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AN INVESTIGATION OF PLANNING PRACTICES IN SELECT COMPANIES

Paweł Wyrozębski[1], Seweryn Spałek[2]

[1] *Warsaw School of Economics, Department of Project Management, Poland*
[2] *Silesian University of Technology, Faculty of Organisation and Management, Poland*

Corresponding author:
Paweł Wyrozębski
Warsaw School of Economics
Department of Project Management
Madalińskiego 31/33, 02-544 Warszawa, Poland
phone: +48 692 112 883
e-mail: pawel.wyrozebski@sgh.waw.pl

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Abstract
The aim of the article is to answer two research questions concerning the influence of organizational factors and shape of project portfolio on the content and scope, as well as on the stakeholders engagement in project planning. The research strategy included a questionnaire-based method. The respondents were representatives of the chosen companies located in Poland, from varied types of industries. The key research finding is that most frequently addressed areas of project planning are those of the iron-triangle of project constraints. There is still lack of understanding for communication, risk and quality planning in projects, which is consonant with recent studies of maturity in project management areas. There are significant differences between industries in terms of areas of project planning. Power engineering seems to be more mature in terms of more frequent practices of planning the project schedule, resources and risk. The research showed a number of significant correlations between components of project planning and both organizational and project portfolio factors, which justifies the statement that those factors can be seen as determinants of project planning practices.

Keywords
project management, project planning, planning process, empirical studies, key factors, research.

Introduction

Project management is one of the most rapidly developing disciplines nowadays. New ideas are constantly being developed and their application endorsed in select companies. However, the core division of the planning and execution phases still remains valid. In addition, issues related to the planning phase continue to be of the utmost importance for those companies. In the article, we investigate the current picture of planning activities in select Polish firms. We investigate how and to what extent planning is applied and what influences planning-related processes.

Therefore, the main goal of the article is to study the key factors influencing the project planning phase by different industries and various types of projects.

This paper introduces a valid empirical study, exploring project management planning practices in a wide range of industries. It also identifies specific priorities of those industries in terms of scope and content of project plans.

The novelty of the article is the investigation of the role of various stakeholders, including the Project Management Office in the planning processes.

Based on the literature review, we formulate our research questions. Then, we describe the research and discuss its results, which leads us to our final conclusions.

Literature review and research question development

The importance of planning processes as a part of formal, complex methodological support to project management is highlighted by the authors of the articles [1–3]. However, considerations regarding the planning activities stem from different perspectives. One of them is definitely the use of methods and tools. Therefore, different planning techniques such as: railway concept [4] PERT, [5–7] CPM [8–10], Monte Carlo [11, 12] are widely discussed in the literature. However, irrespective of the methods or tools applied to different project phases (including planning), their practical application needs to be addressed.

It is generally assumed in the literature that applying project management standards, tools and methods is an industry-specific issue [13, 14]. Some authors [15–21] discuss project management related processes in the company context. Based on their studies, we argue that some interdependence exists between the type of industry and project planning processes. Moreover, certain organizations can be of different size in terms of the number of workers employed. Such companies can also act locally, domestically, internationally or globally.

Projects can be of different nature. Therefore, there is a need to distinguish their multifarious characteristics. Litke [22] describe the typology of the projects, classifying them by (1) size of a project team, (2) man-days required, (3) cost. Shenhar [23] classifies projects in matrix from the four-level technological uncertainty perspective and outlines three levels of system complexity, adding to the hierarchy of systems and subsystems. One of the most comprehensive categorization systems was proposed by Crawford *et al.* [24]. They categorized projects by their attributes: (1) application area, (2) complexity, (3) strategic importance, and (4) contract type.

There is a tendency to associate the specific project management application with types of projects [25, 26]. We argue that this aspect should also be recognized in the planning processes.

Moreover, the investigation of project management in the companies shows that standards, tools and techniques can be partially applied [27-30]. It means that, for example, from the full set of tools associated with the single method or approach, only some of them are chosen. Furthermore, the application of the method can be limited to a few projects only. Therefore, we argue that there is a need to investigate to what extent the planning is applied in their projects. Specifically, if it is desirable to ascertain which elements of the planning process are used in projects and with what frequency (e.g. never, sometimes, mostly, and always)

There are always different stakeholders involved in managing projects in most companies [31]. Their involvement may vary as well. Therefore, we argue that different people influence the planning process to varying degrees of intensity.

Based on the literature review and building on the similarities from the research in the other project management domains, we formulated the following major research questions:

RQ1: Does the type of company and shape of project portfolio influence the content and scope of project planning?

RQ2: Does the type of company and shape of project portfolio influence the project stakeholders' engagement in project planning?

Research method

In our research, we applied a questionnaire-based method. The respondents were representatives of the chosen companies located in Poland, from different types of industries. The response rate was 99%. Such a high response rate was obtained because the questionnaires were given to the participants at the beginning of the meeting that had been previously scheduled and had a generally different purpose. Moreover, the construction of the questionnaire limited the time needed to fill it in to 15 minutes, which enabled it to be coupled with the general meeting concept. As a result, the data from 101 companies was gathered and analyzed.

The following research model was employed in order to answer the research questions (RQ1, RQ2) (Fig. 1). The significance level for hypothesis testing was set at $p < 0.05$.

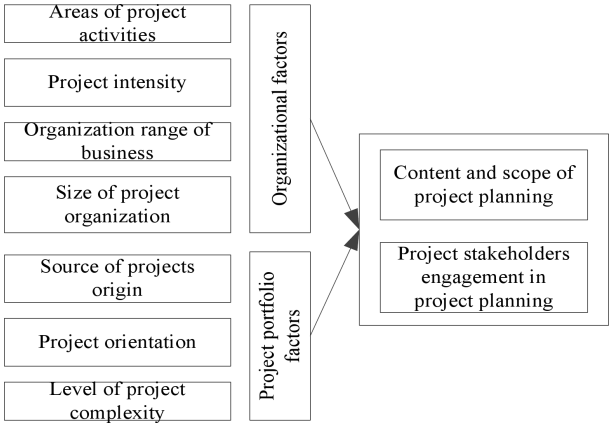

Fig. 1. Research model.

Descriptive statistics of sample

The sample included representatives of the major areas traditionally pursuing their activities in the form of projects. The most numerous were: power engineering, Information Technology – IT (development and implementation of software), production/technology and construction, followed by logistics, IT infrastructure, and commerce (Table 1).

One out of ten survey participants (9.9%) described their project intensity as large; organizations as project-oriented with all its business activity oriented towards project implementation. One third (32.7%) stated that their companies carry out many projects that are essential for their strategy implementation. Organizations with few and occasional projects amounted to 21.8% of the sample.

Detailed characteristics of the research sample, including its project portfolio description, are shown in Table 2.

Table 1
Areas of project activities of the survey participants.

Areas of project activities	Responses		Percent of survey participants
	N	%	
Power engineering	48	13.7	47.5%
IT (software)	43	12.3	42.6%
Production/technology	40	11.4	39.6%
Construction	39	11.1	38.6%
Logistics	25	7.1	24.8%
IT (infrastructure)	21	6.0	20.8%
Commerce	18	5.1	17.8%
Public administration	17	4.9	16.8%
Telecommunications	15	4.3	14.9%
Pharmaceutical industry	14	4.0	13.9%
Medicine/health services	14	4.0	13.9%
Finance and banking	12	3.4	11.9%
Advisory/consulting	11	3.1	10.9%
Media/advertising	7	2.0	6.9%
Insurance	7	2.0	6.9%
Non Governmental Organizations (NGO)	6	1.7	5.9%
Municipal services	5	1.4	5.0%
Tourist services and sports	2	0.6	2.0%
Other	6	1.7	5.9%
Total	350	100.0	346.5%

Table 2
Research sample project portfolio.

Source of projects origin – internal/external				
strongly internal	rather internal	equally internal and external	rather external	strongly external
17.8%	27.7%	28.7%	12.9%	12.9%
Type of projects orientation – process oriented ("soft")/product oriented ("hard")				
strongly product oriented	rather product oriented	equally product and process oriented	rather process oriented	strongly process oriented
30.7%	33.7%	27.7%	5%	3%
Level of projects complexity				
very low	low	moderate	high	very high
0%	4%	25%	54%	17%
Organizations range of business				
local	nationwide		international	global
19.8%	40.6%		28.7%	10.9%
Size of project organization (number of employees engaged in projects)				
01–09	10–49	50–249	250–499	500–1999	over 2000
15%	25%	25%	12%	15%	8%

as percent of valid responses

Results and discussion

In order to reply to the question (RQ1) on investigating the influence of the type of company and shape of project portfolio on the content and scope of project planning, the data presented in Table 3 were achieved.

Table 3
Areas of project management which are included in project plan in organization, as indicated by survey participants.

	Never [%]	Sometimes [%]	Usually [%]	Frequently [%]	Always [%]
Project governance	4.20	14.70	30.50	18.90	31.60
Project scope	0.00	0.00	10.20	18.40	71.40
Project team	3.10	16.50	11.30	23.70	45.40
Project schedule	0.00	2.00	12.10	24.20	61.60
Project costs	1.00	4.10	7.10	14.30	73.50
Project resources	4.10	8.20	18.40	24.50	44.90
Project communication and promotion	10.30	29.90	25.80	16.50	17.50
Project risk	9.20	20.40	22.40	21.40	26.50
Project quality	2.10	17.70	24.00	28.10	28.10
Project procurement	4.00	12.10	14.10	24.20	45.50

as percent of valid responses

Due to the frequency measurement on an ordinal scale, it was necessary to create a unified ranking of project planning areas. The results of the non-parametric Friedman test are presented in Table 4.

Table 4
Overall ranking of project planning areas frequency.

Ranks	
	Mean rank
Project scope	7.19
Project costs	7.13
Project schedule	6.89
Project resources	5.65
Project procurement	5.59
Project team	5.48
Project governance	4.71
Project quality	4.66
Project risk	4.28
Project communication	3.41
Friedman test statistics	
N	90
Chi-square	202.314
df	9
Asympt. Sig.	.000

The results clearly indicate the priorities for the planning of projects in terms of individual areas of project management. The most frequently organizations pay attention to project scope planning (71.4% always). Project cost ranked second (73.5% always) and the third element of the Iron Triangle – project schedule – ranked third (61.6% always). This observation confirms the common assumption that the Iron Triangle is addressed first in project management practice, including planning activities.

Areas the least likely to be taken into account in project planning include: communication and promotion (10.3% never), project risk (9.2% never) and project quality. The observation on project risk is especially notable, as this area is of high importance in the theory of project management standards [32–34]. However, the results show that in practice, activities related to managing risk are seldom applied, which is in line with other studies on project risk management practices and maturity [1].

Detailed analysis of the diversity of the content and scope of project plans helped to identify significant cross-section differences.

As far as differences among industries were concerned, the non-parametric U Mann-Whitney test was used. Significant differences between groups at $p < 0.05$ are presented in Table 5.

Test results showed several statistically significant deviations between sample subgroups:

- in projects managed in the power engineering industry, three components of project planning were taken into account more frequently than in other sectors i.e.: project schedule, project resources, project risk,
- in comparison to other industries, production and technology projects less frequently planned their governance,
- in projects for public administration, their scope was considered relatively less frequently than in the other sectors
- in the pharmaceutical industry, it is relatively less common to include costs and use of resources in the project management plan
- project risk management was taken into account more often for projects in the finance and banking industry
- the advisory and consulting organizations less frequently planned their project procurement.

Table 5
U Mann-Whitney test results – differences significant at $p < 0.05$.

Area of project planning	Test groups	N	Mean Rank	Sum of Ranks
Project governance	Production / technology	38	41.54	1578.5
	other sectors	58	53.06	3077.5
Project scope	Public administration	17	39.56	672.5
	other sectors	82	52.16	4277.5
Project schedule	Power engineering	47	55.94	2629
	other sectors	52	44.63	2321
Project costs	Pharmaceutical industry	13	38.00	494
	other sectors	86	51.81	4456
Project resources	Power engineering	46	55.94	2629
	other sectors	52	44.63	2321
Project resources	Pharmaceutical industry	13	31.35	407.5
	other sectors	85	52.28	4443.5
Project risk	Power engineering	46	55.99	2575.5
	other sectors	52	43.76	2275.5
Project risk	Finance and banking	12	65.46	785.5
	other sectors	86	47.27	4065.5
Project procurement	Advisory / consulting	12	47.21	566.5
	other sectors	88	50.95	4483.5

Notably, power engineering was represented in 3 out of 9 areas and always with higher frequency of planning. It could be a symptom of higher maturity in project management of that sector. However, this assumption requires further investigation. An opposite assumption can be drawn for the pharmaceutical industry, represented in 2 out of 9 areas.

The test of the relationship between the content and scope of project plans, and the organizational and project portfolio factors, showed a statistically significant and relatively strong Spearman correlation coefficient, as shown in Table 6.

The analysis revealed the following findings:

- increase of the intensity and importance of projects in organizations entails more frequent planning in project areas such as: project risk ($r = 0.271$), communication and promotion ($r = 0.231$), the organization of the project team ($r = 0.220$), procurement management ($r = 0.218$) and project governance ($r = 0.202$),
- there is no significant correlation between the project origin and the content and scope of project plans,
- increase of "soft" projects in an organization's portfolio entails more frequent consideration of the communication component in project planning ($r = 0.297$),
- with the rise of project complexity, project plans more often include components relating to the organization of the project team ($r = 0.237$), and project procurement ($r = 0.278$),
- the greater number of employees involved in projects, the more frequent planning efforts in areas such as the organization of the project team ($r = 0.314$), use of resources ($r = 0.298$), communication and promotion of the project ($r = 0.205$), project risk management ($r = 0.363$), quality management ($r = 0.201$), project procurement ($r = 0.310$).

Interestingly, organizations business range correlated with the variables in the opposite direction. Along with its expansion the frequency of several plan components dropped. There were such as: project governance ($r = -0.269$), project cost ($r = -0.200$), use of resources ($r = -0.319$) or project procurement ($r = -0.209$).

The second research question (**RQ2**) covered the influence of **the type of company and shape of project portfolio on the project stakeholders' engagement in project planning**. Table 7 shows the overall data of the research sample.

Table 6
Spearman correlation coefficient between areas of project planning, and type of company and shape of project portfolio.

		Project intensity	Source of projects origin	Project orientation	Level of project complexity	Organization range of business	Size of project organization
Project governance	Spearman's correlation	**.202***	.003	.144	.165	**−.269****	.179
	Sig. (2-tailed)	**.048**	.978	.162	.111	**.008**	.083
	N	**96**	96	96	95	**96**	95
Project scope	Spearman's correlation	.015	.092	−.124	.110	−.028	.011
	Sig. (2-tailed)	.880	.367	.220	.282	.786	.911
	N	99	99	99	98	99	98
Project team	Spearman's correlation	**.220***	.087	.086	**.237***	.127	**.314****
	Sig. (2-tailed)	**.029**	.393	.400	**.019**	.213	**.002**
	N	**98**	98	98	**97**	98	**97**
Project schedule	Spearman's correlation	.022	−.125	−.073	.098	−.039	.140
	Sig. (2-tailed)	.827	.219	.470	.335	.704	.170
	N	99	99	99	98	99	98
Project cost	Spearman's correlation	.053	−.068	−.189	.137	**−.200***	.093
	Sig. (2-tailed)	.604	.504	.061	.178	**.048**	.362
	N	99	99	99	98	**99**	98
Project resources	Spearman's correlation	−.019	−.051	.093	.085	**−.319****	**.298****
	Sig. (2-tailed)	.854	.619	.362	.405	**.001**	**.003**
	N	98	98	98	97	**98**	**97**
Project communication	Spearman's correlation	**.231***	.041	**.297****	−.055	.097	**.205***
	Sig. (2-tailed)	**.023**	.687	**.003**	.596	.344	**.045**
	N	**97**	97	**97**	96	97	**96**
Project risk	Spearman's correlation	**.271****	−.040	.065	.148	−.168	**.363****
	Sig. (2-tailed)	**.007**	.695	.525	.148	.098	**.000**
	N	**98**	98	98	97	98	**97**
Project quality	Spearman's correlation	.102	.083	.032	.101	−.041	**.201***
	Sig. (2-tailed)	.319	.417	.752	.326	.691	**.049**
	N	98	98	98	97	98	**97**
Project procurement	Spearman's correlation	**.218***	.070	−.155	**.278****	**−.209***	**.310****
	Sig. (2-tailed)	**.029**	.488	.123	**.005**	**.037**	**.002**
	N	**100**	100	100	**99**	**100**	**99**

*. Spearman's correlation coefficient is statistically significant at $p < 0.05$ (2-tailed).

**. Spearman's correlation coefficient is statistically significant at $p < 0.01$ (2-tailed).

Table 7
The contributions of the various stakeholders in the process of project planning.

	No contribution	Small	Moderate	Large	Very large
Project Manager	0.0%	4.0%	18.8%	42.6%	34.7%
Project Sponsor / Steering Committee	4.0%	5.0%	32.0%	42.0%	17.0%
User/client representatives	2.1%	15.5%	28.9%	46.4%	7.2%
Internal performers	5.0%	8.0%	25.0%	47.0%	15.0%
External performers	8.2%	11.2%	34.7%	37.8%	8.2%
PMO	40.6%	10.1%	29.0%	14.5%	5.8%

Due to the frequency measurement on an ordinal scale, it was necessary to create a unified ranking of stakeholders' contributions. The results of the non-parametric Friedman test are presented in Table 8.

According to the research data, the project manager makes a major contribution in the planning process – 77.3% of respondents attributed a very large contribution to him. Project sponsors and

members of the steering committee are ranked second with a very large contribution of 59%. The last two places were the representatives of external contractors and project management office. Significantly, according to 40.6% of respondents, PMO plays no role at all in project planning in the organizations represented. Thus, observation is somehow in contradistinction with the common assumption of the PMO's role in the organization and supports the findings of the other studies that PMOs are struggling to show added value to the organization [27, 28, 35].

Table 8

Overall ranking of the project stakeholders contributions in the process of project planning.

Ranks	
	Mean rank
Project Manager	4.68
Project Sponsor/Steering Committee	3.95
Internal performers	3.85
User/client representatives	3.34
External performers	3.25
PMO	1.93
Friedman test statistics	
N	65
Chi-square	101.233
df	5
Asympt. Sig.	.000

Detailed analysis of the diversity of the contributions of various stakeholders in the process of project planning helped to identify significant cross-section differences.

As far as differences among industries were concerned, the non-parametric U Mann-Whitney test was used. Significant differences between groups at $p < 0.05$ are presented in Table 9.

The test results showed several statistically significant deviations between sample subgroups:

- in IT infrastructure projects, the average contribution of the project manager, as well as project sponsor and project steering committee, is higher than in other industries,
- the importance of the project sponsor is rated significantly higher by the organizations of advisory and consulting services,
- in the case of projects for the finance and banking sector, the user/client representatives were acknowledged for higher involvement in project planning,
- representatives of power engineering projects made a significantly lower level of contribution to external performance,
- the contribution of project management offices in project planning was evaluated significantly lower by representatives of the pharmaceutical industry; on the other hand, PMO input was rated higher by individuals working in public administration and logistics.

Table 9

U Mann-Whitney test results – differences significant at $p < 0.05$.

Project stakeholders	Test groups	N	Mean Rank	Sum of Ranks
Project Manager	IT Infrastructure	21	62.10	1304.00
	other sectors	80	48.09	3847.00
Project Sponsor/Steering Committee	IT Infrastructure	20	61.33	1226.50
	other sectors	80	47.79	3823.50
Project Sponsor/Steering Committee	Advisory / consulting	11	67.86	746.50
	other sectors	89	48.35	4303.50
User/client representatives	Finance and banking	12	66.25	795.00
	other sectors	85	46.56	3958.00
External performers	Power engineering	46	43.77	2013.50
	other sectors	53	55.41	2936.50
PMO	Pharmaceutical industry	12	24.71	296.50
	other sectors	58	37.73	2188.50
PMO	Logistics	19	43.21	821.00
	other sectors	51	32.63	1664.00
PMO	Public administration	16	44.47	711.50
	other sectors	54	32.84	1773.50

Once again, the role of PMO is surprisingly low. However, the results are ambiguous. Therefore, further studies in this area are advised.

Notably, user involvement was higher in finance and banking than in the level of project managers in IT and sponsors in advisory/consulting.

The test of the relationship between the contribution of individual stakeholder groups and the organizational and project portfolio factors showed a statistically significant, moderate Spearman correlation coefficient as shown in Table 10.

The analysis revealed the following findings:

- evaluation of the contribution of project management offices was strongly correlated with the number of employees involved in projects in the organization ($r = 0.414$) and organization range of business ($r = -0.249$); As the number of employees rose, the perceived contribution of the PMO was higher. However, with increasing business expansion, this assessment decreased,
- the contribution of project managers was found to be associated with two variables: project intensity ($r = 0.291$) and the degree of project complexity ($r = 0.200$); in both cases, rises in the level of these characteristics improved the evaluation of their input
- in the case of assessing the significance of user representatives in project planning, the analysis showed a moderate correlation with the ratio of external projects in the portfolio of the organization ($r = 0.218$) to the number of employees involved in projects in the organization ($r = 0.324$). In both cases, the directions of variable correlation were in line.

The contribution of project managers and users is in line with the common assumption of their roles. It is remarkable that the representatives of the project sponsor/steering committee do not contribute significantly in any area. The same observation was noticed for internal and external performers.

The results of the PMO contribution revealed how complex the PMO concept is and that under some circumstances the PMO may contribute to the organization.

Table 10
Spearman correlation coefficient between variables.

		Project intensity	Source of projects origin	Project orientation	Level of project complexity	Organization range of business	Size of project organization
Project Manager	Spearman's correlation	**.291****	.007	.191	**.200***	.048	−.015
	Sig. (2-tailed)	**.003**	.943	.056	**.046**	.637	.881
	N	**101**	101	101	**100**	101	100
Project Sponsor/ Steering Committee	Spearman's correlation	.181	−.042	−.060	.038	−.008	.176
	Sig. (2-tailed)	.072	.677	.554	.709	.936	.081
	N	100	100	100	99	100	99
User/client representatives	Spearman's correlation	.119	**.218***	.009	.023	−.073	**.324****
	Sig. (2-tailed)	.247	**.032**	.933	.823	.479	**.001**
	N	97	**97**	97	96	97	**96**
Internal performers	Spearman's correlation	−.059	−.162	.151	−.046	−.056	.175
	Sig. (2-tailed)	.563	.108	.134	.650	.582	.084
	N	100	100	100	99	100	99
External performers	Spearman's correlation	.108	−.127	−.091	.029	−.026	.063
	Sig. (2-tailed)	.286	.209	.368	.773	.799	.538
	N	99	99	99	98	99	98
PMO	Spearman's correlation	.118	.002	.085	.195	**−.249***	**.414****
	Sig. (2-tailed)	.330	.989	.484	.109	**.037**	**.000**
	N	70	70	70	69	**70**	**69**

*. Spearman's correlation coefficient is statistically significant at $p < 0.05$ (2-tailed).

**. Spearman's correlation coefficient is statistically significant at $p < 0.01$ (2-tailed).

Conclusions

The aim of the article was to answer two research questions concerning the influence of organizational factors and shape of project portfolio on the content and scope, as well as on the stakeholders' engagement in project planning. The study showed that those influences do exist.

- The most frequently addressed areas of project planning are those of the Iron Triangle of project constraints. It is clearly noticed in the top of the ranking of project plans components.
- There is still a lack of understanding as regards communication, risk and quality planning in projects. This checks out with the recent studies of maturity in project management areas.
- There are significant differences between industries in terms of areas of project planning. Power engineering seems to be more mature in terms of more frequent practices of planning the project schedule, resources and risk.
- The research showed a number of significant correlations between components of project planning and both organizational and project portfolio factors, which justifies the statement that those factors can be seen as determinants of project planning practices.
- As far as stakeholders' involvement in project planning is concerned, the project manager is a key person to provide information and develop a project management plan. This finding is in keeping with general project management theory and practice, which place project managers as a focal point of project management activities and project planning in particular.
- The role and contribution of PMO, in contrast with its theoretical foundations, is perceived as marginal. However, it seems to be in line with other empirical studies on PMO performance in organizations.

This study, and any other empirically-grounded research, has its limitations. The main one regards the size of sample which, in quantitative analysis, can be assumed as small. Therefore, in-depth studies, especially in the less representative industries, are advised. Moreover, an investigation into the influence of PMO on the planning process can be conducted in further research.

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