
Soft skills needed in the ICT project management – classification and maturity level assessment

Bogdan Lent*

Department of Economics,
University of Applied Sciences,
Morgartenstrasse 2c, 3014 Bern, Switzerland
and

Department of Management and Command,
National Defense University,
Al. Chruściela 103, 00-910 Warsaw, Poland
and

Faculty of Telecommunications and Electrical Engineering,
University of Technology and Life Sciences,
Al. S. Kaliskiego 7, 85-789 Bydgoszcz, Poland
and

Department of Computer Engineering,
Faculty of Engineering,
Kasetsart University,
50 Phahon Yothin Rd., Bangkok 10900, Thailand
E-mail: bogdan.lent@lent.ch

*Corresponding author

Malgorzata Pinkowska

Department of Computer Engineering,
Faculty of Engineering,
Kasetsart University,
50 Phahon Yothin Rd.,
Bangkok 10900, Thailand
E-mail: m.pinkowska@gmx.ch

Abstract: Numerous surveys proved that people are the main cause of failure and challenges of the ICT projects. Project manager skills to handle humans are essential to success of those endeavours. In this paper, authors investigate the awareness of soft skills understanding by project management practitioners and researchers. The analysis of 234 job advertisements for project managers published in Switzerland, Poland and Thailand, displayed significant deviation of demanded skills as compared with the evaluation of 29 journal publications and 46 books on project management. Mapping of recognised skills to the human factors processes of L-Timer® project management system and assessment of skills maturity in accordance to Blooms' taxonomy explains their complexity. Same time the relatively shallow insight of practitioners and researchers into soft skills awareness is exposed.

Keywords: ICT project manager; project key success factor; soft skills; L-Timer; Bloom's taxonomy.

Reference to this paper should be made as follows: Lent, B. and Pinkowska, M. (2012) 'Soft skills needed in the ICT project management – classification and maturity level assessment', *Int. J. Applied Systemic Studies*, Vol. 4, No. 3, pp.168–185.

Biographical notes: Bogdan Lent is a Project Manager, a University Professor, and Director of Postgraduate Studies. He pursues his scientific research in project management, human factor in particular, at the Universities in Switzerland, Poland and Thailand. He authored numerous patents, seven books/monographies and 60 publications in three languages on project management and related issues. He is the Project and Programme Manager of strategic projects of Swiss Government and private organisations. He is a member of several professional organisations and chambers of commerce.

Malgorzata Pinkowska is a PhD candidate at the Department of Computer Engineering at Kasetsart University in Bangkok, Thailand. Her research focuses on human factor related processes in ICT project management, essential soft skills of project managers for different environments and cultures, their impact on project success, project managers' effectiveness and work motivation. She was an international research team member at the Military Academy at the Swiss Federal Institute of Technology in Zurich (ETHZ), Switzerland. She authored and co-authored several scientific publications.

1 Introduction

According to most frequently quoted ICT project management statistics CHAOS only 16–35% of all projects have been successful in the last 15 years (The Standish Group International, 2011). The investigations of ICT project key success factors won the attention of the researchers and practitioners for the last several decades (Powers and Dickson, 1973; Duncan, 1987; Moriss and Hough, 1987; Blaney, 1989; Redmil, 1990; Archibald, 1992; Waterdige, 1995; Shenhar et al., 1996; Gillard, 2009). Increasingly, beside the technical skills and knowledge, also the soft skills of project manager begun to be recognised as having impact on project performance (Belassi and Tukul, 1996; Belzer, 2001; Corcoran, 1997; Kerzner, 2003; Thieme et al., 2003; Suikki et al., 2006; Wong, 2007; Sampson, 2007; Van Ingen, 2007; Langer et al., 2008; Taylor and Woelfer, 2009; Wan et al., 2009; Stevenson and Starkweather, 2010). Employers started to emphasise the fundamental role of employees' soft skills in the success of their ICT endeavours (Casner-Lotto and Benner, 2006). In consequence, both science (Skulomski and Zayed, 2010; Pant and Baroudi, 2008) and practice (Police, 2010) indicated the necessity of inclusion of the soft skills development into the curriculum of software engineering education (Skulomski and Zayed, 2010; Pant and Baroudi, 2008) and practice (Pollice, 2010).

This positive change is most welcome, yet as shown later in this paper, by far insufficient in the right assessment of the complex challenge of soft skills nature. This paper exposes the level of awareness in both groups by referencing to the comprehensive model of skills needed to execute the related project management processes. Bloom's

cognitive taxonomy shows to which extend the intellectual challenges are properly considered by the practice and the science.

2 Soft skills definition

Appropriate skills mastering is required to perform successfully given activity (Tilchin, 2008). A skill is defined as learned ability to bring pre-determined results with maximum certainty, often with the minimum outlay of time or energy or both (Knapp, 1964). Term 'soft skill' is used most often to describe all or partial aspects like demanded general project employees' qualification to handle human relationships, behaviour in conflicts, motivation to work, leadership style or team work (e.g., Motah, 2008). Several authors like Dewson et al. (1987) and Wohlin and Ahlgren (2005) describe soft skills as those skills, which are required to achieve soft outcomes, being difficult or impossible to measure. The term is interchangeably used with soft factors (Caupin et al., 1999; Wohlin and Ahlgren, 2005), interpersonal skills (Gillard, 2009; PMI, 2004) people skills (Flannes, 2004), personal skills (Murch, 2001), social skills (Alam et al., 2010), behavioural skills (Taylor and Woelfer, 2009) or human skills (Pant and Baroudi, 2008). In most cases a clear definition of the used term is missing [see Pinkowska and Lent (2011) for detailed discussion of what constitutes soft skills].

For the purpose of the research pursued by the authors, the term soft skills is defined as an aggregation of all interpersonal and personal learnable abilities, which contribute to higher efficiency of the execution of the human factor related processes of project management (Pinkowska et al., 2011).

3 Soft skills identification

Soft skills are differently treated in monographies and standards and differently in journals and conference publications. Authors observed that:

- journals and conference publications report newer and up-to-date results
- monographs and standards evaluate the subject more thoroughly and broadly, however, usually lack some actuality.

Twenty-nine journals and conference proceedings and 46 monographs and standards strictly related to project manager skills underwent the analysis. The content analysis of both groups allowed to identify 79 soft skills.

In awareness of multicultural impact on demanded soft skills a selection of target cultures has been done. The comparability of the economies with possibly distant cultural heritage has been chosen as a criterion. Reference model economy shall place the demand of soft skills in the right perspective. Poland and Thailand, representative of the new economies, both are on comparable economical level with comparable development pace. Poland was the only European economy to register positive growth in economic crisis year 2009. The country was ranked 39th according to The Global Competitiveness Index 2010–2011 whereas Thailand takes 38th position. World Economic Forum concluded

that both countries move toward the most advanced stage of economic development (Schwab, 2010). The management cultures in these two countries cannot be more differentiated: Asian and European, hierarchy versus democracy, masculine versus gender indifferent (Hofstede and Hofstede, 2004). Switzerland, the world's most competitive economy, is invariantly according to the global competitiveness report ranked number 1 (e.g., report 2010–2011) or 2 (e.g., report 2006–2007), whereas leading economies in other years change significantly across the cultures (Singapore, Sweden, USA and so on). Switzerland has also world highest quality of life and work motivation (Ernst & Young, 2006). Furthermore, Swiss employees are known for the high skilled, high quality of their work, high labour efficiency as well as for their strong work ethic. Major investments of international companies in Switzerland are in the ICT sector. Worldwide unique reliance on professional management and the availability of the right skills, are one of the reasons why Switzerland is home to more than 600 enterprises engaged in research and development of new ICT products and services (Ernst & Young, 2006). Therefore, Switzerland has been chosen as a reference model for the evaluation of the soft skills needed to perform as project manager in a given country.

To assess now the practitioners awareness in those three countries, job advertisements with vacancies for ICT project manager have been thoroughly examined. According to Gallavin et al. (2004), the online jobs advertisements are the most popular source of jobs proposals for the ICT workers. Therefore, the ICT project managers' vacancies, advertised across 2009 and 2011, have been solicited from the most popular job-websites in Switzerland (CH), Poland (PL) and Thailand (TH) and further submitted to thorough evaluation (see Table 1).

Table 1 Number of analysed advertisements with relation to country and web portals

<i>Country</i>	<i>No of analysed advertisements with soft skills</i>	<i>Web portals</i>
Switzerland (CH)	69	http://www.jobs.ch , http://www.jobscout24.ch , http://www.jobsuchmaschine.ch , http://www.monster.ch
Poland (PL)	85	http://www.infopraca.pl , http://www.jobs.pl , http://www.praca.pl , http://www.jobpilot.pl , http://praca.gazetapraca.pl , http://www.praca.info , www.pracuj.pl ,
Thailand (TH)	80	http://www.nationejobs.com , http://www.jobsdb.com http://jobs.monster.co.th , http://th.jobsdb.com

Intentionally, a broader term 'project manager' has been selected as keyword to diminish the impact of various understandings of IT, ICT, computer, software, application, service, system and relevant job description extensions. Further, the content was manually analysed to solicit the appropriate advertisements with soft skills demand. Only about 35% of advertisements contained the soft skills requirements and were further analysed. The reason why the remaining larger group does not treat the soft skills is in speculative area: might be, the responsible planned to examine them during the interview, might be that only basic school knowledge was demanded, might be that the advertising were simply still unaware. Finally, the 42 soft skills were solicited from 234 advertisements (about 35% of all).

4 L-Timer® – reference model for soft skills classification

The completeness of the evaluation base might be assured, if an objective base for comparison is chosen. The processes dedicated to human factor with detailed analysis of sub-processes and individual action to be taken by project manager are considered to be an appropriate and culture-neutral base for the evaluation. The process based L-Timer™ mental model of project management, verified over the ten years of practical deployment and theoretical justification has been chosen as a base for skills solicitation [see Lent (2011) for more details]. In this model the six human factor related processes are defined as presented in Table 2. Processes sequence is given by the logic of occurrences in project life cycle and relationship to corresponding administrative processes [e.g., human resource management (HRM), placed at 20:00 o'clock, is the first human factor related process and matches the organisation management (OM), modelled at 08:00 o'clock. Conflict management (CFM), placed at 00:00 o'clock, matches the problem management (PBM) at 12:00 and so on] (Lent, 2003).

Table 2 Human factor related processes and their goals

<i>Process name and abbreviation</i>	<i>Process main goal</i>
Human resource management – HRM	Best possible assignment of the team members to project roles and related tasks (Belbin, 2010), taking personal needs and development under considerations (Lent, 2011).
Team management – TM	Highest efficiency of the project team, determined by mutual trust, built on personal knowledge about each other in a team (Pinkowska and Lent, 2011).
Conflict management – CFM	Identification of conflict potentials, preventing conflict occurrence and undertaking the suitable actions to solve the emerging conflict securing the sustainability of the solution (Pinkowska and Lent, 2011).
Communication management – COM	Effective communication is one of the key success factors in a project (Melymuka, 2006). Consciousness of communication complexity and proper communication ensuring significantly increase performance (Pinkowska and Lent, 2011).
Self-management (work and life balance) – SM	Reaching the project objectives by developing the personality, personal attitude, capability, self-motivation and managing personal resource towards successful work and life balance.
Leadership – L	Skilful and conscious control of the behaviour of team members targets initiation of specific actions to be taken by the team members (Pinkowska and Lent, 2011).

Each of the L-Timer™ human factor related processes were detailed down to the sub-processes and then individual tasks/actions.

Heuristically to each action the most likely needed skill in the sense of skill definition quoted in Section 2 has been assigned and verified through Delphi procedure with expert labour psychologist. Some skills are used in several processes. Their recurrence is useless from the point of view of the targeted summary of all skills. Therefore, the skill applied in more than one process is assigned arbitrary to only that process, for which particular skill is essential in fulfilling process goal. In the same manner the skills solicited in scientific publications and job advertisement were allocated along the tasks to be performed according to the L-Timer® model.

The results are presented in Tables 4–9. Columns ‘journal’ give skills solicited from journals and conference publications. Column ‘mono’ presents the skills found in monographs and standards. The advertisement sources are correspondingly CH for Swiss advertisements, PL for Polish advertisements and TH for Thai advertisements. The number of sources in this group, where the corresponding skill was named, is given in each column.

The interpersonal skills, often demanded in advertisements, are used either as a synonym for all soft skills or as another term for communication. In the first meaning it is comprised in the consideration of this paper, in the second it stressed the relevance of communication, already underlined otherwise. For this reasons is this ambiguous term not quoted further in the below tables.

Generally, both groups – scientists and practitioners – named the skills using either the commonly met descriptor, or referring to the selected process task description or choosing particular skill name, seldom or never defining the term and specifying the context and selection criteria. The more general, process-level skills are named in the first rows of each table given for each process (see Tables 4–9) and as too general are not qualified with regard to the Bloom’s maturity levels in cognition (see Section 5). The specific skills, needed to perform a specific task in the process, are listed in the following rows in each table and as such are classified according to the Bloom’s taxonomy.

5 Bloom’s taxonomy – reference model for the skills maturity level assessment

Skills allocation to processes allows to illustrate, which skills are essential to execute the given task. However, the skills vary depending on the complexity of the task and subsequently demanded cognitive capabilities of the person, which executes the task. The maturity level (cognitive capability) required to perform a given task is assigned according to the Bloom’s taxonomy [see Bloom et al. (1956) for more details]. The learning maturity scale of Bloom has been chosen because the skills under consideration may be acquired through learning.

The taxonomy identifies six maturity levels: knowledge, comprehension, application, analysis, synthesis, and evaluation, hierarchically build one upon the other (Woolfolk, 1990). The capability level 2 (comprehension) assumes that the person is capable to act on level 1 (knowledge). The capability to evaluate (level 6) assumes the possession of all lower level cognitive capabilities (Whiteley, 2006). Table 3 gives some characteristics of these levels.

Knowledge, comprehension, and application are considered to reflect lower-order maturity, whereas analysis, synthesis, and evaluation are considered to reflect higher-order maturity. Higher-order maturity is much more difficult to achieve than lower-order maturity, since higher-order reflects critical thinking, which requires one to go beyond just the basic facts, understanding, and application, and to use reasoned thinking to gain the insight required to deal with the situation at hand (Whiteley, 2006).

All skills were assessed according to Bloom’s cognitive domain maturity level. As many cases involved unspecified demand for general level skills (e.g., ‘communication skill’) authors assumed the worst case scenario, i.e., that the highest Bloom’s taxonomy level capabilities are demanded.

Table 3 Bloom's taxonomy

<i>Level</i>	<i>Level name</i>	<i>Level characteristic</i>
6	Evaluation	Focuses on whether the learner can evaluate (access) alternatives or suggested relationships and arrive at an appropriate solution (decision) based on a reasoned assessment of the situation (Whiteley, 2006) (e.g., assess, conclude, decide, appraise, direct, justify, etc.)
5	Synthesis	Focuses on whether the learner can establish new relationships (Whiteley, 2006) (e.g., develop, build, create, design, organise, etc.)
4	Analysis	Focuses on whether the learner can see patterns in the material presented and can separate the material into its constituent parts (Whiteley, 2006) (e.g., analyse, arrange, connect, experiment, etc.)
3	Application	Focuses on whether the learner can apply a content area (Whiteley, 2006) (e.g., use, apply, discover, change, manage, execute, solve, react, role-play, etc.)
2	Comprehension	Focuses on whether the learner understands the meaning of a content area (Whiteley, 2006) (e.g., explain, classify, illustrate, review, re-write, paraphrase, trace, example, etc.)
1	Knowledge	Focuses on whether the learner can recall, recognise or identify specific information (Whiteley, 2006) (e.g., define, list, memorise, recognise, select, etc.)

For validation of the allocation correctness the Delphi method, popular quantitative research approach, using consensus from the experts, was applied. In Tables 4–9, last two columns 'Bloom's taxonomy learning domains' presents level and associated key words. Bloom's taxonomy considers only self-evaluation on the highest, sixth level (evaluation) from number of self-management process tasks. Therefore, the skills related to all tasks in the process of self-management (SM) are not classified below.

6 Soft skills classification and assessment

Hereafter, the results of the analysis of the published and advertised skills, with the assignment to an appropriate level in the Bloom's taxonomy, are given in accordance with the L-Timer™ process sequence.

6.1 HRM process skills

As can be seen in Table 4, the HRM process skills are the most underestimated skills by the employers. Apparently, HRM skills of a candidate are not treated as a criterion during the recruiting process. Only in two advertisements in Poland the relevant skills were demanded.

The scientific sources, in turn, treat the demanded skills quite accurately, however, not in vast number of publications. The HRM skills are spread over all Bloom's levels, with majority of them on levels 5 and 6.

Table 4 Survey of demanded project managers' HRM skills

Process	Skill name	Journal	Mono	CH	PL	TH	Bloom's taxonomy learning domains	
							Level	Key word
Human resource management – HRM	HRM skills	1	3					
	Recruiting skills		1		1		6	Assess, investigate, appraise
	Exposing individuals to select		1				4	Select
	Resource allocation skills	2	3				5	Organise
	Resource using skills		3				3	Use
	Evaluating personal needs skills		1				6	Evaluate
	Recognising prior skills		1				1	Recognise
	Understanding personalities skills		2				6	Assess
	Assessing skills		1				6	Assess
	Performance evaluations skills		2				6	Evaluate, assess effectiveness
	Developing others skills	1			1		5	Develop, organise
	Career development skills	1					5	Develop
	Training skills	1					2	Explain meaning, translate
	Promoting skills	1					6	Assess, appraise, grade, argue effectiveness

6.2 Team management process skills

Judging by the number of advertisements, which ask for the team management (TM) skills, are these skills the second most needed ICT project manager skills in Poland. With the growing need to work in teams composed of members from different countries and companies, the multicultural team management skills start to be noticed by employers in Poland. In Switzerland, according to Federal Office of Statistics (2011) one of the most multinational country of the world, these skills seems to be obvious (see Table 5) and taken for granted by the employers. The Asians culture depend more on groups or institutions to determine what they should do and emphasise the loyalty to the group (Hofstede and Hofstede, 2004). The resulting team oriented way of working in Thailand, is obvious and matches well the project management needs. Therefore, also in Thailand these skills are not particularly demanded in the advertisements. The majority of the skills, which are relevant in the execution of the TM tasks, places at levels 3 and 6 of Blooms taxonomy.

Table 5 Survey of demanded project managers' TM skills

<i>Process</i>	<i>Skill name</i>	<i>Journal</i>	<i>Mono</i>	<i>CH</i>	<i>PL</i>	<i>TH</i>	<i>Bloom's taxonomy learning domains</i>	
							<i>Level</i>	<i>Key word</i>
Team management – TM	Team management skills	4	6	5	22	5		
	Team development skills		1				6	Review
	Team building skills	5	7		2	3		
	People management skills		1	5	3	3	3	Manage
	Understanding group dynamics		2				6	Investigate
	Cross culture management skills		1				6	Assess effectiveness, strategic comparison and review
	Multicultural/multinational team management skills		1	6		5		
	Group facilitation skills	1	1	1		1	3	Prepare, conduct
	Relationship skills, relationship management skill	3	6		3	2	6	Assess effectiveness, strategic comparison and review
	Coordination skills	2			1	4	5	Arrange
	Partners management skills, building partnership		1				3	React
	Team work skills	1	1	11	24	21	3	React, role-play
	Team player skills		1					
	Follow up skills		1				2	Trace
	Collaboration skills		1				3	React, role-play
	Interaction skills			2			3	React, respond

6.3 Conflict management process skills

Conflicts occur unavoidably in any regular project course. However, conflicts are associated with negative feelings and negatively projection onto the project. Authors see this as an explanation, that despite the obvious need for these skills, employers prefer not to demand them in their job advertisements (see Table 6).

Contrary, the conflict management (CFM) skills are well treated in the scientific publications and sufficiently covered there.

To manage a conflict, predominantly the high level skills are required.

Table 6 Survey of demanded project managers' CFM skills

Process	Skill name	Journal	Mono	CH	PL	TH	Bloom's taxonomy learning domains	
							Level	Key word
Conflict management – CFM	Conflict management skills	14	11	4	1	2		
	Conflict resolution skills	14	11				6	Relate, judge, direct
	Dealing with conflict skills		4				6	Strategic review
	Compromise skills	1					6	Strategic review, argue
	Win-win approach (for conflict prevention and resolution)		1				6	Strategic review
	Anger management		1				3	Solve a problem, manage, change

6.4 Communication management process skills

There is no doubt, that communication management (COM) related skills are the most widely recognised and required from the prosperous project managers. Both groups, scientists and practitioner, emphasise the importance of communication skills in successful project management (see Table 7). The employers usually look for project manager with both writing and oral communication skills as one capability. Frequently higher level expectations like feedback, constructive critics or active listening are meant. Therefore, these references are grouped together into the general communication skills. Wherever only writing or only oral communication skills were demanded, they are separately listed.

Most of the employers consider the communication skills as crucial competency of candidates for project managers, even if these demands remain vague and unspecified. The specific demand across all countries and advertisements is for the negotiation skills and presentation skills, accentuated in Thai advertisements indicating particular deficit in these skills there.

Quality of the project is expressed by the degree of customer requirements fulfilment (Ottmann, 2003). Project success is often determined by the customer satisfaction (Dvir et al., 2003). Therefore, not surprisingly, skills related to the orientation on a customer, such as: taking care of the relationship with customer, working with customer, providing feedback to the customer and engagement of the customer to get involved in project work are well represented, too. The results of the survey allow already to conclude, that employers are well aware about the importance of customer relationship in the ICT projects. In this respect striking is missing customer orientation in analysed scientific sources.

The demanded communication skills are spread on all levels of Bloom's taxonomy.

Table 7 Survey of demanded project managers' COM skills

<i>Process</i>	<i>Skill name</i>	<i>Journal</i>	<i>Mono</i>	<i>CH</i>	<i>PL</i>	<i>TH</i>	<i>Bloom's taxonomy learning domains</i>	
							<i>Level</i>	<i>Key word</i>
Communication management – COM	Communication skills	23	31	54	54	52		
	Writing skills	2	4	1			1	Reproduce
	Oral skills	1	5				1	Reproduce
	Choosing the right communication channel		1				4	Identify
	(Active) listening skills	1	14	1			2	Restate
	Questioning skills	1	6				4	Questionnaire
	Talking skills	1	4				2	Discuss
	Negotiation skills	4	23	5	11	15	6	Argue
	Network initiation skills	2	1				1	Arrange, recognise, state
	Mediation skills	2					6	Argue, direct
	Feedback skills	1					5	Propose
	Presentation skills	1	9	7	3	18	3	Show
	Facilitation meetings, mang. meetings skills		6	1			3	Prepare
	Selling skills		2				6	Argue
	Marketing skills		1				6	Argue, justify, direct
	Data interchange skills		2				3	Transfer
	Information processing skills		2				1	Identify, locate, label
	Customer orientation skills			7	15	9	4	Focus, identify constituent parts, relationships

6.5 *Self-management process skills*

SM skills appear to be the most scattered group of skills ambiguously in scientific as in practitioners' considerations (see Table 8). The capability of the project manager to manage himself is either ignored, taken as a prerequisite or remaining unconscious. The chosen singular items indicate either a particular interest of the author or experienced deficit in the past. The relevance of this process towards project goals achievement seems to be widely underestimated.

As Bloom's taxonomy beyond the classification of the self-evaluation on the 6 (highest) level do not provide any further hints and in the opinion of the authors of this paper not all SM skills truly demands this level on cognitiveness we rather opt not to classify all of the SM skills.

Table 8 Survey of demanded project managers' SM skills

<i>Process</i>	<i>Skill name</i>	<i>Journal</i>	<i>Mono</i>	<i>CH</i>	<i>PL</i>	<i>TH</i>	<i>Bloom's taxonomy learning domains</i>
Self-management (work and life) – SM	Ethical behaviour, ethic		2				Not classified
	Assertiveness	1	2	1	5		
	Positive attitude	1	1			2	
	Discipline		2				
	Learning skills, development		4		4		
	Self-learning, fast learning, development		1	1		7	
	Personal career development skills	1	1				
	Work under stress				12	11	
	Stress management skills	3	5	4			
	Time management skills		5		7	1	
	Flexibility	5	4	3	1	1	
	Self-motivation skills		1	4	4	17	
	Independence				12		
	Systematic skills				1		
	Self-management		1				

6.6 Leadership process skills

Leadership (L) skills for both groups, scientists and practitioners, are viewed as important and widely acknowledged skills (see Table 9). However, it can be noticed, that European country employers pay lesser attention to the leadership skills at this level of recruitment, as compared to the Thai advertisement content. According to Bloom's taxonomy, majority of the leadership skills are viewed as complex, requiring the highest level of maturity and are placed on level 6.

Table 9 Survey of demanded project managers' L skills

<i>Process</i>	<i>Skill name</i>	<i>Journal</i>	<i>Mono</i>	<i>CH</i>	<i>PL</i>	<i>TH</i>	<i>Bloom's taxonomy learning domains</i>	
							<i>Level</i>	<i>Key word</i>
Leadership – L	Leadership skills (team leader skills)	22	31	17	10	35		
	Building trust skills	1				5		Build
	Supervising skills				3	2	6	Direct, support, criticise
	Mentoring skills				3	3	6	Direct, support
	Coaching skills			1		9	6	Direct, support, criticise, explain, recommend
	Ability to motivate skills	11		3			6	Persuade, direct

Table 9 Survey of demanded project managers' L skills (continued)

<i>Process</i>	<i>Skill name</i>	<i>Journal</i>	<i>Mono</i>	<i>CH</i>	<i>PL</i>	<i>TH</i>	<i>Bloom's taxonomy learning domains</i>	
							<i>Level</i>	<i>Key word</i>
Leadership – L	Inspire skills			1			3	Dramatise
	Influencing skills	2					6	Persuade, direct
	Political skills (to influence organisation)	5					6	Persuade, direct
	Persuasion skills	1				5	6	Persuade
	Delegation skills	4					6	Decide,
	Good judgments skills				1		6	Judge
	Ability to take the initiative skills	1		1	7	6	5	Creative thinking
	Energise others skills				1		3	Discover, execute
	Decision making skills	2		2	7	8	6	Decide
	Individual contact skills		1				4	Identify, relationship
	Building team morale skills	1					6	Standard establishing
	Directing skills	1					6	Direct
	Achievement orientation skills	1				9	4	Focus
	Business acumen skills		1				6	Decide, judge
	Provide vision skills		1				6	Creativity

7 Research results summary

The results of the analysis are summarised in Figure 1. The six processes on the right depict the skills derived from the tasks. There are in total 189 human factor management related skills. Twenty-four are the self-management skills, which for the reasons explained above in Section 6 are not taken into comparison with the skills derived from the scientific papers and advertisements.

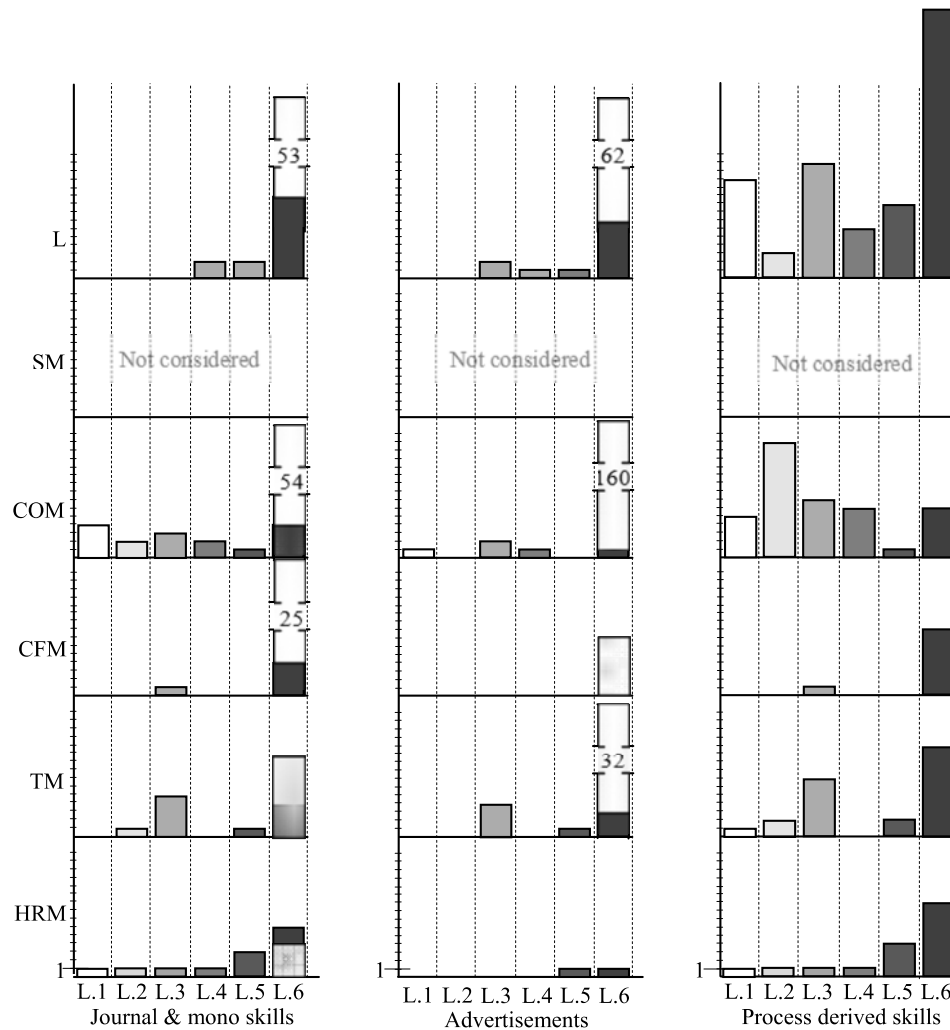
We firstly observe that the process derived skills are predominantly on the six level of Bloom's taxonomy, meaning project management is a highly demanding, intellectual issue. Only in the communication process the lower level 2 skills dominate. This may be explained with task handled in this process which is mainly to deliver the message elaborated in other processes. Nevertheless, also in COM a substantial LEVEL 6 skills are demanded.

Secondly we observe that the majority of skills with a predominant Level 6 amount are required to perform the leadership in a project.

As explained in Section 5 the general skills named both in scientific publications and in the advertisements are assigned to Level 6. Where they reach beyond the scale in Figure 1, they are marked with a number of quotations in the corresponding field. Even considering their arbitrary allocation and possible excessive over-interpretation of the

authors intentions we may qualitatively conclude, that the high cognitive challenges of project management are recognised as well by the science as by the practitioners.

Figure 1 Summary of soft skills maturity level



Striking is the punctuality of demand or otherwise limited consideration of the skills needed to handle the human factor in projects by sources in both groups. Only HRM in the science seems to be adequately treated, while completely underestimated by the practitioners. Also satisfactory, far from adequate, seems to be treated team and conflict management capability of the project managers (TM). Although communication (COM) according to the practitioners and scientists is undisputedly the most demanded feature, the highly unspecific demand for undefined communications skills leads to some second thoughts, whether the authors of those publications and advertisement pray what the preach.

Despite vast interest in leadership, dozens of scientific publications and buzz-word in the advertisements leadership seems to be vastly underestimated and unspecific. There is vast potential to improve and define which skills and for which tasks are really needed.

8 Conclusions

The scientific base for project manager skills elaboration needed in Human Factor related processes is good, yet insufficient. Precision, definitions of common terms and most of all – relationship to the corresponding processes will significantly improve the meaningfulness of the elaborated conclusions. Authors of this paper consider themselves to be privileged to pursue their research in this area.

Advertisements demands in human factor-related skills vary in different cultures. There are clear national/cultural focus areas as well as certain common trend between the three considered cultures. Both Poland and Thailand are on trace of project management skills needed in Switzerland. The comprehensive picture of the individual demand with respect to the human factor-related skills calls for extended view and better identification of needed skills. The process based elaboration of the skills, and an inventory of skills to be chosen may contribute towards conscious selection by the practitioners.

Project management is a complex, highly demanding job with the highest cognitive requirements. It is learnable but candidates have to provide the traits and intellectual capability to deal with it.

Authors of this paper are aware, that beside skills a will to deploy these skills is decisive to the project manager performance. Suitable research is undertaken by the authors and the results of the Swiss study are published in Seiler et al. (2011). The motivation of project managers in Poland and Thailand is concurrently investigated.

Acknowledgements

The authors would like to thank the Editor-in-Chief for his profound review of the draft of this paper.

References

- Alam, M., Gale, A., Brown, M. and Khan, A.I. (2010) 'The importance of human skills in project management professional development', *International Journal of Managing Projects in Business*, Vol. 3, No. 3, pp.495–516.
- Archibald, R.D. (1992) *Managing High-Technology, Programs and Projects*, John Wiley, NY, USA.
- Belassi, W. and Tukul, O.I. (1996) 'A new framework for determinating critical success/failure factors in project management', *International Journal of Project Management*, Vol. 14, No. 3, pp.141–151.
- Belbin, M.R. (2010) *Management Teams: Why They Succeed or Fail*, 3rd ed., Butterworth Heinemann, UK.
- Belzer, K. (2001) 'Project management: still more art than science', available at <http://www.pmforum.org/library/papers/2001/ArtthanScience.pdf> (accessed on 01.03.2011).

- Blaney, J. (1989) *Managing Software Development Projects*, pp.410–417, Project Management Institute Seminar/Symposium Atlanta, USA.
- Bloom, B.S., Englehart, M.D., Furst, E.J., Hill, W.H. and Krathwohl, D.R. (1956) 'Taxonomy of educational objectives', *Handbook I: Cognitive Domain*, David McKay, New York, USA.
- Casner-Lotto, J. and Benner, M. (2006) *Are they Really Ready to Work? Employers' Perspectives on the Basic Knowledge and Applied Skills of New Entrants to the 21st Century U.S. Workforce Contents*, The Conference Board Inc., USA.
- Caupin, G., Knöpfel, H., Morris, P., Motzel, E. and Pannenbacker, O. (1999) *ICB-IPMA Competence Baseline Version 2.0*, Satz&Druck, Eigenverlag, DE, Bremen.
- Corcoran, C.T. (1997) 'How to find an IT management job', *InfoWorld*, Vol. 19, No. 48, 125p.
- Dewson, S., Eccles, J., Tackey, D.N. and Jackson, A. (1987) 'Measuring soft outcomes and distance travelled: a review of current practice', The Institute for Employment Studies for DfEE (RR219).
- Duncan, W. (1987) 'Get out from under', *Computerworld*, 9 March, pp.89–93.
- Dvir, D., Lipovetsky, S., Shenhar, A.J. and Tishler, A. (2003) 'What is really important for project success? A refined, multivariate, comprehensive analysis', *International Journal of Management and Decision Making*, Vol. 4, No. 4, pp.382–404.
- Ernst & Young (2006) *Swiss Attractiveness Survey What Foreign Companies Say*, September, Ernst & Young Ltd, CH.
- Federal Office of Statistics (2011) available at http://www.bfs.admin.ch/bfs/portal/en/index/themen/01/02/blank/dos/la_population_etrangere/intro.html (accessed on 01.03.2011).
- Flannes, S. (2004) 'Effective People Skills for the Project Manager: A Requirement for Project Success and Career Advancement', *Proceedings of SUGI 29*, Montréal, Canada, 9–12 May 2004, Paper 131–29.
- Gallavin, M., Truex, D. and Kvasny, L. (2004) 'Changing patterns in IT skill sets 1988–2003: a content analysis of classified advertisements', *The Database for Advances Systems*, Vol. 35, No. 1, pp.64–87.
- Gillard, S. (2009) 'Soft skills and technical expertise of effective project managers', *Issues in Informing Science and Information Technology*, Vol. 6, pp.723–729.
- Hofstede, G. and Hofstede, G.J. (2004) *Cultures and Organizations: Software of the Mind*, McGraw-Hill, USA, New York.
- Kerzner, H. (2003) *Project Management: A Systems Approach to Planning, Scheduling and Controlling*, Wiley, UK.
- Knapp, B. (1964) *Skill in Sport*, Routledge & Kegan Paul, London, UK.
- Langer, N., Slaughter, S.A. and Mukhopadhyay, T. (2008) 'Project managers' skills and project success in IT outsourcing', *ICIS 2008 Proceedings*, Paper 147.
- Lent, B. (2003) *IT-Projekte lenken - mit System*, Vieweg, DE.
- Lent, B. (2011) *Leader, Manager, Expert. The Project Management System*, National Defense University Publishing House, PL.
- Melymuka, K. (2006) 'Want to kill a project? Keep quiet about problems', *Study finds*, *Computerworld*, Scottsdale, USA.
- Moriss, P.W.G. and Hough, G.H. (1987) *The Anatomy of Major Projects, A Study of the Reality of Project Management*, John Wiley, UK.
- Motah, M. (2008) 'The influence of intelligence and personality on the use of soft skills in research projects among final year university students: a case study', *Proceedings of the Informing Science & IT Education Conference, InSITE 2008*, Informing Science Institute, pp.219–230.
- Murch, R. (2001) *Basic Skills for Project Managers, Project Management: Best Practices for IT Professionals*, Chapter 2, Prentice Hall, USA.

- Ottmann, R. (2003) 'Qualitätsmanagement', in Rationalisierungskuratorium der Deutschen Wirtschaft e. V (Hrsg.): *Projektmanagement Fachmann*, band 2; 7. Auflage, Eschborn, pp.921–961.
- Pant, I. and Baroudi, B. (2008) 'Project management education: the human skills imperative', *International Journal of Project Management*, Vol. 26, No. 2, pp.124–128.
- Pinkowska, M. and Lent, B. (2011) 'Evaluation of scientific and practice approaches to soft skills requirements in the ICT project management', *IBIMA Business Review Journal*, Article ID 318867, IBIMA Publishing Library, USA.
- Pinkowska, M., Lent, B. and Keretho, S. (2011) 'Processes based identification of software project manager soft skills', *8th International Joint Conference on Computer Science and Software Engineering (JCSSE2011) – Conference Proceedings, JCSSE2011*, Mahidol University, 11–13 May, Bangkok, TH 2011, accepted for publication.
- Pollice, G. (2006) 'Soft skills for software engineers', IBM, available at <http://www.ibm.com/developerworks/rational/library/sep06/pollice/index.html> (accessed 01.03.2010).
- Powers, R.F. and Dickson, G.W. (1973) 'MIS project management: myths, options and realities', *California Management Review*, Vol. 15, No. 3, pp.147–156.
- Project Management Institute (PMI) (2004) *A Guide to the Project management Body of Knowledge*, 3rd ed., CD-ROM, Pennsylvania, USA.
- Redmil, F.J. (1990) 'Considering quality in the management of software based development projects', *Information and Software Technology*, Vol. 32, No. 1, pp.18–22.
- Sampson, B. (2007) 'Get with the project', *Professional Engineering*, Vol. 20, No. 12, pp.41–42.
- Schwab, K. (2010) *The Global Competitiveness Report 2010–2011*, World Economic Forum, CH.
- Seiler, S., Lent, B., Pinkowska, M. and Pinazza, M. (2011) 'An integrated model of factors influencing project managers' motivation – findings from a Swiss survey', *International Journal of Project Management*, Elsevier, USA, available at <http://www.sciencedirect.com/science/article/pii/S0263786311000354> (accessed on 13.04.2011).
- Shenhar, A., Renier, J. and Wideman, R. (1996) *Improving PM: Linking Success Criteria to Project Type*, PMI, Calgary, USA.
- Skulomski, G.J. and Zayed, E.T. (2010) 'Information systems project manager soft competencies: a project-phase investigation', *Project Management Journal*, Vol. 41, No. 1, pp.61–80.
- Stevenson, D.H. and Starkweather, J.A. (2010) 'PM critical competency index: IT execs prefer soft skills', *International Journal of Project Management*, Vol. 28, No. 7, pp.663–671.
- Suikki, R., Tromstedt, R. and Haapasalo, H. (2006) 'Project management competence development framework in turbulent business environment', *Technovation*, Vol. 26, Nos. 5, 6, 723p.
- Taylor, H. and Woelfer, J.P. (2009) 'Critical skills for IT project management and how they are learned', *Special Interest Group on Computer Personnel Research Annual Conference Archive, Proceedings of the Special Interest Group on Management Information System's, 47th Annual Conference on Computer Personnel Research*, Ireland, pp.103–112.
- The Standish Group International (2011) *CHAOS Manifesto 2011*, pp.4–44, USA.
- Thieme, R., Tromstedt, R. and Shin, G.C. (2003) 'Project management characteristics and new product survival', *The Journal of Product Innovation Management*, Vol. 20, No. 2, pp.104–119.
- Tilchin, O. (2008) 'Creating work environment for collaborative learning', *The International Journal of Technology, Knowledge and Society*, Vol. 4, No. 5, pp.83–92.
- Van Ingen, S. (2007) 'Leadership of project teams', *Chemical Engineering*, Vol. 114, No. 1, pp.55–58.
- Wan, K.S.C., Ma, L.C.K. and Banerjee, P. (2009) 'The importance of project manager's soft competence on IT project success: an exploratory study in the banking context', *International Research Workshop on IT Project Management*, Paper 15.
- Waterdige, J. (1995) 'IT projects: a basis for success', *International Journal of Project Management*, Vol. 13, No. 3, pp.169–172, Elsevier Science.

- Whiteley, T.R. (2006) 'Using the Socratic method and bloom's taxonomy of the cognitive domain to enhance online discussion, critical thinking, and student learning', *Development in Business Simulation and Experimental Learning*, Vol. 33, pp.65–70.
- Wohlin, C. and Ahlgren, M. (1995) 'Soft factors and their impact on time to market', *Software Quality Journal*, Vol. 4, No. 3, pp.189–205.
- Wong, X. (2007) *Human Factors in Project Management, Concepts, Tools and Techniques for Inspiring Teamwork and Motivation*, 1st ed, John Wiley & Sons, USA.
- Woolfolk, A.E. (1990) *Educational Psychology*, 2nd ed., Englewood Cliffs, Prentice Hall, NJ, USA.

