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RANKING PROJECT MANAGEMENT COMPETENCES

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Abstract
With the appreciation of the competence approach in project management, several models have emerged, and long lists of competencies have become available. Alongside this, assessing the relative importance of competences has become difficult. The paper shows an experiment to rank the 49 individual project management competences defined by IPMA. Q-sort ranking was used based on student opinions. The results confirm the difficulty of interpreting a large number of items.

1 Introduction

The success of a project is a multifaceted phenomenon. The iron triangle of scope, time, and budget boundaries has been the defining compass for a long time [1]. Still, recent approaches, especially the stakeholder theory, have widened the interpretation of success [2] [3]. The contribution to the strategic goals and the satisfaction of the stakeholders came to the fore and was generally accepted in the practice of management. However, these indicators do not refer to the source of the success. Project management standards and studies [4] [5] [6] broadly investigate, among others, the role of team composition, organizational support, culture, and communication. A detailed analysis goes beyond the limits of this study; there is a focus on an ingredient that is highly agreed upon in the literature: the project manager's skills and competences. Papp-Horváth et al. [5] show a systematic review and understanding of project management-related competences, including the approaches of the most popular standards. The extensive literature (see [5] [7]) in the field confirms the relevance of the soft side of management but leads to ambiguous and untransparent situations. Since each project is individual, but scientific research aims to generalize from experience and offer lessons learned, countless partially overlapping studies are available from different industries with long lists of competencies. Another interesting challenge is the relative importance in the case of a large number of items.

This study uses the competence list of the IPMA's 'Individual Competence Baseline for Project, Programme & Portfolio Management Version 4.0' [8] for a special pilot analysis. Q-sort analysis was applied to draw the relative order of 49 personal ('People') competence items by university students and to check whether a consensus in the assessment is available.

2 IPMA ICB competences

The 4th edition of the Individual Competence Baseline (ICB) of the International Project Management Association (IPMA) defines individual competence as "the application of knowledge, skills and abilities in order to achieve the desired results" [8]. It must be noted that the expression competence (ability) and competency (results) may have different meanings that make the interpretation difficult [9]. Although 'competencies' align with project success purposes, IPMA meaningfully and consistently uses 'competence', which is also followed in this paper.

The 'Eye of Competence' model divides the competences into categories of perspective (interaction with the environment), people (inter and intrapersonal skills), and practice (using

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methods and tools). There are 29 competence elements, 10 of which cover the 49 items for ‘People’. Top items and categories are presented in the results section of the paper.

3 Research design

Q-sort ranking (Q-methodology) was established for psychological assessment by Stephenson [10] [11] to make an objective measurement of subjective individuals. Over the years, its application has been extended, and the method has become popular for solving ranking problems. It allows for ranking a (large) set of statements and drawing the typical patterns of opinions. Brown [12] justified the applicability of the Q-methodology in the 1980s, emphasizing that only a limited number of distinct viewpoints exist on any topic, and even a limited sample managed with the Q-method can reveal most of the perspectives. Q-methodology does not require extensive or representative samples or normal distribution of the responses (it is assured by the data collection method). The way of data collection about the relative opinion of a respondent about every statement concerning all other statements is explicit, presenting a holistic order with integrated trade-offs [13].

A voluntary online survey was designed, including the 49 IPMA ICB ‘People’ competences for university students. The respondents were asked to rank them by asking, ‘How well do the statements describe a good project manager?’. The explorative study aims to answer the following research question:

- Do the students have a uniform opinion about the project manager’s required competences?
- What are the more and the less important competences?
- Is there a majority opinion to be highlighted?

The study's hypothesis was that the large number of competencies makes common understanding difficult. The procedure and software Ken-Q, developed by Banasick [14], were used for the analysis, including KADE version 1.3.1. Results are based on the software output. Data collection was performed during the spring semester of 2024.

The research sample consists of 253 students from various institutes, including business and engineering faculties. The sample is not representative in any sense; we consider it a pilot study for preparing further investigations.

4 Results and discussion

4.1 Factor composition

Factors represent the opinion patterns in the Q-method. The KADE software offers different options and indicators to establish the factors. Due to the explorative nature of the study, we applied principal component analysis with Varimax rotation. According to the research sample, there is no definite solution for grouping the opinions. Based on the eigenvalues of the factors, up to 8 factors can be created, but the number of defining variables is 98 of 253, i.e., only 38.7% of the respondents significantly contribute to the factors. The scree plot suggests two factors with 222 (94.4%) defining variables. We have checked various solutions. The composite reliability is higher than 0.9 in any solution for all factors. The cumulative explained variance is relatively low, 28% for 2 factors and 47% for 8 factors. The correlation between the factor scores shows decreasing values with the number of factors established, and majority opinions have emerged, but there are no consensus statements. When the two-factor solution is accepted for analysis, 10 consensus statements could be highlighted. A majority opinion cannot be distinguished; Factor 1 includes 123 defining variables (composite reliability 0.998), while Factor 2 has 99 (composite reliability 0.997). The factor score correlation is 0.675, which means that the opinion patterns are partly overlapped. The data table of the full IPMA ICB list exceeds the limits of the present paper, so there are highlights of the 5 most and the 5 least important items (Table 1). Beyond, a factor visualization is presented with the original grouping factors in the standards: Self-reflection and self-management, Personal integrity and reliability, Personal communication, Relationships and engagement, Leadership, Teamwork, Conflict and crisis, Resourcefulness, Negotiation, and Results orientation. That allows an insight into the more and less important types of competences for a project manager.

Table 1. Rank and Z-score of the most and least important competences for a project manager in Factor 1

Statement	*Statement Number*	*Factor 1 Z-score*	*Factor 1 Rank*	*Factor 2 Z-score*	*Factor 2 Rank*
Create and maintain a healthy, safe and productive working environment	Results orientation	1.65	1	0.2	20
Take ownership and show commitment	Leadership	1.49	2	1.96	2
Take responsibility for own decisions and actions	Personal integrity and reliability	1.48	3	1.94	3
Act, take decisions and communicate in a consistent way	Personal integrity and reliability	1.43	4	1.66	4
Recognise errors to facilitate learning from mistakes	Teamwork	1.35	5	1.42	5
...					
Apply analytic techniques to analysing situations, financial and organisational data and trends	Resourcefulness	-1.26	45	-0.18	28
Promote a holistic view of the project and its context to improve decision-making	Resourcefulness	-1.48	46	-0.54	35
Reach negotiated agreements with other parties that are in line with own objectives	Negotiation	-1.53	47	-1.65	47
Detect and exploit additional selling and acquisition possibilities	Negotiation	-1.54	48	-1.19	43
Exert appropriate power and influence over others to achieve the goals	Leadership	-2.85	49	-1.77	48

Except for the most important competence, there is an agreement in the ranking orders of the two factors. Factor 2 keeps a leadership item, ‘Make, enforce and review decisions’ the most important item. The less important competences are negotiation and one leadership item about forcing and influencing others. Factor 1 also keeps resourcefulness items as not so important, while these are ranked in the middle by Factor 2. At the same time, employing humor and a sense of perspective when appropriate, as well as social network building and sharing one’s vision and goals to gain the engagement and commitment of others, are among the less important competences in Factor 2.

4.2 Factor visualizations

Color maps of factor visualizations are presented in Figures 1 and 2. based on the grouping factors by IMPA ICB [8]. That allows a more simple overview of the items in the case of a large item set. The categories are as follows:

- Self-management (Self-reflection and self-management)
- Reliability (Personal integrity and reliability)
- Communication (Personal communication)
- Engagement (Relationships and engagement)
- Leadership
- Teamwork
- Conflict (Conflict and crisis)
- Resourcefulness
- Negotiation

- Results (Results orientation)

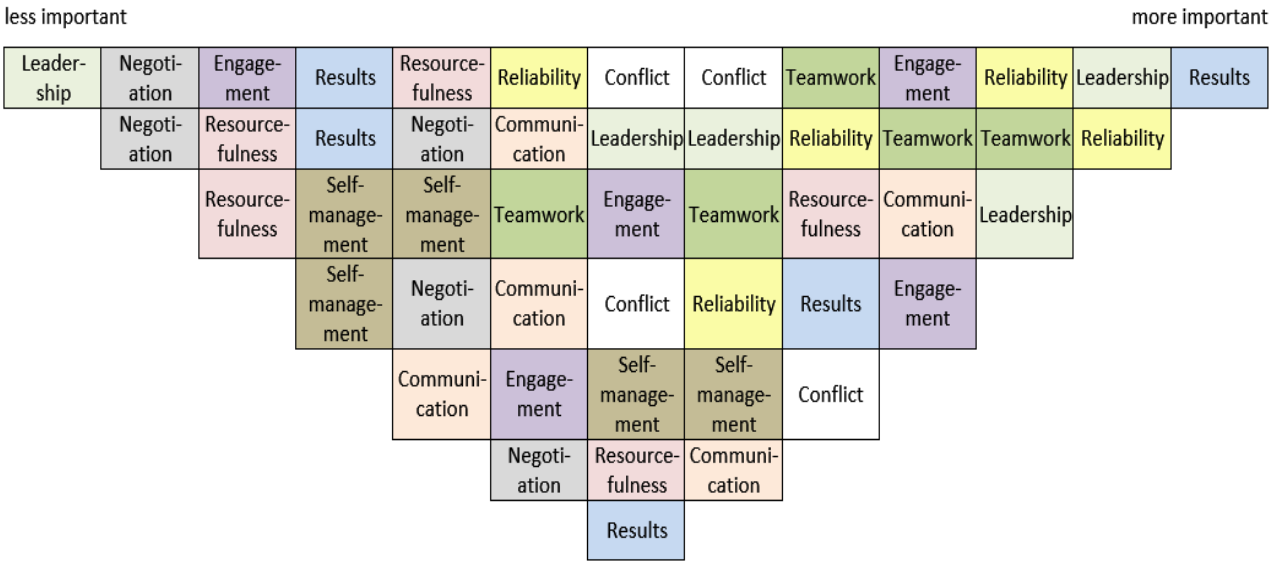

Figure 1. Factor 1 visualization (based on KADE output)

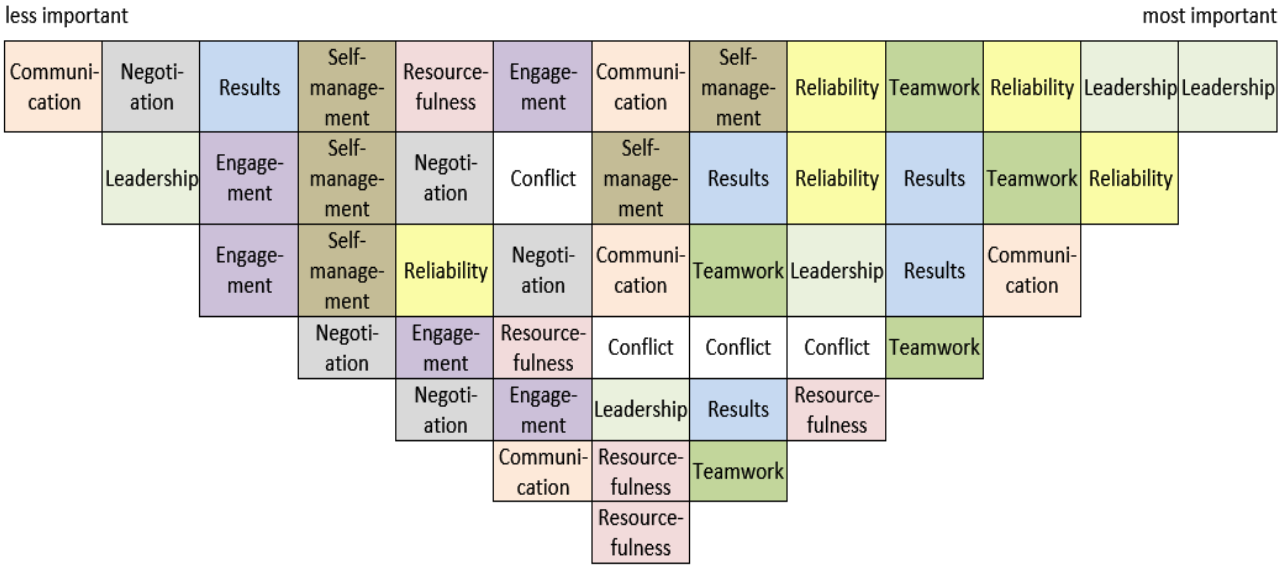

Figure 2. Factor 2 visualization (based on KADE output)

Based on the results, reliability and teamwork belong to the more important items in both factors. Factor 1 focuses on collaboration, but the low positions for resourcefulness items suggest a linear approach, i.e., following the plans is more important than an open-minded approach to changes. One result item ('Create and maintain a healthy, safe and productive working environment') is ranked the most important, but other related items are among moderately or less important. Meanwhile, Factor 2 represents a higher emphasis on the project manager's personal role.

4.3 Consensus statements

However, understanding the differences is essential for establishing appropriate development plans, due to the large number of competences that cannot be the first step. Further analysis may be started with filtering for the consensus statement (Table 2).

Table 2. Consensus statements (ranking between -6 and +6)

		Factor 1		**Factor 2**	
Competence item	*Group*	*Q rank*	*Z-score*	*Q- rank*	*Z-score*
Identify, and reflect on the ways in which own values and experiences affect the work	Self-reflection and self-management	-2	-0.786	-3	-0.874
Identify, and reflect on, personal motivations to set personal goals and keep focus	Self-reflection and self-management	-3	-1.026	-3	-1.09
Complete tasks thoroughly in order to build confidence with others	Personal integrity and reliability	2	1.005	2	0.91
Provide direction, coaching and mentoring to guide and improve the work of individuals and teams	Leadership	1	0.542	2	0.598
Recognise errors to facilitate learning from mistakes	Teamwork	4	1.347	4	1.415
Anticipate and possibly prevent conflicts and crises	Conflict and crisis	2	0.64	2	0.576
Promote and apply creative techniques to find alternatives and solutions	Resourcefulness	0	-0.052	0	-0.167
Identify and analyse the interests of all parties involved in the negotiation	Negotiation	-2	-0.72	-2	-0.55
Develop and evaluate options and alternatives with the potential to meet the needs of all parties	Negotiation	-2	-0.796	-2	-0.773
Reach negotiated agreements with other parties that are in line with own objectives	Negotiation	-5	-1.527	-5	-1.647

There is greater consensus on the less important competences. Of course, that does not mean that these items are not important; the Q-sort shows just a relative order. However, the results suggest that a detailed explanation of negotiation may be unnecessary; these competencies can be compressed into one umbrella item. Similarly, self-reflection and self-management may be overrepresented in the list. Among the most important competences, teamwork can be mentioned with recognizing errors to facilitate learning from mistakes ranked to the 4th place. There are no agreement statements among the most important competences.

5 Conclusions

Appreciating a competence-oriented approach in management development is common in any field. Project management competences are discussed in the leading standards. The investigation focused on the 49 individual competences defined by the IPMA ICB [8] standard. Based on a pilot Q-sort analysis to rank them, we can conclude that there is no common understanding about the most important competences for a project manager among higher education students. That finding hinders the efficiency of competence-based education and the development of project management. Several models were tested to establish opinion patterns and highlight a majority opinion, but they failed. At the same time, we cannot conclude that competing opinions exist in the sample since the explanatory power and the number of significant contributors in the models are low.

The study used the 2-factor solution to explore the agreement statements and check the competing opinions based on the groping of the competences. The result mirrors the quite high-rank correlation value between the 2 factors; there are not basically contradictory opinions found. The differences show that the focus on the project manager's role or collaboration issues is in question.

The methodological implication of the study is that the Q-sort ranking can provide helpful information for selecting and filtering the most competences for further studies. Although the sample could not give a clear response to the research question, building the different patterns and the consensus statements can compress redundant or unnecessary information.

The theoretical implication of the conclusions is that a large number of items for competences may be difficult to be managed. However, a nuanced and detailed picture may seem to be professional, a less complex approach can say more. The analysis with the limited number of grouping factors offers better readability and understandability. Since each project is unique by definition, efforts to define it in detail may lead to wasting resources.

The main contribution of the paper is methodological, as it presents the opportunities of Q-sort ranking and Q-methodology. Practical implications are less valuable due to the limitations of the sample selection. Further study must include project management stakeholders to explore the differences in their opinions.

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