Lowe and Wilkinson, 1998; Bernardin, Dahmus and Redmon, 1999) shows that, within the broader category of middle management, the role of production supervisors is critical in the implementation of lean production related work organization, human resource policies and industrial relations practices.

Studying knowledge creation processes in Japanese companies, Nonaka (1988) fully recognizes the key role of middle managers, introducing the concept of “middle-up-down management”. In Japanese companies, middle-up-down management is the process that resolves the contradiction between the visionary, deductive and abstract concepts of top management and the inductive, practice-grounded concepts originating from experience in daily operations. Middle managers make this synthesis, since they are equipped with the ability to combine strategic-macro-abstract information with hands-on-micro-experiential information.

Similarly, Huy (2001) studies middle managers’ valuable contributions to organizational change - contributions that go largely unrecognized by most top managers, under four major perspectives. First, middle managers often have value-adding entrepreneurial ideas that they are able and willing to realize -- if only they can get a hearing. Second, they leverage informal networks and mobilize energies needed to make substantive, lasting change. Third, they stay attuned to employees' moods and emotional needs, thereby ensuring that the change initiative's momentum is maintained. And finally, they manage the tension between continuity and change -- keeping the organization from falling into extreme inertia, on the one hand, or extreme chaos, on the other.

These studies share the idea that middle managers link strategic and operational decisions (Floyd and Wooldridge, 1996), have exclusive knowledge of issues related to strategy implementation and control (Floyd and Wooldridge, 2000) and are an undervalued actor in organizational processes of change (McKersie and Walton, 1991; Balogun, 2003). Balogun and Johnson (2004) develop this point maintaining that middle managers are particularly important in organizational sensemaking, i.e. in the

conversational and narrative process through which people create and maintain an inter-subjective world, act in a more conscious mode, and interact with each other to make sense of what is going on around them. Similarly, Westley (1990) argues that middle managers can represent an important constituency in strategic conversations and studies the microdynamics of middle managers' inclusion within the strategy process.

Dutton and Ashford (1993) and Dutton and others (1997 and 2001) focus on a particular aspect of middle management's strategic role, issue selling to top management. They identify what conditions favor or hurdle issue selling (like top management's willingness to listen, a supportive culture, fear of negative consequence in presence of restructuring, uncertainty, etc.). They also identify factors that middle managers associate with image risk in the context of issue selling to top management (norm violations, perceived distance from top management, etc.).

Huy (2002) emphasizes the role of middle managers' emotion-management patterns in organizational transformation. He shows that, in order to resolve the contradiction between continuity and change, middle managers simultaneously enact two patterns: a) emotionally committing to personally championed change projects, and b) attending to recipients' emotion.

All these studies share the common idea that middle managers and, among them, production supervisors, play a strategic, often underestimated organizational role.

Most of them, however, focus only on the organizational roles of middle managers and on the organizational context in which they operate. They do not analyze their personal characteristics (background, skills, attitudes, motivations, etc.).

But, while strategy, structure and systems shape middle managers' organizational roles and affect their contributions to organizational performance, middle managers' abilities, attitudes, motivation and personal background (family, education, job experience, etc.) impact on organizational performance, too.

Kanter's (1982 and 1983) study of effective middle managers working in US large corporations represents one of the few cornerstones of this under investigated aspect. This study, based on interviews to middle managers from five major corporations located across the United States, shows that these people share a set of personal qualities: thoroughness, persistence, discretion,

persuasiveness, and comfort with change. Perhaps surprisingly, they aren't extraordinary individuals. Rather, they work through existing networks to uncover opportunities, build coalitions, and make change happen.

Huy (2001, 2002) develops a case study of a large service-providing company in the information technology industry, which for many years had enjoyed a market leadership but, at the moment of the study, was attempting a major organizational transformation. The study suggests that good middle managers show the following qualities (Huy (2001: 75): early volunteering, positive critics, informal power, versatility, emotional intelligence.

Indeed, these and a few other studies (Snyder and Bruning, 1985; Daniel, 1992; Wilcox King, Fowler and Zeithaml, 2001) provide some evidence that the presence of talented and committed people at the intermediate organizational levels represents an important source of organizational performance. On the whole, however, this literature lacks rigorous, large-scale, articulated studies on middle managers' competency portfolios. Hence, the personal characteristics and managerial abilities of effective middle managers, and, among them, production supervisors, can be considered as a relatively under (and less rigorously) researched topic.

3. Theory

As evoked in the title, our study builds on Boyatzis (1982), who maintains that effective performance in managerial jobs depends on personal qualities and defines these personal qualities as competencies. The competency literature has developed significantly in the last three decades since the pioneering work by David McClelland (1973). He argues that intelligence testing, scholastic grades and the traditional job analytic approaches to personnel selection, fail to predict job performance. Instead, McClelland proposes testing for competency. Although controversial among applied and organizational psychologists (Atwater, 1992; Barrett, 1994; Barrett and Depinet, 1991; Sternberg and Wagner, 1986), competency-based studies and applications have gained popularity and acceptance within the human resource academic and business community through the work of McClelland and his associates, particularly Richard Boyatzis, at Case Western Reserve University.

3.1. Competency definition

In his study of managers' effectiveness, Boyatzis (1982: 21) defines a job competency as "an underlying characteristic of a person, in that it may be a motive, trait, skill, aspect of one's self-image or social role, or a body of knowledge which he or she uses, which is causally related to the achievement of effective, or better, work performances". His definition of competency is general (and somewhat ambiguous) enough to reflect either individual or specific organizational concerns. Such ambiguity left room for subsequent research which re-defined competencies as:

1. the knowledge, skills, abilities, and other attributes required to perform desired future behavior (Blancero, Boroski, and Dyer, 1996: 387);
2. an individual's demonstrated knowledge, skills, or abilities (Ulrich, Brockbank, Yeung, and Lake, 1995: 474);
3. skills and traits that are needed by employees to be effective in a job (Mansfield, 1996);
4. knowledge and skills that underlie effective performance (McLagan, 1997);
5. knowledge, skills, abilities and behaviours required for successful performance of job duties (Mirabile, 1995: 13);
6. "an underlying characteristic of an individual that is causally related to criterion-referenced effective and/or superior performance in a given job or situation" ((Mitrani, Dalziel, and Fitt, 1992; Spencer and Spencer, 1993: 11);
7. a collection of observable behaviors that superior performers exhibit more consistently than average performers, grouped according to a central theme, which then becomes the competency (Klein, 1996).

Klein's definition is significantly different from the others since, instead of maintaining that competencies underlie behaviors, it suggests that behaviors underlie competency. Woodruff (1993) raises a similar issue distinguishing between competence and competency and proposing that competence is a performance criterion while competencies are the behaviors driving the competence. This is similar to Klein's (1996) argument that competencies are not psychological constructs but thematic groups of demonstrated observable behaviors that discriminate between superior and average performance. These behaviors require no inference, assumptions, or interpretation.

All these definitions, though different, share some common elements. First, most of them assume that competencies are the knowledge, skills, attitudes or other attributes that underlie effective or successful job performance; second, these elements must be observable or measurable; and third, these elements differentiate between best and other performers.

3.2. Competency-based modeling

Competency-based approaches focus on individuals who perform more effectively a given job. Several methodologies can be used to determine the competencies (Boam and Sparrow, 1992; Spencer and Spencer, 1993; Rothwell and Lindblom, 1999), depending on the goals of the analysis (e.g.: research or practice), the desired degree of accuracy, the resources available and other contingencies. As concerns competency analysis for research purposes, most of the modeling procedures build on those proposed by Boyatzis (1982) and then refined by Spencer and Spencer's (1993) and the studies conducted by scholars at Case Western Reserve University (Boyatzis, 1994, Boam and Sparrow, 1992; Ballou, Bower, Boyatzis and Kolb, 1999; Boyatzis, Cowan, Kolb and Associates, 1995).

Typically, the outcome of the analysis produces two sets of competencies: (1) threshold competencies that apply to both average and superior performers, and (2) differentiating competencies that apply only to superior performers.

Mansfield (1996) describes three different types of job competency models: a) "single job" competency approach, which focuses on one job; b) "one-size-fits-all" approach, which defines a set of competencies for a broad range of jobs; c) "multiple job" approach, which defines a set of competencies believed to be common to all jobs and a set of competencies which could be job-family (or even job) specific. There is a trade off between model accuracy and model generalizability, in that, *coeteris paribus*, single job models are more accurate but less general. Moreover, choosing among these three options depends on the purpose of the study/model, the resources available for the analysis and the relevance of technical skills. In fact, while competencies are mostly managerial and non-technical in nature, technical competencies required to perform the job can be extremely different across positions.

4. Research Design and methods

We analyze the competencies, not the technical skills or knowledge, of production supervisors, which are the object of the study. Following Klein (1984), we define them as first line supervisors, directly managing workers involved in direct production steps, and responsible for the production results of one of the elementary organizational units of the plant contributing product manufacturing. Basically, these supervisors cover the organizational role corresponding to the first hierarchical level in the plant. We do not consider, in order to keep the analysis homogeneous and focused, production engineering, maintenance or other technical units.

Differently from most other previous competency based studies, usually aimed at developing competency models within a given firm or occupation, our analysis proposes a multi-firm competency model of production supervisors working in North East Italian SMEs. This option implies: a) the adoption of a *single job approach* to competency modeling (Mansfield, 1996); b) the assumption that the firms under analysis not only operate in the same region, but share similar challenges, values and, to some extent, business and organizational models¹.

We adopt the modeling procedures proposed by Boyatzis (1982), as refined by Spencer and Spencer's (1993) and by the studies conducted by scholars at Case Western Reserve University and in the UK (Boyatzis, 1994, Boam and Sparrow, 1992; Ballou, Bower, Boyatzis and Kolb, 1999; Boyatzis, Cowan, Kolb and Associates, 1995)².

Step 1: definition of a performance criterion.

In each of the 23 analyzed companies³ we conduct in depth interviews with one or more top managers (in many cases the founder/owner or the CEO) in order to:

1. understand the firm's competitive environment, its business and manufacturing strategy;
2. identify the interviewees (production supervisors);
3. define key performance parameters at the plant level (classified in one of the following five categories: efficiency, quality, flexibility, speed and dependability (Slack, Chambers, and Johnston, 2003)).

At each plant, we also conduct a preliminary extensive interview with the plant manager in order to: present the study, understand how the plant operates, what is the manufacturing strategy and

objectives, explain the research protocol, agree on confidentiality issues and research code of conduct, plan the field work.

We also analyze the plant organizational structure, identifying the production supervisors as defined in the research protocol.

Step 2: production supervisors' performance analysis, ranking and classification.

To improve the accuracy of the analysis and avoid sampling issues, we do not sample but study *all* the supervisors in the analyzed plants ($n = 212$). In parallel, we collect background data for each production supervisor from the human resource department or other relevant department. Over a three year time frame we also collect, for each supervisor: a) data on organizational units' performance (efficiency, quality etc.); b) individual performance appraisal data (not available in a few cases).

We conduct 44 repertory grid interviews⁴ with the supervisors' boss (usually the plant manager or, in the case plants with more than 2 hierarchical layers, the supervisors' direct boss) eliciting a set of competencies/constructs and deriving, from the scoring of each construct for each supervisors. We also ask the interviewees to independently rank the supervisors.

We compare the performance data collected from multiple sources (hard data, performance appraisals, repertory grid derived ranking, plant manager's ranking) and check for inconsistencies. If appropriate/necessary, we go back to the data source, clarify and then iterate. At the end, we get, for each firm/plant, a ranking of the production supervisors and we classify them in three categories: best, average and poor performers⁵.

Then, we pool the data and split the global sample into three groups/subsamples: best (32% of the sample), average (47% of the sample) and poor performers (21% of the sample)⁶.

Step 3: collection of data on how production supervisors perform their job.

Using Behavioral Event Interviewing⁷ (BEI) techniques, we interview all the role holders (production supervisors), during their normal working hours, according to a time schedule previously agreed upon with them and the plant manager. Interviews range from a minimum of 100 minutes to a maximum of 160 minutes. As an introduction to each BEI, we ask supervisors to tell us about their professional background, and their current jobs' task and responsibilities.

Step 4: Production supervisors' behavior analysis

Through the 212 BEIs, we collect 1071 behavioral events (an average of 5.1 events per interview), 78.5% of which positive (related to success). We tape and type up all the interviews; we analyze (thematic analysis) and code the transcripts for frequency and variety of occurrence (Boyatzis, 1998). We apply blind double coding to check for inter-rating reliability (Spencer and Spencer, 1993; Boyatzis, 1998) obtaining an inter-rater agreement of at least 70%⁸.

We use the Case Western Reserve University's code-book as an initial, main reference for coding (Boyatzis, 1982; Boyatzis, Cowen, Kolb and Associates, 1995: 82-91). This code-book (table 1) categorizes 22 themes of competencies that are divided into three groups: goal and action management abilities, people management abilities and analytic reasoning abilities⁹.

Table 1 about here

Step 4: identification of patterns (competencies/themes) within the data that differentiate production supervisors' performance.

We grow our statistical analysis out of the database stemming from coding for frequency and variety of occurrence. We calculate frequency distributions for the coded competencies¹⁰; they provide a first summary of the behaviors and personal qualities needed to cover the analyzed role.

Then, we use standard non-parametric statistical analysis to: a) test if best performers have more and more articulated competencies than average and poor performers; b) identify the set of competencies necessary to cover the production supervisor's role (threshold competencies) and the set of competencies causally related to outstanding performance (top performers' differentiators) (Spencer and Spencer, 1993; McLagan, 1997).

5. Data and sample

We analyze 23 plants of 23 North East Italian manufacturing firms. These firms agree to participate to a 3-year research project comprising 3 rounds of field work and including, beside productions supervisors, middle managers in the finance and new product development functions.

All the firms included in the sample are small and medium sized (total sales less than \$ 250 million), are export oriented, operate in competitive, mature industries, and represent the typical core industries of the North East of Italy (textiles, mechanical, eyewear, apparel, footwear, air conditioning etc.). In the five years prior to the study, they have performed well both from the financial and market standpoints. They are private, family owned companies (three are listed at some stock exchange, but not public firms).

From the manufacturing standpoint, most of the plants are relatively young or new. Automation or state of the art technologies are present homogenously in both capital and labor intensive settings. Labor costs account, on average, for approximately 30% of the product full manufacturing cost. A majority of the plants (17 out of the 23) operate under ISO 9000 quality certification norms. Most of the plants have flat organizational structures (2 or 3 hierarchical layers). Only 5 plants have 4 layers. With 3 exceptions, all the plants have active unions. Union density is, on average, 40%.

The supervisors are prevalently male (91%), in their late thirties – early forties, born and grown up in the province where their current employer is located (87.9% of the sample). They have been working in the same firm and plant for a long time (average firm seniority 15.5 years), moving up the ladder from within from blue collar to supervisor. They have also significant role seniority as supervisors (7 years). Curiously, a significant number of them has either co-founded the firm, worked in it since its start-up or has personal ties to the owner/owning family. Basically, they are the result of stability, attachment to a single firm and geographical area, low inter-firm and job mobility. Since the majority of them have little education (only one third has completed high school or has college education) and investment in training is modest (only half of the firms in the sample has formal training programs in place), their skills have been learned mainly on the job and by doing. Interestingly, best performers, on average, are older, and have longer firm and job seniority. Besides, they have slightly higher education. The production supervisors' average span of control (the number of workers directly supervised) is, on median, 19, and higher than average for best performers.

7. Findings

As a preliminary step we test the hypothesis, usually implicit in competency models, that best (average) performers possess more competencies than average (poor) performers¹¹. This represents also an indirect control of the goodness of our production supervisors' grading in best, average and poor performers¹². Table 2 reports: a) the average frequency of occurrence of competencies per interview (for the whole sample and then for the three sub-samples: best, average and poor performers); b) the results of the Mann-Whitney-U Test¹³ on the difference, between best, average and poor performers, in the frequency of occurrence of competencies per interview. Similarly, table 3 reports: a) the average variety of competencies per interview (for the whole sample and then for the three sub-samples: best, average and poor performers); b) the results of the Mann-Whitney-U Test on the difference, between best, average and poor performers, in the variety of occurrence of competencies per interview.

The data supports the hypothesis that best performers show in their interviews a significantly higher number of competencies than “average performers (similarly for average performers versus poor performers). Best performers' competencies are also more articulated (i.e. demonstrated with a wider array of behavioral indicators) than average performers' (similarly for average performers versus poor performers).

Table 2 about here

Table 3 about here

Table 4 shows the frequency distributions for all the competencies calculated for the total sample, and for the three sub-samples.

Table 4 about here

At an aggregate level, competencies in the people management (42.1%) and goal and action (41.7%) clusters are the most frequent. Competencies belonging to the analytical reasoning cluster (16.2%) are far less important.

This portfolio of competencies offers a complementary view about the nature of North East Italian SMEs' superior manufacturing capabilities. On the one hand, being hands-on, efficiency oriented and entrepreneurial fosters plant effectiveness and drives performance improvement; on the other hand, being empathic, willing to share knowledge and social oriented makes organizational communication more efficient, motivates workers, reduces conflicts, and drives skill development and diffusion.

Somewhat surprisingly, competencies in the people management cluster are the most important (42.1%). This is consistent with: a) Huy's (2001) idea that effective performance requires the management of one's as well as of others' emotions (*empathy*); b) studies on Italian industrial districts' dynamics (Locke, 1995; Berger and Locke, 2001) which underline skill development as a key feature of locally embedded SMEs (*group management* and *development of others*); c) the importance of social ties and community aspects (also outside the firm) (*persuasiveness* and *self confidence*).

Competencies belonging to the goal and action cluster are also important (41.7%). This suggests that the prevalent nature of supervisors' knowledge is tacit, derives from experience, and can be learned on the job. This is consistent with the supervisors' career and tenure profile (one job, one firm).

The lack of analytic competencies is instead consistent with the production supervisors' age and education profile (2/3 of the sample has not completed high school education).

Since production supervisors constitute the lower end of middle management (closest to operations, far from top management), and given the "emergent" nature of strategy in most SMEs (Mintzberg and Waters, 1985), it is understandable why they seem to play a more "operational" and less "strategic" role than that envisioned by Wesley (1990). However, their competency portfolio is consistent with functions like organizational sensemaking (Balogun and Johnson, 2004) and issue selling (Dutton and Ashford, 1993).

Table 5 summarizes the competency model. It features the results of the hypothesis tests used to identify the set of distinctive and threshold competencies that differentiate the sub-samples (best, average and poor performers).

For each competency, we test the alternative hypotheses that frequency of occurrence for best performers is larger than for average performers. Similarly, for average performers versus poor performers.

Table 5 about here

Slightly innovating with respect to standard modeling procedures, we define “distinctive” the competencies present with “significantly different intensity” in the best performers’ sub-sample (compared with the average performers’ subsample), and “threshold” the competencies present with “significantly different intensity” in the best and average performers’ sub-sample (compared with the poor performers’ subsample). Again, we use the Mann-Whitney U statistics to test these hypotheses.

Production supervisors have four threshold competencies: a) *efficiency orientation* and *initiative* (goal and action cluster); b) *empathy* and *group management* (people management cluster). These threshold competencies are essential to performing their job, but are not causally related to superior performance. Interestingly, these competencies are few (four) and all with high overall frequency of occurrence. They are consistent with Huy’s (2002) conjecture that middle managers simultaneously: a) commit to personally championed projects; and b) attend to subordinates’ emotions.

The distinctive competencies (or differentiators), instead, are nine: a) *planning* and *attention to detail* (goal and action cluster), *persuasiveness*, *self-confidence* and *development of others* (people management cluster); c) *use of concepts*, *networking*, *use of technologies* and *social objectivity* (analytic reasoning cluster).

They are more numerous than threshold competencies and their coded frequency of occurrence is very diverse. This variety reflects, at least in part, the diversity among the firms, their manufacturing strategies and their organizational culture.

Interestingly, four differentiating competencies, but no threshold competencies, belong to the analytic reasoning cluster (which, on the whole, is the least important).

These facts suggest various considerations.

Firstly, it seems as if best performers have explored and developed, over time, a wider set of behaviors that make the difference in terms of performance. This is consistent with Kanter's (1983) and Klein's (1984) findings about "good" middle managers and supervisors.

Secondly, social and intellectual abilities seem to be making the difference. For example, through competencies like *persuasiveness*, *networking*, *self-confidence*, *development of others*, the best supervisors leverage on the internal and external social system to mobilize the effort, skills and resources necessary to ensure the effective and consistent performance of their organizational units. Many of the stories told in the interviews show how permeable the internal social system is to external factors, how personal and family issues mix with work activities and how supervisors leverage the external environment to achieve production goals. These people management abilities, together with *social objectivity*, are perfectly in line with the supervisors' sensemaking function illustrated by Balogun and Johnson (2004).

Similarly, the presence, though not frequent, of a few differentiators pertaining to the analytic reasoning cluster, constitute a radical departure from the supervisor stereotype of the practical, self-made-and-learned, "hands-on", technical expert. The *use of concepts* and the *use of technologies* are two competencies strikingly coherent with the middle management literature we briefly summarized in section 2 and particularly with Nonaka's (1988) idea of "middle-up-and-down" management.

From a different standpoint, as argued in several competency studies (Boam and Sparrow, 1992; Boyatzis, Cowen Kolb and Associates, 1995), differentiators can be interpreted as emerging competencies, since top performers are always somewhat ahead of the others, more open to experimentation and more engaged in innovation. Thus, while threshold competencies have guaranteed satisfactory job performance in the past and at present, differentiators can be seen as the competencies which will be required in the future. This applies especially to the distinctive competencies belonging to the analytic reasoning cluster. Though their frequency of occurrence is low, they probably represent the direction where effective supervisors are moving.

From this perspective, we also find the set of differentiators particularly coherent with the activity of strategic issue selling analyzed by Dutton and Ashford (1993) and Dutton and others (1997). Indeed, in SMEs, since the scale of operations is relatively small, organizational structures are informal, and there are strong interpersonal ties between the supervisors and the top management, competencies like *planning*, *persuasiveness*, *networking*, and *self-confidence* represent the ideal competency portfolio to become involved in strategic conversations with and issue selling to the top management (Westley, 1990; Floyd and Woolridge, 2000; Dutton and others, 2001).

8. Implications

In order to perform their job, North East Italian production supervisors have to have *both* goal and action *and* people management competencies. Being practical and efficiency oriented is worthless without empathy and group management abilities, which, surprisingly, account for the largest share of the detected abilities.

This portfolio of competencies offers a complementary view about the nature of North East Italian SMEs' superior manufacturing capabilities. On the one hand, being hands-on, efficiency oriented and entrepreneurial fosters plant effectiveness and drives performance improvement; on the other hand, being empathic, willing to share knowledge and social oriented makes organizational communication more efficient, motivates workers, reduces conflicts, and drives skill development and diffusion.

The context in which the analyzed firms and supervisors operate seems to have contributed to the development of these competencies, even in the absence of explicit and specific training policies. Low social mobility, attachment to a single firm, job stability and seniority seem to have facilitated competency learning and development.

Our study also identifies nine differentiating competencies which characterize superior performance. They can be divided into two groups: a) those that currently are fairly widely distributed (*planning*, *persuasiveness*, *self-confidence*, *developing others*, and *use of concepts*); b) those that currently are not widespread (*attention to detail*, *networking*, *using technology*, and *social objectivity*).

The former, since fairly common already, are probably developable on the job, and are, on the whole, consistent, with the threshold competencies. The latter, instead, are probably emerging competencies,

and signal that something is changing in this domain that makes them more important to performance these days. Unfortunately, these emerging competencies are not more widespread, probably because they are most effectively developed by formal education and training, while supervisors are, on average, under-educated and the analyzed companies report negligible investment in training.

Something should be done to develop these emerging competencies, but in ways that wouldn't be prohibitively expensive for SMEs. Firms, unions, labor market institutions, schools and universities, should pool ideas and resources to design training programs that both maintain the competencies that have made success possible in the past and foster the emerging competencies.

We do not suggest that North East Italian SMEs should jump to sophisticated competency-based human resource management systems, and we do not think that labor market institutions should base their policy on competency based systems (certification etc.), either. As a matter of fact, the results of these systems, especially if bought off the shelf, are controversial even within large organizations and even in countries, like the United Kingdom, with a long tradition.

Nonetheless, we believe that sound multiple-firm competency-based research on key job families could constitute a good starting point for innovative human resource development practices.

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Table 1
The “Case Western Reserve University code-book”

Goal and action management abilities
1. Efficiency orientation
2. Planning
3. Initiative
4. Attention to detail
5. Self-control
6. Flexibility
People management abilities
7. Empathy
8. Persuasiveness
9. Networking
10. Negotiating
11. Self-confidence
12. Group management
13. Developing others
14. Oral communication
Analytic reasoning abilities
15. Use of concepts
16. System thinking
17. Pattern recognition
18. Theory building
19. Using technology
20. Quantitative analysis
21. Social objectivity
22. Written communication

Source: Boyatzis, Cowen, Kolb & Associates, 1995: 82-91.

Table 2
 Production supervisors' competencies: frequency of occurrence per interview
 Total sample and sub-sample (best, average and poor performers) averages and differences

Frequency of occurrence per interview	F_t	F_b	F_a	F_p
Average	8.78	10.58	8.26	7.28
Hypothesis test	Z values for Mann-Whitney U Test, one tailed			
$F_b > F_a$	3.88**			
$F_a > F_p$	2.05*			
$F_b > F_p$	5.18**			

+ p <0.10; * p<0.05; ** p<0.01

Table 3
 Production supervisors' competencies: variety of occurrence per interview
 Total sample and sub-sample (best, average and poor performers) averages and differences

Variety of occurrence per interview	V_t	V_b	V_a	V_p
Average	12.18	15.47	11.40	9.01
Hypothesis test	Z values for Mann-Whitney U Test, one tailed			
$V_b > V_a$	4.51**			
$V_a > V_p$	2.45**			
$V_b > V_p$	5.98**			

+ p <0.10; * p<0.05; ** p<0.01

Table 4

Production supervisors' competencies:
total sample and sub-samples (best, average and poor performers) frequency of occurrence

Competencies (Boyatzis' code-book)	Frequency of occurrence				
	Total sample	Total sample by competency cluster	Best performers	Average performers	Poor performers
1. Efficiency orientation	33.05	Goal and action Abilities 41.7%	35.21	34.19	26.67
2. Planning	16.15		18.87	14.43	15.71
3. Initiative	17,37		20.56	17.19	12.38
4. Attention to detail	8.87		12.11	7.91	5.71
5. Self-control	4.30		3.66	4.74	4.29
6. Flexibility	2.24		3.38	1.78	1.43
7. Empathy	22.41	People Management Abilities 42.1%	26.20	22.53	15.71
8. Persuasiveness	13.63		16.62	12.25	11.90
9. Networking	3.64		5.07	2.57	3.81
10. Negotiating	3.08		2.54	3.95	1.90
11. Self-confidence	13.82		17.46	12.25	11.43
12. Group management	8.87		10.99	8.89	5.24
13. Developing others	15.97		18.87	14.03	15.71
14. Oral communication	1.31		1.97	0.79	1.43
15. Use of concepts	13.07	Analytical Reasoning Abilities 16.7%	17.46	11.07	10.48
16. System thinking	2.61		3.66	2.17	1.90
17. Pattern recognition	5.60		5.63	5.34	6.19
18. Theory building	0.09		0.00	0.00	0.48
19. Using technology	4.86		6.20	3.75	5.24
20. Quantitative analysis	0.37		0.85	0.20	0.00
21. Social objectivity	4.95		7.32	2.77	6.19
22. Written communication	0.19		0.28	0.20	0.00

Table 5

The production supervisors' competency model: Distinctive and threshold competencies

Competencies (Boyatzis' code-book)	Hypothesis test: $F_b > F_a$ and $F_a > F_p$			
	Z values for Mann-Whitney U Test, one tailed + $p < 0.10$; * $p < 0.05$; ** $p < 0.01$			
	<i>Best Vs. Average</i>	<i>Average Vs. Poor</i>	Distinctive Competency	Threshold Competency
1. Efficiency orientation	0.04	2.06*		<input type="checkbox"/>
2. Planning	1.58 ⁺	-0.31	<input type="checkbox"/>	
3. Initiative	1.00	1.79*		<input type="checkbox"/>
4. Attention to detail	1.33 ⁺	0.75	<input type="checkbox"/>	
5. Self-control	-0.26	0.28		
6. Flexibility	0.92	0.20		
7. Empathy	1.14	1.75*		<input type="checkbox"/>
8. Persuasiveness	1.95*	0.49	<input type="checkbox"/>	
9. Networking	1.35 ⁺	-0.05	<input type="checkbox"/>	
10. Negotiating	-0.92	1.05		
11. Self-confidence	1.84*	1.07	<input type="checkbox"/>	
12. Group management	0.60	1.53 ⁺		<input type="checkbox"/>
13. Developing others	1.86*	-0.21	<input type="checkbox"/>	
14. Oral communication	0.70	-0.27		
15. Use of concepts	1.99*	0.30	<input type="checkbox"/>	
16. System thinking	0.74	0.11		
17. Pattern recognition	-0.02	0.24		
18. Theory building	0.00	-0.21		
19. Using technology	1.41 ⁺	-0.62	<input type="checkbox"/>	
20. Quantitative analysis	0.38	0.10		
21. Social objectivity	1.80*	-0.96	<input type="checkbox"/>	
22. Written communication	0.05	0.10		

¹ Although the analyzed firms operate in different industries and are characterized by different production technologies, we believe our analysis is still sound for two reasons: a) albeit different, the industries are all mature and share similar competitive challenges; b) differences in technologies should reflect more on technical skills and knowledge, which are not within the scope of the analysis.

² Our team comprises 6 researchers, all previously trained in repertory grid and behavioral event interview techniques. Graduate students provide support in data analysis. Here is a synthesis of the provisions of the research protocol. Before conducting the study, we had each company agree on the following: a) the study was made for research purposes only; b) all the information collected during the study had confidential nature; c) the research team would not provide any personal information on the interviewees and would not made them recognizable at any stage of the project. Moreover, to minimize the risk of biased interviewing and coding, we had two research team members conducting the repertory grid interviews, but not conducting and coding the BEIs, and four research team members conducting and coding the BEIs, but not the repertory grid interviews. Hence, neither the interviewees (production supervisors), the interviewers, nor the coders know the ranking of the supervisors and if they classify as best, average or poor performers. We use blind double coding and check for inter-rating reliability.

³ Most of the firms operate one plant, a few of them (4) more than one. In the latter case we conducted our analysis in the larger and most representative plant.

⁴ Originally developed by Kelly (1955) within personal construct theory as “role construct repertory test” (or reptest), the repertory grid interview is used to study personal and interpersonal systems of meaning. It aims to assessing the content of an individual’s repertory of role constructs —the unique system of interconnected meanings that define his or her perceived relationships to others. In its simplest form, the reptest requires the respondent to compare and contrast successive sets of three significant people (supervisors, in our case), and formulate some important way in which two of the figures are alike, and different from the third. These constructs represent, in our framework, themes/competencies (Boam and Sparrow, 1992). Following common practice in social psychology, in this research we extend the method beyond the simple elicitation of constructs, by prompting the respondent (supervisor’s boss) subsequently to rate or rank each of the elements (the supervisors) on the resulting construct dimensions (Neimeyer and Neimeyer, 2002).

⁵ Best performers are defined as those role holders who systematically achieve outstanding results in terms of quality, efficiency, speed, flexibility and dependability. They make a significant contribution to the plant results improving operations and often going beyond top management expectations. Average performers are defined as those role holders who perform their job diligently, achieving their production targets. Poor performers are defined as those role holders who have problems in performing their jobs and in meeting top management’s expectations.

⁶ This performance frequency distribution differs significantly from the general rule of thumb provided, for example, by McClelland (1998: 332), who asserts that best performers generally range from 5% to 10% and average performers account for 11% to 25%. Nonetheless, we are confident that our assessment is accurate because it relies on multiple performance measures (not simply on peer nomination). Besides, the difference derives from: a) the nature of the job (production supervisors, not top executives); b) the peculiarities of the North East Italian context (e.g. in terms of work organization and careers); and c) the particular meaning that concepts like “best”, “average” and “poor” performers take in the analyzed settings (less competitive context).

⁷ The Behavioral Event Interview (BEI) is an adaptation of the critical-incident interview originally developed by Flanagan. McClelland (1998: 332) designed it as a way to discover differences between two types of incumbents: those outstanding and those typical in performing a job (e.g.: production supervisor). In specially designed interviews, role holders (production supervisors, in our case) describe, in their own words, what they said, thought, felt, and did in six – positive and negative - episodes at work. The BEI is “an intensive face-to-face interview that involves soliciting critical incidents from performers and documenting what the performers were thinking, feeling and doing during the incident” (Rothwell and Lindblom, 1999: 94). Our research protocol requires that each event told by the interviewees be explicitly related to a significant achievement in terms of improvement of at least one of the manufacturing performance objectives (cost, quality, flexibility, speed, dependability).

⁸ McClelland (1998) and Boyatzis (1998) suggest using multiple blind coding to attain higher reliability. On average, interjudge agreement for well trained coders is in the range of 74% to 80% for maximum level and frequency of occurrence.

⁹ We follow Raelin and Cooledge’s (1995) evolutionary approach to competencies. Since effective behaviors evolve and are context specific, also the code-books need to change and adapt. Thus, we do not use *sic et simpliciter* the standard Boyatzis’ code-book derived from the study of managers in the US context. We adapt it to productions supervisors taking into account also cultural differences. Furthermore, we supplement it with some other original themes/competencies derived: a) from original thematic analysis (these are behaviors that, though leading to effective performance, are not already grouped in themes/competencies); or b) from the

constructs elicited during the repertory grid interviews to the plant managers. For the sake of conciseness, in this article we do not present data on this second type of coding.

¹⁰ The percentage frequency of occurrence of a competency is the number of times a competency is detected out of the maximum possible number of times; for example, a 10% frequency means that a competency appears in one behavioral event out of ten. More generally, we code for frequency and variety of occurrence using the following measures:

$$F_i = \frac{\sum_j^n CC_{i,j}}{\sum_j^n PC_{i,j}}; \quad V_i = \frac{\sum_j^n db_{i,j}}{\sum_j^n pb_{i,j}}.$$

with:

F_i : Frequency of competency i ;

$CC_{i,n}$: Coded Competencies: the number of behaviors associated with competency i detected in the interview with subject j (independently on the specific behavioral indicator);

$PC_{i,n}$: Potential Competencies: the maximum number of behaviors associated with competency i detectable in the interview with subject j (independently on the specific behavioral indicator).

V_i : Variety of competency i ;

$db_{i,n}$: Different Behaviors: the number of different behavioral indicators associated with competency i detected in the interview with subject j ;

$pb_{i,n}$: Potential Behaviors: the number of different behavioral indicators associated with competency i detectable in the interview with subject j .

¹¹ It could be argued that these differences reflect the better verbal abilities of the best supervisors (vs. average vs. poor), not a richer competency portfolio. This extreme interpretation could apply in the case of not well trained interviewers and coders.

¹² Theoretically, the different competency endowment between best, average and poor performers could derive from other factors or background variables like age, firm seniority, role tenure, and education. In order to rule out this possibility, we run correlation and regression analysis between these variables (independent) and the supervisors' ranking (dependent variables). We find no significant result, fact that supports our competency based analysis.

¹³ Following common practice in competency based studies (Boyatzis, 1992; Spencer and Spencer, 1993; Boyatzis, 1998; McClelland, 1998), we use the Mann Whitney U test as a method for the comparison of pairs of independent random samples (best versus average; average versus poor). The Mann Whitney U statistic is defined as:

$$U = n_1 n_2 + \frac{n_2(n_2 + 1)}{2} - \sum_{i=n_1+1}^{n_2} R_i$$

where samples of size n_1 and n_2 are pooled and R_i are the ranks.

Since the alternative hypothesis is that values for best (average) performers tend to be larger than values for average (poor) performers, an upper side test is required. The main assumptions of the Mann-Whitney test (random samples from populations; independence within samples and mutual independence between samples; measurement scale is at least ordinal) apply in our research setting. Notably, our sample size is much larger than in most of other competency based studies.