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Industrial Leadership that Inspires

Managerial Communication as an Emerging Pedagogical Focus in Engineering

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Abstract—To explore the characteristics of effective industrial leadership, this work embarked on a quantitative effort to investigate requirements posed on leaders. Contrary to previous competence-based studies, the present work examined leader qualities more broadly through substantive knowledge, personality traits, socio-emotive skills, cultural awareness, and ethics and values. A particular aim was to conceptualize and operationalize effective leader behavior in industries to identify relevant and targeted foci for engineering pedagogy. Statistical analysis and factor analysis of the data from 503 respondents on 81 leader traits or skills shows that leadership that elicits positive organizational outcomes is founded on such leader personality dimensions as reliability, and such socio-emotive skills as self-leadership, emotional stability, inspiration and assertive communication.

Keywords—industrial leadership, management behavior, personality, socio-emotional competence

1 Introduction

In the contemporary world of hyper-competition, organizations strive to leverage client satisfaction and financial gains by strengthening their employees' psychological connection with work, severely undermined by such macroeconomic forces as social upheaval and political turmoil. At the core of the convulsion, the concept of work is undergoing a change affecting not only organizational and team outcomes but also the context of individuals' psychological processes [1]. This strengthens the business case for understanding and building the psychological capital in the workplace and for identifying measures preventing psychosocial risks [2]. When these risks materialize, they incur monetary costs through absenteeism, presenteeism, decreased productivity, increased employee turnover, deteriorated organizational citizenship behavior, and change resistance [3]. On societal and national levels, negative mental load at work impairs citizen health, increases mortality, lowers the average retirement age, and reduces quality of life, while straining the public welfare and health care systems [4].

Contrastively, a rapidly expanding body of research has established an association between e.g. employee affective commitment and organizational outcomes, or between workplace climate and physiological, psychological and economic effects [5]. To better understand positive socio-emotive factors and their impacts at work, organizational studies have taken an interest in the motivational role of job resources as facilitators of task accomplishment, exploring aspects such as autonomy and social support available at the work community [6], [7]. Representatives of the positivity school have found support for the role of positive emotions as factors yielding positive impacts on individuals' thoughts, actions and physiology, ultimately incrementing their psychological, physical, social and intellectual resources [8], [9]. As the most salient and immediate source of emotional contagion, leadership is increasingly viewed as predictive of employee attitudes, performance, well-being and motivation [10], [11], with follower motivation for higher job performance having been described as the prime function of leadership. As mediators, organizations and management studies have proposed e.g. job design, organizational interaction culture, inspiring visions, or leader's charisma, attractiveness, authenticity, motivational language [12], [13] or leadership style [14].

The myriad quests to understand the sources and foundation of effective organizational leadership have introduced various paradigms, drawing on supervisor influence on subordinates [15]. Traditionally, leadership has been approached through three different theory lines: the first examined leader attributes, the second leader behavior, and the third, contingency theory acknowledged the role of situational variables or contingency factors in moderating leadership effects. However, a group of leadership styles exists that does not fit into any of these theories directly as it cuts across several theories, directing the focus to a mixture of leader traits, conduct and contextual variables [16], [17]. Extrapolating from the core features of the above schools, the answer could be found with the constructivist theory, according to which leadership emerges in the relationship between leaders and followers [18], [19]. Sparked by this theory, the focus of leadership research has subsequently shifted from leader actions to the perceptions of the followers, taking the premise that without followers, there is no one to be led. This consideration for employee evaluations evidences a paradigmatic transition from top-down to bottom-up approaches to leadership [20].

Perplexingly, despite the early recognition of the role of managerial communication as manifestation of leadership style and its significance for employee outcomes, the study of managerial communication competence has centered mainly on elementary and mechanical skills such as clarity of expression, appropriateness of language, timeliness of response, and attentiveness [21]. Until recently, the role of leaders' non-verbal transmission and influence strategies in enhancing human capital has been largely ignored [22], [23], [24].

The presently burgeoning research on leader emotions and emotive communication has made significant advances, drawing upon theories such as motivational language theory and speech act theory, but the full grasp of factors impacting the quality of leader-member exchange is yet to be achieved [25]. While support is available for claims on the role of leaders' individual differences and dispositional variables in interaction with subordinates [26], the communicative building blocks contributing to

successful leadership are insufficiently understood. Effective management communication has not been operationalized on a level concrete enough to explain for incidents perceived as inspiring, motivating and persuasive by subordinates.

Leadership research has been criticized for strong segmentation and neglect to integrate findings from different approaches in a way that would allow simultaneous examination of leader traits, behaviors, situational factors and follower cognitions [27]. To respond to this call and to more solidly establish the anatomy of effective leadership, this study sliced supervisory competence requirements into a set of 81 personal qualifications found through literature review, to examine which dispositions, abilities, and skills are regarded as most pertinent for successful industrial leadership. The findings are based on a sample of 503 respondents to an online survey. Factor analysis was employed to yield the components of leader performance.

This research offers three contributions to the field of engineering education: 1) it furthers understanding of personal qualifications in industrial leadership, 2) it repositions communication competence in relation to industrial leadership, and 3) it builds a framework operationalizing managerial communication in the industrial set-up. Together these efforts not just advance the theory of leadership and management but also provide concrete instruments for organizations and university educators by suggesting priorities for engineers' competence development.

2 Advances in Managerial Communications Research

Management research has advanced significantly since the early curiosity about ways in which leaders exercise influence on their followers to create a sense of organizational coherence [28], [29], [30]. The fundamental tenets of such influence have traditionally centered on the transactional principles of exchange in the leader-follower interaction, while directing growing attention to the personal capabilities of the leader, with studies of leader pathologies paving the way [31]. Subsequently, much is known about traits enabling dysfunctional leadership, but to date, only little about leaders' relational or influence strategies, or the implicit motives, thinking styles and attitudes that drive leader behaviors and outcomes and the ways in which they are perceived by subordinates [32], [33], [34].

Supervisor behaviors and abilities in interaction deserve more research attention, however, as they are known to be associated e.g. with organizational commitment and employee performance and well-being [35]. Owens and Hekman [36] contend that positive organizational outcomes such as effectiveness and high-quality leader-follower relationships can be traced to leader humility. Leaders featuring positive characteristics through e.g. hope, optimism, resilience and self-esteem have been found to promote follower positivity and performance [37]. Kelloway et al. [38] take it as far as to claim that the prime purpose of organizational leaders is to spread positivity to their followers, due to the number of desired impacts that positive emotions induce in terms of creativity, efficiency, scope of attention, physical skills and health, optimism, resilience, commitment and coping at work. Overall, leader positivity seems indicative of subordinate perceptions of leader effectiveness, suggesting that

leaders' socio-emotive skills bear an impact beyond subjective experiences. This, together with the accumulating reports on positive organizational scholarship or positive organizational behavior, substantiates a focus in this study on leaders' psychological capital [39].

Further, Lappalainen [40] challenged the advantage of the mathematically intelligent in leader positions by investigating managers' socio-emotive competence, personality dispositions and analytical intelligence and comparing them to subordinate perceptions. She found that social and emotional intelligences correlated on a significant level with subordinate cognition of effective leadership, whereas analytical intelligence yielded no correlation at all. Four out of fourteen personality dimensions seemed predictive of success in supervisory tasks. It should be noted that these four dimensions, sociability, inspiration, concrete perception, and optimism, all drive and color communication behavior and could therefore broadly be regarded also as components of communicative competence.

2.1 Leadership as Emotional Work

Historically, managing stable and predictable tasks involved prescription of specific goals and directions, allowing leaders to direct, or to exercise their legitimate, positional or informational power to punish and reward [41]. Managing in the postmodern world is, however, much more complex, calling for less coercive and more empowering means. As an example of power responding to today's demands for employee's self-directed action and proactive behaviors, leaders' social power, referent or expert power, means that the individual is either seen in high esteem or regarded as possessing unique knowledge, granting him or her subsequent authority. Social power is linked with influencing strategies and contributes largely to organizational citizenship behavior, which in turn promotes individual and organizational effectiveness [42].

From the exercise of formal authority or power, leading others has gradually morphed into emotional work - feelings and affect are deeply intertwined with leading, leader outcomes, and follower outcomes [43]. The motivation and need to follow have deep emotional roots, the profound motive deriving from craving for care and attention, and a sense of identity and purpose - when allowing ourselves to be controlled, we feel protected and secure. The leader provides meaning and simplifications in otherwise complex surroundings [44].

Emotionality at work typically refers to concern for job design, workload, and job satisfaction [45] but also to the quality and impact of an individual's affective responses to work. Studies show that the share of time an employee feels net positive affect matters for job satisfaction, more than the intensity of that affect. This implies that employers should rid their staff of minor irritations that accumulate into a mental load that eventually tips the balance towards constant negative affect. Contrastively, frequent positive reinforcements, although less intense, elevate job attitudes [46].

Leaders can adopt emotionally intelligent *behaviors* in the workplace but emotionality poses demands also for *personality*. Certain traits such as extraversion and emotional stability have been found to correlate with leadership emergence [47]. Personality moderates an individual's perceptions as leader-like but requires further investiga-

tion as a predictor of job performance or actual leadership effectiveness. In other words, perceived influence is not equivalent to effectiveness. The other way round, the absence of certain traits may hinder the individual from emerging as a leader [48]. To add to the expanding body of research on positive leadership, this work embarked on an empirical effort to analyze the attributes that contribute to leader impact.

3 Theoretical framework and research questions

Among industrial leadership competences, the professional, transferrable leader skills have earned unanimous recognition, yet a systematic definition and conceptualization of leaders' generalist abilities remains to be achieved [49]. This may result from the nature of leader requirements: leadership competence is increasingly viewed through the lens of communicative competence [50], which is undergoing a conceptual controversy of its own. Further, the systematic analysis of leader communication is perplexed by tension between two competing approaches: leader qualifications can be examined either as learnable skills or as biological personality traits [51].

For the present study, however, the divide between skills and traits remains irrelevant; instead, it suffices to acknowledge that the pivotal personal qualities comprise a mix of learnable skills and personality origins, be they inherent, genetic, biological or the result of conscious skilling or life history. This research subsequently limits its scope to the manifested or behavioral level of these qualities, that is, how these traits or skills are perceived by organizations. The overall research objective to further the understanding of leader qualifications is broken down to two research questions (RQ):

RQ1: What is the make-up of leaders' personal managerial qualifications?

RQ2: What qualifications matter most in leadership tasks?

The categorization serving as the basis of the empirical research was derived from a literature review of studies conducted in work psychology, leadership, organizational communication, and personality psychology. The aim was to map out the diverse competence areas intervening in leader tasks, resulting in a grouping that is not exhaustive, nor does it attempt to suggest a solid typology or prioritization, but rather serves as a first attempt to direct investments in engineering graduates' leadership education.

3.1 Categories of Leader Competences

In industry, technical or substantive expertise alone seldom guarantees effective contextual behavior, which is known to turn field-related knowledge into productivity and profitability [52]. The study of bottom-up leadership must involve also follower perceptions and a subsequent focus on the leader's relational abilities. These process skills address lifelong learning, learning to learn, critical thinking, cooperation, communication, teamwork, intercultural cooperation, organizational understanding and project management. These represent the socio-cultural dimensions that are becoming

increasingly important as globalization intensifies the demands for flexible, socially adept and communicative engineering teams [53].

This paradigm shift manifests itself also in leader requirements: today's leadership theory has departed from the industrial foci on hierarchy, control and division of labour and moved to a post-industrial accent on relationships, networks, trust, ethics and participation [54]. This also reflects a shift in research emphases: where leadership was earlier the subject of psychology studies, it is presently examined through the lens of social psychology, interested in the role of the individual as a group member in a social setup [55].

Consequently, postmodern leadership in industrial operating environments is far from static. The complex temporal conditions have subjected work communities to societal and social forces that urge leaders to assume roles that largely differ from those of their modern antecedents. Heroic, hierarchy-based headship labelled as charismatic, inspirational, visionary, transformational or transactional, among others, was based on the social authority of an individual believed to endow extraordinary gifts and powers. This divine notion of leadership is gradually morphing into a more mundane, constant earning of leader status in inter-human interaction where employees are no longer regarded as subordinates but rather as equal partners [56].

The advanced technologies of today, disappearance of market boundaries, transforming customer expectations, and the subsequently modified operating principles in the engineering world are further moulding managerial competence requirements [57].

These trends set the stage for the analysis of managerial communication that proves effective in the psychological and cognitive processes of the post-industrial workplace. The following sections review literature on today's working life skills, and, in particular, recent findings on competences pertinent to managerial tasks. They broadly categorize managerial competences into five areas: 1) substantive expertise, 2) personality traits, 3) socio-emotive skills, 4) cultural skills, and 5) ethics and values. It should be noted, however, that these categories are broad and at times overlapping, and merely serve as a theoretical point of departure for the empirical work.

Substantive expertise: Functional Job Analysis examines leader activities through behaviours regarded as universal in the managerial setup. The foundation of effective leadership has traditionally been laid on first-rate substantive expertise but is increasingly expected to extend beyond domain-specific capabilities. This expertise is a prerequisite in the five main managerial functions, comprising 1) planning and problem solving, 2) viewing, as well as the three functions of action: 3) independent action, 4) leadership and 5) cooperation [58].

Present membership of many teams, networks and communities simultaneously requires not only subject-related technological expertise, but also soft skills and self-leadership enabling employees to integrate thinking, feeling and behavior[59]. Resultatively, where managers were earlier hired and promoted largely on the basis of their technical or substantive skills, they presently face mounting demands for personal qualifications such as social skills and self-leadership ability. It should be underlined, though, that substantive expertise, be it theoretical, practical or strategic, takes an undeniable role in the build-up of professional expertise and managerial

credibility. As substantive expertise is domain-specific, this study investigates it only narrowly and superficially through theoretical knowledge, practical experience, insight, and academic argumentation.

Personality: In addition to observable personality traits that have traditionally enjoyed a dominant position as descriptors of personality, other variables such as motives and cognitive styles deserve attention, especially in the context of organizational life. Motives and cognitive styles are purposive-cognitive factors and causal agents that relate to behavior and have predictive value. More specifically, motives constitute drivers for action functions and cognitive styles for planning and problem solving, which explains why they are worthy of examination in the work context.

This study addresses bipolar personality dimensions that moderate the five universal leadership functions, including achievement motive (competitive achievement and focused achievement), leadership motive (action leadership and inspiration), cooperation motive (sociability, listening and reliance), cognitive style (orientation, perception and thinking), and attitudes (ambiguity-change, optimism and self-image) [60].

Socio-emotive skills: One of the most intriguing organizational processes is interpersonal communication, not from the viewpoint of information exchange, but in particular, from the point of view of the innuendos, feelings and conscious and subconscious messages that employees convey. The recent paradigm in communication studies consequently discriminates between traditional linear views of communication as one-way information transmission, and more recent understanding of communication as a social process involving emotional exchange, culture formation and relationship build-up [61]. What is of interest in the context of leadership research is that numerous studies have demonstrated that the social or relational abilities of the leader and his or her inspirational communication strategies are associated with successful employee outcomes [62].

The present study departs from the definition of socio-emotive competence either as biological or learnable and chooses to focus on its manifested, behavioral expression in the work context [63]. This is important due to the connection between a leader's mood and the subsequent mood of his subordinates. The connection is grounded on the design of the human brain, and because of this so-called mirroring process, huge expectations are placed on a leader, as his emotions tend to shift into the registers of those in interaction with him. What is noteworthy is that moods can be transmitted also nonverbally, because emotions can be conveyed even in silence, through body language. Although every participant in a culture adds his or her own touch to the mixture of personal footprints, those of leaders have the strongest impact, since their messages bear most weight because of the role assigned to them. They manage meaning and interpretations for the entire organization, even when not expressing their thoughts consciously, intentionally or out loud. Their responses and bodily conduct are followed closely and modelled on, and this is how they set the emotional standard for the work environment [64].

Emotional intelligence or socio-emotional intelligence is founded on two levels of capacity: intrapersonal or emotional, and interpersonal or social intelligences, further divided into self-awareness, self-management, self-motivation, social awareness and relationship management. A fundamental aspect of socio-emotional intelligence is the

reflection and understanding of one's own emotions, and self-reflection and self-awareness are generally recognized as the most important and effective managerial tool. Effective self-awareness facilitates self-motivation and emotional regulation, which helps prevent emotions from rising to a level that causes stress and problematic behaviour. There is evidence that those capable of regulating their emotions by means of rational thinking are physiologically, cognitively and socially healthier. Strong intrapersonal, or self-leadership, skills form the platform for social fluency. Social awareness allows the individual to read, interpret and tolerate others' emotions, and those capable of capitalizing on this knowledge by attuning their conduct to the moods of others are regarded as socially skilled [65].

Social fluency can prove particularly useful for those in charge: adoption of soft influence tactics positively facilitates organizational change and makes leaders appear as more effective in the eyes of the followers. Although not always recognized as a communication skill, effective listening has been claimed to distinguish the best managers and leaders [66]. They do not merely listen, but they give their full attention, attune to the other person's feelings, paraphrase and ask questions to understand better. Their attunement is not jeopardized by preoccupation; full listening maximizes physiological synchrony and emotional alignment, resulting in their presence being truly felt by the other person [67].

The present research subsequently includes question items that represent both the one-way information dissemination process and the two-way meaning creation and relationship build-up process.

Cultural skills: Changes stemming from globalization accentuate socio-cultural aspects in employee competence development to accommodate the needs of individuals representing increasingly different educational backgrounds, cultures, and nationalities in the workplace [68]. Global markets and value network necessitate both scientific-technical and economic competences that bolster production, but also socio-cultural awareness and mental flexibility bridging the gaps between the growingly multi-cultural staff. Simultaneously, cultural and generic knowledge such as methodological, communicational, and personal skills facilitating the functioning of multicultural corporate teams are called for, as industrial tasks become less repetitive, linear and mechanistic. Resultatively, today's employees experience disengagement that stems from the cultural boundaries characterizing the professional work settings and impeding the build-up of social connections and trust. The increase in workforce diversity also complicates managerial work, requiring cross-cultural skills such as cultural empathy and adaptability [69].

This is why generic socio-emotional skills such as empathy, flexibility, tolerance for diversity and openness are included in the present study. However, as they represent generic socio-emotive skills, they were not grouped under their own heading in Table 1.

Ethics and values: Recent managerial wrongdoings have set higher and more public requirements for leader conduct that is in line with organizational values and societal morale. More than ever, employees need to be ethically oriented and socially responsible, capable of contributing to a just, equitable and sustainable world. Further, they are expected to master ethical thinking and implementation both on the macro-

ethical level related to their profession and the micro-ethical level of the individual [70].

Consequently, the present survey includes question items addressing sustainability, values thinking, integrity and responsibility.

3.2 Research framework

Traditionally, managerial communication studies have focused on the interaction between managers and subordinates, neglecting to adopt an individual differences perspective and paying, until recently, little attention to an individual leader's personal capabilities. To fill the related research gap, the present work embarked on a quantitative empirical effort to conceptualize and operationalize effective leader behaviour in today's industry. The study examined leadership broadly through five categories of competence pertinent for managers' professional artistry: 1) substantive knowledge, 2) personality (motives, thinking styles and attitudes), 3) socio-emotive skills, 4) cultural skills, and 5) ethics, values and attitudes. Under such a definition of leader capabilities, the five areas were further divided into 81 skills, abilities or personality dimensions, responded to on a Likert scale 1 (not important) – 6 (highly important).

This approach is founded on our previous study that identified effective leadership to comprise the substantive foundation, the personality level of intrapersonal or self-leadership ability, and the manifested level that shows as communication behavior, as depicted in Figure 1. The key finding was that effective managerial conduct centers on assertion (alpha .88) emotional availability (alpha .90) and inspiration (alpha .81), found on the interpersonal or skills level.



Fig. 1. The foundation of effective leadership.

3.3 Method and data collection

The present research focused on examining today's leader requirements in industry. The ultimate aim was to support organizational HR processes, particularly recruitment and competence development. The survey asked for 1) respondent details (age, gender, and experience from supervisory tasks), 2) respondents' industry or field, and 3) respondent insights into supervisory requirements (81 question items as listed in Table 1). The survey was devised with the Webropol tool. An online survey link was emailed to corporate HR managers, who then forwarded the invitation email to their staff. Responding took approximately 20 minutes.

The question items were derived from the literature review and two previously established instruments:

1. **the Work personality index WOPI 360:** WOPI 360 is a multi-source appraisal for the comprehensive assessment of managers' universal competences in terms of competent, good and desired behaviors. The 45-item questionnaire incorporates descriptive statements typical in managerial work situations. The respondents use a 1-7 graphic rating scale to appraise how descriptive each statement is of the target person's habitual behavior (1 = not at all descriptive; 7 = very descriptive). [71]
2. **Emotive Communication Test (ECT):** The ECT is an other-report tool measuring managerial socio-emotive skills. Its origin is in the Affective Communication Test ACT, which assesses nonverbal expressiveness and the affective elements that are essential to face-to-face and interpersonal relations in effective leadership. The instrument is valid for examining one's ability to transmit emotion, and to lead and inspire others, thanks to its focus on such dimensions of expressivity as communication ability, emotionality, extraversion, responsivity, and empathy. The ECT is an adaptation that was modified to suit the Scandinavian operating culture, addressing self-regulation, assertion, agreeableness and emotional accessibility through 20 questions on a 1-7 graphic Likert scale (1=not at all descriptive; 7=very descriptive) [72].

Table 1. The categories under examination and the related question items.

SUBSTANTIVE KNOWLEDGE	1. is competitive
2. has theoretical domain expertise	3. makes decisions based on fact
4. has practical, hands-on experience	5. is optimistic and hopeful
6. has insight and visionariness	7. is realistic and considers facts
8. has academic writing skills	9. believes in him/herself
SOCIO-EMOTIONAL SKILLS	10. is self-aware and realistic about him/herself
11. communicates clearly and unambiguously	12. recognizes his/her flaws and weaknesses
13. communicates in an original and personal style	14. is assertive and decisive
15. expresses empathy	16. likes to help others
17. discusses issues outside work	18. relies on others
19. is good at summarizing	20. willingly leads others
21. expresses emotions	22. is compliant, follows advice and rules
23. gives positive feedback	24. is flexible, capable of compromising
25. gives critical feedback	26. is not impulsive or easily provoked
27. accepts critical feedback	28. is goal-oriented and determined
29. is an enthusiastic public performer	30. is efficient and a high achiever
31. inspires and motivates others	32. carefully considers every decision
33. hugs or touches in emotional situations	34. makes decisions in a speedy manner
35. tolerates failure and disappointments	36. is systematic and organized
37. has a sense of humor	38. solves problems analytically
39. expresses opinions assertively	40. is intuitive and relies on instinct
41. doesn't avoid emotional situations	42. remains calm and collected even in crises
43. is collegial and expresses solidarity	44. takes responsibility for the atmosphere
45. communicates negative issues face-to-face	46. is punctual and a good time-manager
47. makes sure his/her messages are understood	48. tolerates routines
49. is sensitive to other people's moods	50. is intelligent
51. negotiates skillfully	52. thinks critically
53. keeps others up-to-date and shares information	54. is good at motivating him/herself
55. networks and participates actively	56. seems content and happy
57. masters small-talk	58. is entrepreneurial
59. admits his/her mistakes	60. wants to develop as a human being
61. apologizes when necessary	62. adapts easily to change
63. is emotionally intelligent	64. is warm and agreeable
65. is credible and convincing	66. is balanced and at peace with him/herself
67. is energetic and enthusiastic	ETHICS, VALUES AND MORALE
PERSONALITY	68. does not compromise his/her values
69. is inspired by new ideas and change	70. is absolutely honest in every situation
71. focuses on detail	72. takes responsibility for his/her wellbeing and self
73. focuses on the bigger picture	74. takes responsibility for others and their wellbeing
75. is extraverted and sociable	76. is concerned for the environment and sustainability
77. is a good listener	78. tolerates and respects diversity
79. is creative and innovative	80. is reliable
81. is willing to experiment with new ideas	

The data were gathered from organizations that employ engineers. As can be seen in Table 2, most respondents in the sample represented the private sector (engineering, commerce, finance), and the rest the public sector (higher engineering education or research, health care, city administration). Anonymous responses were received from altogether 503 respondents, out of which 269 were male and 234 female. In the sample, 190 respondents were 40 years or above, and 303 under, and 308 had managerial experience and 195 not (Table 1).

Table 2. Respondent fields.

Field of operation	n
Engineering industries	119
Finance	75
Commerce	63
Engineering education, or research	79
Health care	9
Other	158

4 Results and conclusions

The results from the sample of 503 respondents to the online survey indicate that regardless of respondent age, gender, managerial experience and field, such emotive skills and personality dimensions that form the foundation for self-leadership are prioritized highest in industrial leader quality requirements. These included the ability to deal with emotionally difficult situations: receiving critical feedback, admitting one's mistakes and apologizing. Managers are also expected to be balanced, implying that impulsive behavior is destructive in managerial tasks. Further, managers are expected to manage traditional information dissemination duties and to actively deliver and spread relevant information. In the sample of 503 respondents, the top ten item averages were as shown in Table 3.

Table 3. Top ten item averages in the sample

Question item	average	Stand. dev	deviation	median	
1.is reliable	5,53	0,66	0,27	6	personality
2.gives positive feedback	5,43	0,74	0,74	6	socio-emotional
3.keeps others up-to-date and shares information	5,42	0,71	0,71	6	socio-emotional
4.accepts critical feedback	5,40	0,70	0,70	6	socio-emotional
5.communicates negative issues face-to-face	5,37	0,79	0,79	6	socio-emotional
6. communicates clearly and unambiguously	5,32	0,72	0,72	5	socio-emotional
7.inspires and motivates others	5,30	0,76	0,76	5	socio-emotional
8. apologizes when necessary	5,30	0,82	0,82	5	socio-emotional
9. expresses opinions assertively	5,28	0,75	0,75	5	socio-emotional
10. admits his/her mistakes	5,23	0,84	0,84	5	values and ethics

No major differences can be found between male and female respondents, as can be seen in Table 4. Nine out of ten items were identical on the two rankings, with only one difference: where men viewed “admits his/her mistakes” as an essential leader requirement, women prioritized “remains calm and collected even in crises”.

Table 4. Top ten item averages for male and female respondents.

Male		Female	
is reliable	5,52	is reliable	5,56
accepts critical feedback	5,39	keep others up-to-date and shares information	5,55
gives positive feedback	5,36	gives positive feedback	5,54
communicates negative issues face-to-face	5,31	communicates negative issues face-to-face	5,49
keep others up-to-date and shares information	5,29	accepts critical feedback	5,45
apologizes when necessary	5,27	communicates clearly and unambiguously	5,42
expresses opinions assertively	5,26	inspires and motivates others	5,4
admits his/her mistakes	5,24	apologizes when necessary	5,38
communicates clearly and unambiguously	5,23	expresses opinions assertively	5,29
inspires and motivates others	5,21	remains calm and collected even in crises	5,28

Respondents’ managerial experience did not induce major differences in responses, either, as shown in Table 5. Eight out of the ten items on the top ten list are identical, with only two differences: those with managerial experience value “inspiration and motivation” and the ability to “communicate clearly and unambiguously”, whereas those with no experience in managerial roles prioritized the ability to “remain calm and collected even in crises” and “practical, hands-on, field-related expertise”.

Table 5. Top ten items for those with experience in managerial tasks and for those with none.

Has managerial experience		No managerial experience	
is reliable	5,53	is reliable	5,49
gives positive feedback	5,41	accepts critical feedback	5,38
accepts critical feedback	5,39	expresses opinions assertively	5,36
keeps others up-to-date and shares information	5,33	communicates negative issues face-to-face	5,36
communicates negative issues face-to-face	5,29	remains calm and collected even in crises	5,28
apologizes when necessary	5,28	apologizes when necessary	5,25
inspires and motivates others	5,27	has practical, hands-on, field-related experience	5,23
communicates clearly and unambiguously	5,26	gives positive feedback	5,21
admits his/her mistakes	5,25	admits his/her mistakes	5,2
expresses opinions assertively	5,23	keeps others up-to-date and shares information	5,18

When examining the averages per respondent field, some peculiarities emerge. Table 6 demonstrates that all the fields within the study value managerial “reliability”, “positive feedback” given by the manager, manager’s abilities to “accept critical

feedback” and “communicate difficult issues face-to-face”, and managers who “share information and keep others up-to-date”.

Table 6. Top ten items per field.

Engineering		Finance	
is reliable	5,37	is reliable	5,57
gives positive feedback	5,29	communicates negative issues face-to-face	5,5
accepts critical feedback	5,27	keep others up-to-date and shares information	5,47
apologizes when necessary	5,25	communicates clearly and unambiguously	5,38
inspires and motivates others	5,22	accepts critical feedback	5,38
communicates clearly and unambiguously	5,21	gives positive feedback	5,3
expresses opinions assertively	5,19	expresses opinions assertively	5,28
communicates negative issues face-to-face	5,19	focuses on the bigger picture	5,27
keeps others up-to-date and shares info	5,16	remains calm and collected even in crises	5,27
recognizes his/her flaws and weaknesses	5,09	apologizes when necessary	5,27
Engineering education or research		Healthcare	
is reliable	5,75	has practical, hands-on, field-related experience	5,71
gives positive feedback	5,58	gives positive feedback	5,71
communicates clearly and unambiguously	5,54	expresses opinions assertively	5,71
inspires and motivates others	5,54	accepts critical feedback	5,57
keeps others up-to-date and shares info	5,54	is balanced and at peace with him/herself	5,57
communicates negative issues face-to-face	5,51	is reliable	5,57
accepts critical feedback	5,48	takes responsibility for the atmosphere	5,43
apologizes when necessary	5,43	communicates negative issues face-to-face	5,43
remains calm and collected even in crises	5,42	makes sure his/her messages are understood	5,43
is good at summarizing	5,37	keeps others up-to-date and shares info	5,43
Commerce		Other	
is reliable	5,69	gives positive feedback	5,53
keep others up-to-date and shares info	5,56	accepts critical feedback	5,49
gives positive feedback	5,49	is reliable	5,48
accepts critical feedback	5,44	communicates negative issues face-to-face	5,47
admits his/her mistakes	5,36	keeps others up-to-date and shares information	5,43
apologizes when necessary	5,36	expresses opinions assertively	5,37
has practical, hands-on experience	5,31	communicates clearly and unambiguously	5,36
communicates negative issues face-to-face	5,31	inspires and motivates others	5,34
inspires and motivates others	5,3	remains calm and collected even in crises	5,34
expresses opinions assertively	5,25	admits his/her mistakes	5,34

Some differences emerged when analyzing differences between fields. Quite logically for a sector that operates in citizen health and security, healthcare prioritizes practical, field-related expertise highest. The sample of the “Other” field comprised

mostly employees from city administration, which, in the absence of more tangible incentives and bonus programs, probably long for recognition and feedback from their leaders. In finance, skills in clear and frank information transfer are of the essence, which can be expected in an industry where even the tiniest inaccuracies in details can induce major financial risks or loss.

What was regarded as least important for managers in all the fields was “hugging or touching in emotional situations”, which could be a cultural trait in the Finnish society. Similarly, competitiveness, an original or personal communication style, and reliance on others were not deemed important, nor were academic writing skills or small-talk. These findings apply to all respondent groups, to both genders, to those with or without managerial experience, to younger and older participants. Subordinates apparently do not wish to serve leaders that are driven by a strong competition motive but rather appreciate social motives in them. On the other hand, they want their managers to be assertive, without a need to rely on others or to look for others’ acceptance. Workplace interaction should focus on work and the substance matter, small-talk is not valued. A common, plain and ordinary communication style suffices that does not even have to be academically sophisticated.

4.1 Factor analysis

The data acquired from the 503 respondents was treated with SPSS for factor analysis (main component analysis, varimax rotation in use), examining the differences between respondents with and without managerial experience. The aim was to identify the competences required in managerial work that are regarded as pivotal for organizations.

The five strongest factors in the sample of respondents with no managerial experience emerged as shown in Appendix 1 in their order of strength: 1) emotional stability, 2) agreeableness, 3) self-leadership, 4) efficiency and energy, and 5) conscientiousness. The first three categories are of personality origin and manifest themselves strongly in interaction with others as self-regulation ability, lack of impulsiveness, approachability and self-discipline. It is interesting that substantive knowledge explains for leadership to the least extent.

In the category of respondents with managerial experience, the five strongest factors were, in their order of strength: 1) agreeableness, 2) self-leadership, 3) emotional stability, 4) conscientiousness, and 5) assertion. Again, personality-driven attributes were accentuated in respondent perceptions, showing that managers understand the value of interaction and the quality of their relationship with the followers. The emphasis on conscientiousness probably stems from the competitive and performance-valuing operating environment in today’s organizations and the demands it poses for drive and achievement. Assertion offers no surprise, as firm and convincing ethical communication has generally been valued by other studies, too.

5 Discussion

Traditionally industrial managers have regarded emotions as an element that disturbs the rational operation of organizations but are beginning to understand that humanity goes hand in hand with good performance. An increasing body of evidence has confirmed the mediating role of leader affects and emotional intelligence for industrial performance. Post-modern employees recognize that the fundamental or primal task of leadership is emotional, to prime good feeling in those they lead by creating resonance that allows the best in people to be unleashed. This good feeling in the community facilitates the build-up of a reservoir of positivity, which brings added value as the decisive factor driving productivity and the overall performance of the organization.

This study set out to break leadership down into its essential components, to support university curriculum development and organizational competence development by identifying the key constructs of successful leadership. The analysis revealed that organizations place huge expectations on their leaders in terms of their personality development and socio-emotive abilities. This study showed that the most accentuated expectations are directed to leaders' self-leadership ability; the most crucial component of managerial interaction seems to be the ability to control one's behaviour in a way that conveys balance, warmth and stability as this promotes approachability and ensures communication of critical information also bottom-up.

While self-awareness and self-leadership are beneficial in bringing balance and happiness to one's life, their appropriate and purposeful application in a way critical for the entire organization takes place, first and foremost, through reliable, ethical and value-based leader conduct that secures the fundamental legitimacy of the organization. By demonstrating self-leadership, the leader can serve as an example in accepting one's weaknesses, apologizing for one's mistakes, accepting criticism and appreciating others' successes and effort, but also in motivating oneself for competence development, resilience and personal growth. Further, motivational and inspirational leader communication styles, active listening skills, and spreading of positive energy and passion for the organizational mission are known to contagiously infect the work community with joy of work and dedication and elevated levels of achievement and performance.

In order for this to materialize, the engineering education needs to incorporate themes such as self-leadership and self-reflection into the degree curricula to ensure a solid basis for constructive dialogue and positive communication in industries. Besides serving engineering communities through more versed and effective leadership, such a reform will allow engineering graduates, be they leaders or subordinates, to lead more satisfactory – and productive – lives characterized by warm relationships and genuine interaction.

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8 Appendix

Factor analysis based on respondents with no managerial experience.

		Rotated Component Matrix* / Component									
		1	2	3	4	5	6	7	8	9	10
1. EMOTIONAL STABILITY	M78. is reliable	,700									
	M58. tolerates failure and disappointments	,630									
	M57. remains calm and collected even in crises	,622									
	M70. apologizes when necessary	,609									
	M69. myöntää virheensä / admits his/her mistakes	,603									
	M77. is balanced and at peace with him/herself	,565		,454							
	M27. keep others up-to-date and shares information	,536									
	M79. is emotionally intelligent	,514	,427								
	M48. is flexible, capable of compromising	,512									
	M18. is not impulsive or easily provoked	,483									

2. AGREEABLENESS	M74. tolerates and respects diversity	,480						
	M23. communicates negative issues face-to-face	,471						
	M72. takes responsibility for others and their wellbeing	,463						
	M17. takes responsibility for the atmosphere	,460						
	M22. is collegial and expresses solidarity	,456						
	M44. likes to help others	,450						
	M39. is realistic and considers facts	,443						
	M41. is self-aware and realistic about him/herself	,441						
	M33. is a good listener	,432						
	M42. recognizes his/her flaws and weaknesses	,426						
	M20. doesn't avoid emotional situations	,413						
	M10. expresses emotions		,720					
	M7. expresses empathy		,664					
M16. hugs or touches in emotional situations		,647						
M8. discusses issues outside work		,638						
M76. is warm and agreeable	,462	,571						
M6. communicates in an original and personal style		,515						
M49. has a sense of humor		,444						
M56. is intuitive and relies on instinct		,440						
M25. is sensitive to other people's moods		,416						
M45. relies on others		,400						
3. SELF-LEADERSHIP	M66. wants to develop as a human being			,620				
	M71. takes responsibility for his/her wellbeing and self			,595				

4. EFFICIENCY AND ENERGY	M65. is entrepreneurial		,584						
	M63. is good at motivating him/herself		,569						
	M64. seems content and happy		,531						
	M40. believes in him/herself		,473						
	M67. does not compromise his/her values		,470						
	M46. willingly leads others								
	M73. is concerned for the environment and sustainability								
	M53. makes decisions in a speedy manner			,554					
	M81. is energetic and enthusiastic			,523					
	M36. is competitive			,513					
	M32. is extraverted and sociable			,510					
	M29. masters small-talk	,440		,509					
	M14. is an enthusiastic public performer			,496					
	M43. is assertive and decisive			,490					
5. CONSCIENTIOUSNESS	M26. negotiates skillfully			,472					
	M51. is efficient and a high achiever			,461					
	M80. is credible and convincing			,437					
	M61. is intelligent								
	M50. is goal-oriented and determined								
	M52. carefully considers every decision				,656				
	M54. is systematic and organized				,635				
	M47. is compliant, follows advice and rules				,623				
	M30. focuses on detail				,621				
	M55. solves problems analytically				,567				
	M37. makes decisions based on fact				,503				
	M60. tolerates routines				,471				
	M59. is punctual				,432				

and a good time-manager									
M62. thinks critically									
M12. gives critical feedback						,779			
M13. accepts critical feedback						,735			
M11. gives positive feedback						,642			
M19. expresses opinions assertively						,490			
M15. inspires and motivates others									
M35. is willing to experiment with new ideas						,639			
M21. is inspired by new ideas and change						,637			
M34. is creative and innovate						,541			
M28. networks and participates actively						,438			
M38. is optimistic and hopeful						,429			
M75. adapts easily to change									
M4. has academic writing skills							,595		
M5. communicates clearly and unambiguously							,576		
M9. is good at summarizing							,576		
M3. has insight and visionariness							,478		
M31. focuses on the bigger picture									
M1. has theoretical domain expertise								,705	
M2. has practical, hands-on, field-related experience								,693	
M24. makes sure his/her messages are understood									
M68. is absolutely honest in every situation									,525

Extraction Method: Principal Component Analysis.

a. Rotation converged in 14 iterations.

Rotation
Method:
Varimax
with Kaiser
Normaliza-
tion.