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DRIVERS AND BARRIERS OF PROJECT MANAGEMENT MATURITY IN IT START-UPS

Alina KOZARKIEWICZ[1*], Tomasz SWAŁDEK[2]

[1] AGH University of Krakow, Faculty of Management; alina.kozarkiewicz@agh.edu.pl, ORCID: 0000-0002-0683-3148
[2] AGH University of Krakow, Faculty of Management; tswaldek@agh.edu.pl, ORCID: 0000-0001-9171-6562
* Correspondence author

Purpose: The main aim of study was the identification of the significant factors that are perceived as positively and negatively influencing the maturation processes of project management in nascent and young innovative firms termed as start-ups.
Design/methodology/approach: The study base on mixed-method approach. The research on factors driving and limiting project maturity in start-ups was performed using qualitative data collection methods. Additionally, quantitative approach and quantify the elements indicated by respondents were used to support study conclusion.
Findings: In the studies it was confirmed that among the factors influencing the maturity of project management in start-ups very frequently the same factors were indicated as drivers and as barriers. Based on the research findings it was identified that start-ups can be divided into three groups with different characteristics which relates to proposed new division of barriers and drivers of project management development. Within the analyses identified factors were distinguished as directly and indirectly influencing project management processes.
Research limitations/implications: Limitations of research relates to the number of interviews and the fact that the sample comprised the organizations located in the same region. The extension of the sample, inclusion of start-ups from diverse locations can add value to the results and confirm or extend some of discoveries.
Practical implications: Identification of barriers (negative influence) and drivers (positive influence) of project management processes in start-ups. Division of the factors into those that have direct and those that have indirect influence of the advancements.
Originality/value: The paper presents exploration of the peculiarities of advancing project management in young, new product-oriented organizations termed "start-ups". Results of interviews with IT start-up founders and stakeholders from start-up ecosystems (VCs, university incubators) used for studies and discussions enhanced understanding of factors affecting project management maturity.
Keywords: Project Management, Project Management Maturity, Start-ups.
Category of the paper: research paper.

1. Introduction

Project management maturity has been a topic of interest for project management theorists and practitioners for years (Crawford, 2006; Backlund et al., 2014; Brookes, 2014). It results primarily from the main assumption of maturity research, i.e., the belief that project maturity affects the effectiveness of the organization and achieving repeatable successes in project activities. Therefore, striving for project management maturity is regarded as a direct orientation towards development, effectiveness, or efficiency of the organization being managed (Cooke-Davies, Arzymanow, 2003).

Organisational project management maturity can be understood as a measure of the ability to initiate and execute projects for different but correct purposes (Anderson, Jessen, 2003). In this context, project management maturity models are the instruments designed to assess progress toward maturity via providing a systematic means to perform benchmarking and are considered to add value to organizations trying to achieve continue improvement (Pennypacker, Grant, 2003; Pasian 2014). One interesting stream of research concerns the contingency of project maturation (Jiang et al., 2004; Pasian, 2014). Our exploration is a part of this trend. What we want to underline here is that although there is an important stream of research on project management maturity that underlines the role of the repeatability of processes that lead to definability and predictability of process and long-term perspective (Backlund et al., 2014), our research was focused on project maturation in nascent and young organizations termed start-ups. Our research on factors driving and limiting project maturity in such type of organization was based on the assumptions conveyed by Pasian (2014) that project management maturity could be also related to undefined projects preformed in dynamic environment and a culture of adaptability. Moreover, our fits into the research stream on the topic oriented towards specific types of projects and peculiar conditions of their realization (Cooke-Davies, Arzymanow, 2003; Pasian, 2014).

We are interested in exploring the peculiarity of advancing project management in young, new product oriented organizations, characterized by innovative technologies or business models termed as “start-ups” (Berg et al., 2020; Steininger, 2019; Ghezzi, 2018; Unterkalmsteiner et al., 2016). What seems to be interesting in this context are the similarities and differences between a project and a start-up, as both are temporary endeavors with a defined beginning. Start-ups at their early stages can be viewed as a project with specific goals and timelines, mile-stone orientation, and limited resources.

This unclear demarcation between a start-up and a project make the exploration more complex as well as based on interpretations and managerial viewpoints. In our research we are interested in how start-up founders frame the relationship between start-up and project maturation processes. Therefore, our research is based on qualitative methods of data collection. The interviews with IT start-up founders and with people engaged in activities of start-up

ecosystems (such as venture capital, university incubators) are used for our studies and discussions. Within our research we will look at the following questions: What factors are the drivers and the barriers in project management maturation in start-ups? What are the similarities and differences among the factors influencing the development of start-ups and those influencing the maturation of project management? Are there any differences in the perception of the factors by the start-ups proprietors and other external stakeholders?

The structure of our paper is as follows. After short demonstration of the prior research on the factors influencing the development of start-ups and projects, we will continue with delineation of research methods and research process, next we will present research results and discuss them briefly. Finally, the concussions, limitations and avenues of further research will be provided.

2. Barriers to the development of start-ups versus barriers to project maturity

The concept of "maturity" is being used increasingly to describe the state of an organization's effectiveness (Crawford, 2006). Project management maturity, in broad terms, pertains to the degree of advancement exhibited by an organization's project management processes, methods, and competencies (Backlund et al., 2014). It reflects the organization's ability to manage and execute projects efficiently and consistently over time.

Over the past three decades, the evaluation frameworks known as project management maturity models have garnered considerable attention in both research and practical applications (Backlund et al., 2014; Crawford, 2006; Grant, Pennypacker, 2006; Brookes et al., 2014). This attention has led to the emergence of numerous project management maturity models, including but not limited to the Capability Maturity Model (CMM), Capability Maturity Model Integration (CMMI), Portfolio, Programme, and Project Management Maturity Model (P3M3), Organizational Project Management Maturity Model (OPM3), and PRINCE2 Maturity Model (Young et al., 2014; Brookes et al., 2014).

Maturity is commonly measured in discrete stages and across a number of dimensions. Measurement is based on subjective assessments of what people are doing operationally, with each being scored (or allocated) a level of maturity, usually from a graded step model. Most models are based on five stages to maturity: initial level, repeatable level, defined level, managed level and optimizing level. These five levels define an ordinal scale for measuring the maturity of an organization's process and for evaluating its process capability. Project management maturity can be used to measure current capability and define improvement targets for organizations wishing to improve the effectiveness of their project management. The importance of maturity models lies in the general assumption that

organizations with higher maturity levels are expected to be successful in terms of project effectiveness or efficiency and thus have a competitive advantage in the marketplace (Cooke-Davies, Arzymanow, 2003).

Previous research on project management maturity has addressed numerous questions concerning aspects such as performance enhancement (Brookes et al., 2014; Nieto-Rodriguez, Evrard, 2004; Jiang et al., 2004), project success (Milosevic, Patanakul, 2005), the maturity of projects across diverse environments (Cooke-Davies, Arzymanow, 2003; Pasian, 2014), and the contingent views of project, process and context as influencing maturity assessment (Mullaly, 2014).

When analysing the results of prior research on the conditions of project maturation, a few perspectives can be identified. First, there are investigations comparing project maturity in various sectors, demonstrating the influence of the *type of project activities* (Cooke-Davies, Arzymanow, 2003; Pasian, 2014). Next, an important stream of research underlines the role of the *repeatability of processes* that lead to definability and predictability of process, and similarly, the significance of a long term perspective in developing project management competence and skills (Backlund et al., 2014). There are numerous studies focused on the role of *internal organizational* factors, such as organizational culture (Andersen, Jessen 2003; Dinson, 2003; Riollano, 2012), leadership (Ahmed, 2018), knowledge management (Nelson, 2007; Easterby-Smith, Lyles, 2012), or introduction of particular structures, such as PMO (Khalema, Waveren, Chan, 2015). Finally, there are studies underlying the importance of including *individual competences* of people involved (Skulmoski, 2001).

What has to be underlined, according to Pasian (2014), project management maturity, although frequently seen as a feature of repeatable processes under constant and clear improvements, could be also related to undefined projects preformed in dynamic environment and a culture of adaptability. One good example of organization performing undefined projects in the conditions of constant adaptability are start-ups. The term "start-up" denotes a nascent business entity characterized by innovative technologies or business models that distinguish them from prevailing solutions, coupled with scalability potential enabling swift and significant expansion with the aim of enhancing their market presence (Berg et al., 2020; Steininger, 2019; Ghezzi, 2018; Unterkalmsteiner et al., 2016; Crowne, 2002). Start-ups often engage in rapid iterations of their product or service based on user feedback, market changes, and other factors, they are known for fast-paced development, with ability to react to changes in product and business development, and introduce flexibility in the process (Berg et al., 2020).

The research on the factors influencing the development of start-ups offers a long list of potential drivers as well as barriers in start-up growth. The systematic literature review of IT start-us success factors (Santisteban et al., 2017) demonstrates that the most important role played *individual* factors related to founding team competences: their previous experience, academic formation, technological capabilities, leadership competences. Next, this research pointed at *organizational* factors such as size, age, location, and finally at the *external* factors,

such as governmental and VC support, R&D policy, the development of ecosystems and clusters, and environment dynamism.

Start-ups and projects share several commonalities, particularly in their organizational and operational aspects. First, both start-ups and projects are temporary endeavours with a defined beginning, start-ups may evolve into established businesses, but their early stages can be viewed as a project with specific goals and timelines. Next, they have usually clear and defined objectives, use milestone-based approaches to track progress, operate with limited resources, involve a degree of risk and uncertainty, and both require effective collaboration among team members. Although similarities exist, it is essential to emphasize the distinct characteristics inherent to start-ups and projects. Start-ups represent comprehensive business entities with long-term visions, whereas projects are transient undertakings devised to accomplish specific objectives. The resemblance between the initial phases of a start-up and project endeavours underscore the applicability of project management principles and methodologies in providing guidance and structure to their development trajectories. The similarity has given rise to the enquiry regarding the similarities and differences in barriers and drivers of start-ups and project maturation.

3. Research method

This research has been designed as a cross-sectional exploratory study based on qualitative semi-structured interviews (Flick et al. 2004, Brinkmann, 2013). However, we have to note, that for the introductory exploration, we conducted three selected case studies based on observations and in-depth interviews with start-up founders and team members.

Our semi-structured interviews were conducted with two distinct groups of respondents: firstly, IT start-up founders or co-founders, and secondly, representatives of entities within the start-up ecosystem, such as business incubators, academic accelerators, or venture capital institutions. This methodological approach enabled a comprehensive exploration of perspectives from both the entrepreneurial forefront and the support infrastructure surrounding start-up ventures.

The process of our research comprised two distinct phases: first, we contacted 4 organizations supporting local start-ups ecosystems asking for transferring our message about this study. In this way we managed to gain the acceptance from 18 IT start-ups proprietors and were able to conduct three case studies based on interviews and observations, and then qualitative interviews based on the protocols designed iteratively after analysing the cases. In our research process these 18 firms were interviewed in three time series. As we were aware of the fact that when tackling complex phenomena in their real-world context, it is very common for both the interviewers and the interviewees to unconsciously miss or neglect some

points, we decided also to conduct additional six interviews with some experts, i.e., venture capitalists, consultants, employees of organizations supporting local start-ups to discuss our research questions and confirm our findings.

The protocol of the interviews was consistent with the study's research question. First, the informants were asked to generally describe start-up development (size, products, business models, financing, etc.), and comment on the processes undertaken in their start-up during the early stages of its development. In addition, the informants were invited to discuss the experience of the owners (founders and co-founders), and project management activities (daily activities, methods, software used, etc.). Finally, we asked questions regarding the factors (both: barriers and drivers) influencing the development of the start-ups and project management processes.

During the data analysing process all interviews were transcribed then coded in MAXQDA by one of the researcher to identify dominant themes related to our inquiry. We not only concentrated on the themes that constituted the influencing factors (positively and negatively) but we decided to introduce some elements of quantitative approach and quantify the elements indicated by respondents during our talks. Consequently, we introduced mixed-method approach, i.e., the exploration that combines qualitative and quantitative data analysis within a single study (Azorín, Cameron, 2010; Harrison et al., 2020).

4. Research results

The start-ups involved in the study differed from one another, allowing us to classify them into three groups: A, B and C. Start-ups A were companies in the pre-seed and seed phase, employed from 1 to 5 employees, and did not formalize team work into structure with a legal form. In Group B, start-ups most often operated as limited liability companies and employed from 5 to 10 employees. Younger organizations of this segment in the early growth phase were an exception, engaging fewer human resources, but often supported themselves with outsourcing, minimizing the current staff maintenance costs. Enterprises in the expansion phase (Group C), most often limited liability companies dependent on financing entities, employed up to 20 people. What was noteworthy was the relationship between the age of the organization and the development phase. In Group A of start-ups there were the youngest organizations, none older than 5 years, similarly in segment C there were no very young start-ups, operating for less than one year, while in each group there were organizations 2-3 years old. When it comes to financing, the dominant share of private funds and funds from the accelerator was typical for segment A. In the A category, the most characteristic was the involvement of proprietors' own time, converted into financial values, and small capital resources. Group B was also dominated by organizations using equity capital (6 out of 9 enterprises),

but their volume reflected larger private investments of owners and was related to the need to employ the first employees. This group intensively sought grants to finance the construction of the product. Segment C enterprises were distinguished by the share of financial resources coming from outside and self-financing from the sale of products.

The analysis of the statements of respondents representing Groups A, B and C and the surveyed Experts (E) enabled the identification of factors positively and negatively influencing the development of project management in start-ups. Additionally, the factors that, in the respondents' opinion, determine the development of start-ups were identified. These conditions were termed as factors with an indirect impact on the development of the project management. As mentioned, for the purposes of presenting the research results, the statements of individual respondents were given a quantitative dimension by calculating the number of indications of individual factors in the respondents' statements. The summary of results are presented in Table 1.

Table 1.
Assessment of the positive and negative impact of selected factors on the development of project management in start-ups

Negative						Positive					
Indirect factors (start-up development)		A	B	C	E	Indirect factors (start-up) development		A	B	C	E
	Market	1	**5**	**5**	4		Market	1	**7**	**5**	2
	Organizational culture	1	0	0	0		Ecosystem	**4**	3	3	**11**
	Financing	1	**5**	3	**5**		Financing	0	3	3	2
	Procedures, policies	1	3	0	1		Sales/Customers	0	1	2	4
	Prioritizing	0	2	0	1		Prioritizing	0	1	1	0
	Owner(s)	0	0	1	**5**		Owner(s)	3	3	2	5
	Availability (no time)	**3**	**5**	1	0		Product characteristics	3	4	0	2
	Human resources	1	2	**5**	3		Human resources	0	1	0	3
Negative						**Positive**					
Direct (project management)		A	B	C	E	Direct (project management		A	B	C	E
	Availability (no time)	2	**4**	1	**3**		Start-up development	0	2	2	2
	Financing	0	1	3	0		Financing	0	3	1	1
	Procedures, policies	0	0	0	1		Procedures, policies	1	1	2	**3**
	Human resources	1	2	3	0		Human resources	0	1	2	0
	Prioritizing	**3**	**4**	**4**	2		Prioritizing	1	**6**	1	0
	Ecosystem	1	0	0	0		Ecosystem	0	0	1	2
	Owner(s):	1	1	2	1		Owner(s)	0	2	**9**	0

Source: Own study.

4.1. Analysis of indirect factors

The list of negative indirect determinants allowed us to notice that companies in the initial stages (A) are struggling with lack of availability (time) resulting from full-time employment and working for other organizations, which, in fact, was underlined frequently when answering various questions during the interview. Not without significance for early growth start-ups was the negative impact of adapting to externally imposed procedures, policies and formalization required by grant processes: *... theoretically we had been granted the grant, but changes in national policy resulted in a change in the attitude of the financing institution, and as a result*

we did not sign the contract... (Respondent 11/A). This group, however, indicated the importance of the start-up ecosystem as supporting their development as positive factors: *...yes, the Krakow ecosystem, acceleration programs, a lot of knowledge for free, semi-free, favourable start-up environment*... (Respondent 4/A). Similarly, the importance of the role played by the owner and his involvement was noticed.

Entrepreneurs in segments B and C, in addition to the frequently mentioned limitations in availability and constant lack of time, indicated limitations related to obtaining financing for the development. What has to be noted, they pointed at the difficulties related to market factors, including the labour market and the shortage of properly competent employees: *...problems with finding people, much better financing from the competition, we have insufficient money*... (Respondent 2/B), or deficiency in consumers responsiveness: *...lack of qualified staff, lack of trust in the industry, lack of consumer awareness and that we need to educate our customers*… (Respondent 3/C).

An element that was not identified by the respondents representing all groups, but highlighted by Experts asked within our research, is the negative impact of the owners' competences, e.g.: *... on the other hand, the lack of abilities in selling what they have invented, it will not sell itself*... (Expert 3).

It is worth noting that among the positively influencing factors, the role of external factors, such as market conditions and ecosystem support were indicated most frequently. Entrepreneurs from Group B rated very highly - again - the importance of the market and the possibility of active operations on the market, selling products and acquiring customers: *...hacker attacks - interest in cyber-security, the current war in Ukraine has made people aware ...we have a geographically unlimited market*... (Respondent 7/B).

According to experts, apart from the influence of the supporting start-up ecosystem, again the involvement and competences of the owners were key factor of the firm development, e.g.: *... definitely the first thing: one technical, substantive co-founder (at least one), the second is the complementarity of co-founders... someone who understands and loves product*.... *...it should be someone from the founding group*.... (Expert 2).

To sum up, the information resulting from the analysis of indirect factors allowed to indicate the important role of the external factors such as market and ecosystem, as well as the owner(s) engagement, which was perceived both in a positive (having proper competences) and negative (lack of time or abilities) context. Factors such as the influence of organizational culture and lack of proper prioritization of tasks were mentioned rarely.

4.2. Direct factors

Among the significant factors directly influencing the development of project management in start-ups the proper prioritization of tasks was indicated more frequently. This view resulted from recognizing the role of efficiently implemented projects in start-up future growth. This way of interpreting the conditions was visible in the statements of respondents belonging

to all groups: ... *everyone is involved, ... and the founders have experience from similar projects implemented before*... (Respondent 13/B). Prioritization of task was mentioned by respondents during the discussions regarding negative as well as positive factors of project management maturation processes.

Among positive factors, the respondents from Group C, i.e. the segment with the highest level of organizational maturity, noticed the importance of their own attitudes and commitment, e.g.: ...*my cooperation with the university and the use of many resources that would be more difficult to access*... (Respondent 12/A).

It was not surprising, however, that among factors of negative influence, the respondents of Group B indicated the importance of resources, such as financing and time: ...*time, I work in two companies*... (Respondent 7/B) or ...*time and the fact that we do not have a person familiar with the techniques and aspects of project management* (Respondent 13/B). During the interviews, entrepreneurs also mentioned the impact of remote work on the development of common, understandable design practices and interaction related to performing activities together and simultaneously: ...*time zones, communication, especially with technical people, the problem of not being able to admit failure and errors, also lack of language skills, we work in English, and for Poles it is a second language* (Respondent 2/B). Remote cooperation has been classified as a group of factors generally referred to as availability.

When comparing the perspectives of start-up owners and ecosystem experts there are no significant differences. Representatives of supporting organizations also noticed that the development of a start-up and the resulting increase in the number of tasks performed affect the project management both positively and negatively. The information obtained during our discussions with experts indicates the importance of time and availability as well as factors related to management and prioritization of project management activities: ... *as a rule, yes, there is project awareness*... (Expert 4). The experts also pointed out procedural factors related to grant and investment procedures. This determinant was perceived and presented as external pressure (external requirements) that shaped project management processes in organizations: ... *mainly control in enterprises where projects related to grants are carried out*.... (Expert 4).

5. Discussion

The main aim of our study was the identification of the significant factors that are perceived as positively and negatively influencing the maturation processes of project management in nascent and young innovative firms termed as start-ups. In our research, on the base of mixed method approach, we indicated the drivers and the barriers in project management as seen by two groups of respondents: the proprietors (start-ups' founders and co-founders) and experts in start-ups growth coming from start-ups ecosystems, i.e., business accelerators and venture

capital. As we see the similarities between projects and start-ups, first of all related to time and resource constraints, we explored prior research looking at the similarities and differences among the factors influencing the development of start-ups and those influencing the maturation of project management. Next, within our studies we surveyed start-up development factors as indirectly influencing project management processes. Finally, we analysed the similarities and differences in the proprietors and experts assessments, considering the assumption that they represent internal and external stands in their analyses and interpretation of reality.

When comparing the results of our research we can consider prior studies on the conditions of project management maturation. There are numerous studies focused on the role of internal organizational factors influencing project management maturity, such as organizational culture (Andersen, Jessen, 2003; Dinson, 2003; Riollano, 2012), role of leadership (Ahmed, 2018), the significance of knowledge management (Nelson, 2007; Smith, 2012) as well as underlying the importance of individual competences of people involved (Skulmoski, 2001). In this context, our study is not confirming the internal factors mentioned above. We can assume that our respondents, mostly founders of start-ups, have not consider such factors as their own leadership style or organizational culture they create. These components are perceived as being a part and result of their personal involvement, and they try to do their best engaging their time and personal funds. They have the tendency to perceive external factors or lack of time as responsible for the low advancement of project management processes.

In our studies we confirmed that among the factors influencing the maturity of project management in start-ups very frequently the same factors were indicated as drivers and as barriers. The most important factor are competences and attitudes of founders and co-founders. They experience but also lack of time, part-time involvement in start-up activities due to the work for other employers, the priorities put on product development rather than the advancements of internal management processes are indicated are discussed by our respondents. In our research, the dynamic and adaptive culture as well as knowledge acquisitions (workshops organized by accelerators functioning in ecosystem) were rather related to the start-up development seen as indirectly influencing approach towards project management.

When looking at the factors influencing start-up development we revealed not only the importance of external factors such as the role of ecosystems supporting obtaining funds and knowledge, but also the market and existing demand allowing gaining revenue required for the development. Again, the role of founding team, lack of time or competences were indicated as main barrier for expansion.

We can relate directly to the results of previous research on start-ups success factors (Santisteban et al., 2017) and the most important role played by founding team competences: their previous experience, academic formation, technological capabilities, leadership

competences. Next, we confirmed the importance of the *external* factors, such as the development of ecosystems and clusters, and environment (market) dynamism.

Our contribution we see as threefold. First, in our research we distinguished segments of start-ups and consequently we managed to indicate and analyse the difference in factors influencing project management processes in nascent (A), young (B) and expanding (C) start-ups (see Table 1). According to our research, there are differences in the drivers and barriers of the development perceived by the respondents from each group. For instance, in Group B the most important positive factor are proper priorities and proper assessment of the role of project management as the driver of start-up growth. Among Group C respondents the role of the founder is frequently assessed as influential. And as to start-up development, Group B is frequently discussing the role of market for their products, while respondent from Group C indicate the role of absence of employees' competencies as influencing (negatively) the development of their start-ups.

Next, in our study we suggest a new division of barriers and drivers of project management development. Within our analyses we have distinguished factors of direct influence on project management processes as well as the factors influencing start-up development and, in consequence, indirectly influencing the approach towards projects.

Finally, we emphasised the fact that similar factors are perceived by the start-up founders as barriers or as drivers of the development of their firm (e.g., market) or the management processes (e.g., prioritizing tasks). The assessment of the effects of these factors can attributed to the particular experience of the start-up founder.

We believe that even if there are no clear borders between start-ups and projects, it is important to understand how the primary stakeholders of start-ups perceive project management development and understand its significance for the future successes of their firms (Pasian, 2014).

6. Concluding remarks

The aim of our research was to explore the factors influencing the development of project management processes in peculiar type of organizations, i.e. nascent and young IT start-ups. On the basis of semi-structured interviews we indicated the main themes of discussions raised by respondents when talking about the barriers of the development of their organizations and the advancement of the processes. Next, applying mixed method approach and quantifying the importance of indicated factors we demonstrated and discussed the most frequently pointed factors.

Our contribution relates to the identification of barriers (negative influence) and drivers (positive influence) of project management processes in start-ups. We managed to divide the factors into those that have direct and those that have indirect influence of the advancements. Moreover, we also analysed these factors separately for three groups of star-ups depending on the stage of their development and compare the perspectives of founders and representatives of ecosystems.

Limitations of our research relates to the number of interviews and the fact that the sample comprised the organizations located in the same region. The extension of the sample, inclusion of start-ups from diverse locations can add value to the results and confirm or extend some of our discoveries. Apart from the extension of our sample we see some other avenues for further research, e.g., quantitative research based on a questionnaire constructed on the basis of semi-structured interviews conducted within qualitative studies.

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