Investigation of Project Schedule Management Challenges Underpinned by Process Approach [1]

Dr. Roman Titarenko & Dr. Nuno Da Camara

Abstract

As projects have become more diverse and complex, effective schedule management now is crucial for successful project implementation. Nonetheless, there is a possibility for unique challenges to appear in organizations, and these challenges have to be addressed. To achieve this objective, the article studied project schedule management challenges based on responses from 51 managerial/senior-level staff members on the open-ended questions related to the project schedule management processes. Data analysis, supported by process approach, was performed with the employment of systematic coding. The findings invite the conclusion that managing projects creates a fertile soil for challenges, related to the project schedule management processes, which extend to schedule management planning, defining and sequencing activities, activity duration estimation, schedule development, and schedule control. The research gave us an opportunity to discover a set of project schedule management challenges, find their effects and causes, and elaborate on possible countermeasures. Implications and recommendations for future research are stated.

Keywords: Project schedule management, Challenges, Process approach.

1. Introduction

In recent years the interest in project management has significantly increased. It appears that the field of project management is expanding, and this trend is supported by the increasing importance of project work for the global economy (Harvey & Aubry, 2018). In addition, many researchers agree that managing projects is a difficult and challenging task (e.g., Niederman et al., 2018; Amer, 2020; Kahvandi et al., 2018). Project managers face various challenges on a daily basis, which despite the specific nature of projects, appear to share a common character (Walkowska, 2020). Every year there is a number of studies developed on the topic of project management challenges, but it still suffers from a lack of necessary attention (Patil, 2016).

Mossalam (2018) states, that the possibility for a project to be completed without encountering any troubles, obstacles and issues within its lifecycle from its concept till closure is noticeably low. Therefore, it is reasonable to expect that the topic of "project issue management" should have gained the corresponding importance, but the current situation shows that the required attention was not paid neither in the literature nor in the project management standards or practical use by project managers.

[1] How to cite this paper: Titarenko, R. & Da Camara, N. (2025). Investigation of Project Schedule Management Challenges Underpinned by Process Approach; *PM World Journal*, Vol. XIV, Issue II, February.

Project based practice is widespread in many organizations in a variety of industrial sectors. One of the determining features of this practice lies in the fact that projects are generally constrained by specified time limitations and cost budget. Moreover, there is a variety of uncertain factors that can potentially influence time and cost during project delivery (Olawale & Sun, 2014). The real challenge is not being definitely sure about the way and the time the risks are going to manifest themselves (Sachan et al., 2016).

The substantial level of uncertainty makes it unachievable for managers to predict all the possible risks (unknown unknowns) and stop all the problems related to the teams, levels of motivation and organization of work from appearing in the project (Raydugin, 2014).

Professional expertise in project management is in demand, and this trend seems to be rising without any signs of slowing down. This movement is caused by the increasing complication of processes connected to the environment, and the functioning of different organizations together with appearing problems through the implementation of the projects (Bukłaha et al., 2016).

Time is a crucial component of project management that requires such competencies as goals setting, planning, and prioritizing, which are necessary to achieve a better project performance (Oburu, 2020). Project schedule management can be compared to scope, cost, and quality management knowledge areas in terms of importance in PMBOK® Guide (Da Silva & de Oliveira, 2017).

Project scheduling offers a specified plan that shows how and when the project will provide the services, products, and results stated in the project scope and includes the processes necessary to ensure the timely completion of the project (PMI, 2017). The result of effective schedule management leads to an increase productivity and effectiveness (Oburu, 2020).

However, implementing good schedule control in practice is commonly considered to be a challenging task (Olawale, 2020). The efficiency of project management can be influenced by various causes, which can potentially lead to delays and cost deviations in the project (Ahbab et al., 2019). Schedule overruns is a reoccurring problem on large projects, despite evident progress of the project management profession (Simushi & Wium, 2020). The result of delays in the project negatively affects all project stakeholders (Oburu, 2020).

Kembro et al. (2017) stated that a challenge is a reflection of a complicating factor, which can be solved or overcome with a high possibility; according to Monyane et al. (2018) challenges appear in the form of “dissatisfactions”. In this study schedule management challenges are defined similarly as “dissatisfactions”, “problems” or “matters of difficulty” that can affect the effectiveness of project schedule management.

A large number of studies was dedicated to identifying project schedule management challenges in a variety of projects, yet to the best of our knowledge, there were no studies that have used process approach to research these challenges. It is also important to remember that consistent

knowledge was not developed to a necessary degree, and this situation led to a limited number of solutions to employ in the industry.

This study aims to fill this knowledge gap and uses a theoretically informed approach to develop an understanding of project schedule challenges with the help of the following research question:

Applying process approach, what are the challenges that pertain to project schedule management, and the possible reasons for appearance of these challenges?

The focus group includes managerial managerial/senior-level staff that work in the field of project management. A discussion of theoretical and practical implications is available below in Section 6.

2. Literature Review

Project success is conditioned by various factors that are outside project management control; it is dependent on project management success and the success of the end-product. Despite that, it seems to be troublesome to develop a distinctive definition of the term "project success". Its meaning appears to be too broad, to the point that the literature on project management does not reach a single conclusion on its measurement and definition, which in turn makes the difficulty of development such only higher (Ika, 2009; Al-Hajj & Zraunig, 2018).

The success of a project can be perceived subjectively, regardless of the individual success criteria and factors. None of the studied projects demonstrated the achievement of project success, without the implementation of project management tools and techniques (Al-Hajj & Zraunig, 2018). Moreover, the definition of success can vary depending on profile of the organization, the stakeholders and the project itself (Takagi & Varajão, 2019).

Ensuring that any project guarantees its feasibility and outcome that will satisfy the needs of the customer without encountering any challenges that might create a chaotic environment and cause havoc in the project is key (Sachan et al., 2016; Walkowska, 2020). One of the basic challenges for project management is to discover a way to balance time, quality and cost. Since that is the case, project success depends heavily on the possibility to achieve the said three major components (Kahvandi et al., 2018; Amer, 2020). Managerial staff has to understand the challenges beforehand and be ready to confront them as and when they appear with the assistance of proper preparations that will help to resolve these challenges, as well as do it effectively and without any delay (Sachan et al., 2016).

A large number of researchers studied project management challenges both on global scale, e.g., Al-Hajj & Zraunig (2018); Amer (2020); Isern (2015); Patil (2016); Parizotto et al. (2020); Teubner (2018); Walkowska (2020); Zhang et al. (2015), and on a level of specific countries and regions, e.g., Bukłaha et al. (2016); Ekanayake et al. (2019); Kahvandi et al. (2018); Luacky et al. (2014); Ray et al. (2019); Saukko et al. (2020).

Schedule management is seen as a vital part of management. It is viewed this way because time is a meager resource, that cannot be stored once incurred or utilized, which in turn means it is

impossible to keep time and use it in the future, and if unused, it will be lost forever. Moreover, goals of management cannot be achieved without efforts that always consume time (Oburu, 2020). Schedule project control is important, because it serves as the means to prevent project failure (Olawale, 2020). Extending the expected schedule limits is a serious problem in project management. Stumpf (2000) defines schedule delay as an event or act that prolongs the time allocated to finish the task beyond the set contract deadline. The need to optimize projects made politicians, academics, and other parties acknowledge of the challenges demonstrated by the reoccurring time overruns (Ahbab et al., 2019; Larsen et al., 2016).

Delays in schedule were caused by uncertain activities during the project life cycle that have a possibility of putting the project at risk (Susanti, 2019). To this day the delay situation is unstructured and not defined coherently, therefore the studies related to delay and the necessary solutions to overcome it are still being conducted (Abwunza et al., 2020).

There is a high number of modern publications that investigate project schedule management challenges, and the vast majority of them are related to the specific types of projects, most of which are connected to the construction industry, e.g., Ahbab et al. (2019); Asmitha (2019); China & Hamid (2015); Imad et al. (2018); Famiyeh et al. (2017); Khalid (2017); Larsen et al. (2016); Li et al. (2017); Nyqvist (2015); Olawale (2020); Osman & Mohamud (2022); Shibani et al. (2021).

The construction projects have a tendency to develop a variety of schedule management challenges, which include inaccurate definition of project scope, unplanned works, change or increase in the project scope, as well as design changes (Ahbab et al., 2019); poor organizational structure, untimely decision making by owner, unqualified project team, lacking scope decision, and insufficient competence of the planning staff (Imad et al., 2018); unrealistic durations of contracts made by clients, incoherently defined project scope, unrealistic estimation of project cost by consultants, variations initiated by clients, and inadequate supervision of projects by consultants (Famiyeh et al., 2017); changes in design and scope by owner in the process of construction, lacking supervision of the site by contractor, poor scheduling and planning of project, incompetent workforce, and low quality of materials used for construction (Shibani et al., 2021).

Chang (2002) discovered schedule management challenges for engineering design projects, which include additional work, overly optimistic schedule, cases of omissions, inability to provide information, incorrect or incomplete information, incompetency of consultants, rising needs, and changes in laws.

Silva et al. (2022) researched production projects connected to metalworking industry and identified such challenges as poorly evaluated times of activities, wrong activity sequencing, inappropriate process methodologies, lacking time control, inadequate communication, unplanned and scarce resources, and materials that fail to arrive according to schedule.

Ahsan & Gunawan (2010) studied international development projects and their research has shown some challenges, namely extensively long duration of contract, bad procurement, land

acquisition and civil works, engagement of consultants, cases of natural calamities, and bureaucracy of the host country.

Simushi & Wium (2020) analyzed large projects and listed the following challenges – inadequate level of project-specific experience by the project team, previous organizational and external decisions, resistance in community, changes in scope, and pressure put on the project team by stakeholders.

The lacking amount of attention towards schedule management challenges that occur in projects of different types, and the fact that systematic approach was not employed to study these challenges gave authors an opportunity to implement process approach to research schedule management challenges discovered in a wide selection of projects. The definition and explanation of the application of process approach in the study is available in Section 3.

3. Theoretical Framework: Process Approach

Processes are used by every organization to meet their goals (ISO, 2015). The process approach, which has lately become a crucial part of managerial practice in the company, puts the business processes under the spotlight. Focusing on processes and bettering them in companies is necessary to increase the response quality to changes in customer requirements and open up new possibilities that will allow for an increase in the business performance and competitiveness (Papulova, 2020).

A process is described as a set of interconnected or interacting activities that employ inputs to produce a specified result. The process approach defines the institution's processes to work as a unified and complete system and can be applied in institutions and management systems of any complexity, type or size (ISO, 2015). In general, process theory aims to create comprehensive knowledge, which explains how specific outcomes emerge from a sequence of actions and events, while paying attention to particular inputs (Niederman et al., 2018).

Project management is largely standardized, which was demonstrated by the ISO standard and the well-known bodies of knowledge (Harvey & Aubry, 2018; Stellingwerf & Zandhuis, 2013). PMBOK® Guide makes a clear suggestion to view processes as the center of the consolidation and synthesis of knowledge (Niederman et al., 2018), and proposes that project management is implemented through the adequate employment and incorporation of logically grouped rational and foreseeable project management processes that can be applied to various industries around the world (PMI, 2017; Sergi et al., 2020).

All project management processes produce one or more outputs from one or more inputs with the application of required project management tools and techniques. Processes can integrate overlapping activities that occur in the project. The number of process iterations and interactions between processes is determined by the project requirements (PMI, 2017).

Project management processes are combined into several project management process groups, such as initiating, planning, executing, monitoring and controlling, and closing process groups. They are also categorized by knowledge areas that are defined in connection to the component processes, practices, inputs, outputs, etc. (PMI, 2017).

Project schedule management is one of the knowledge areas, and it incorporates certain processes: schedule management planning, defining activities, sequencing activities, activity duration estimation, schedule development, and schedule control. The processes are interconnected and can interact with processes in other knowledge areas (PMI, 2017).

Since processes such as defining activities, sequencing activities, and activity duration estimation are closely connected, and in many cases are executed simultaneously, within the study they were grouped together. Therefore, while developing the survey and analyzing the results we focused on the following processes or sets of processes: (1) schedule management planning, (2) defining, sequencing activities and estimating activity duration, (3) schedule development, and (4) schedule control.

The discussion opened up an opportunity to make a claim that process approach serves as a foundation for systematic discovery of challenges connected to project schedule management processes, which is proven by its emphasis on activities, interrelations and interactions between them, the necessary responsibilities and authorities, the required resources, and the planned outputs (results of a process). In light of this knowledge, process approach was implemented in this study.

4. Research Methodology

4.1 Research Method

To implement the research design, it was necessary to collect data on a large scale from the experts in project management with the help of a survey that consisted of both qualitative and quantitative questions. The qualitive part aimed to receive answers to the open-ended questions connected to challenges in project schedule management and help demonstrate the results in the study. The approach in this research is consistent with the approach that was employed in previous studies (e.g., van den Heuvel & Bondarouk, 2017).

The survey was devised so it will offer respondents both multiple-choice and open-ended questions. The aim of the questionnaire was to gather in-depth information on respondents' profiles, extending to their position, work experience, core responsibilities, organizational size, industry type, and the information regarding the projects that were described in the survey. In addition to that, the questionnaire also contains the open-ended questions that aim to explore opinions of respondents on project schedule management challenges (Kaminsky, 2021). The implementation of the open-ended questions created a possibility for the respondents to provide flexible answers, which helped to discourage them from giving replies that could have been preconceived.

The respondents were given the following questions:

Q1. Please write down the project schedule management challenges you encountered when managing any project in your organization.

Q2. Please describe the main reason or reasons that caused these challenges to appear.

In the theoretical underpinning section, it was shown that the open-ended questions are aligned with process approach, and that fact provided us with an opportunity to ask the questions connected to the following schedule management processes or groups of processes: (1) schedule management planning, (2) defining, sequencing activities and estimation of activity duration, (3) schedule development, and (4) schedule control. In this way, the respondents were offered to answer a total of 8 open-ended questions. Every respondent was asked to analyze one finished project, which was executed in accordance with traditional project management approach, to allow for a correct comparison of results that corresponds to prior studies (e.g., Ekanayake et al., 2019).

The other questions (including the multiple-choice and open-ended questions) are not connected to project schedule management challenges in any way, and therefore, are not related to the results that were shown here. This allowed us to focus on explaining and analyzing the answers in this study, that the respondents gave to the specific open-ended questions that touched the topic of project schedule management challenges.

4.2 Sample Selection and Data Collection

Since the issue of concern was related to specialized expert knowledge, we employed purposive sampling to define possible respondents. This approach helped us find respondents who could offer a deep and informed perspective (Patton, 1990).

The participants were surveyed at local project management seminars and meetings. In total, we were able to gather 51 responses. The sample size appeared appropriate since it offered a significant amount of data from knowledgeable respondents, which in turn allowed for qualitative content analysis. The superior quality of data we have received soon became obvious, and that was demonstrated in the big list of challenges identified by the respondents.

The respondents' country of origin was Russia, and among them were different professionals connected to the field of project management.

This selection can be compared with selections of respondents in other studies, for instance, with the sample of Osman & Mohamud (2022) of 52 respondents, and other studies had a similar number of samples (e.g., Ahbab et al., 2019; Larsen et al., 2016). A diverse selection of respondents with varying levels of experience, most of which are currently occupying primarily high-ranking positions, gave us a substantial advantage in the process of developing new knowledge in an area with limited research.

4.3. Data Analysis

To study data gathered through analyzing responses to the open-ended questions, we employed a qualitative content analysis technique (Hsieh & Shannon, 2005), which was also applied in the previous studies (e.g., Ninan et al., 2020). The first step was to check if our data are complete or not. Out of the 51 respondents 7 did not give responses to the open-ended questions, which made the response rate 86%.

That left us with 44 completed responses to analyze. Since the questions were open-ended and not quantitative, we made an informed decision that working with 44 responses still offered us a substantial amount of data to employ proper content analysis, and it is especially true because missing data becomes problematic only when the data are quantitative.

In the early part of analysis, we directed our attention towards developing a "themes and subthemes" structure for important problems found in data. To do so, we found it reasonable to apply the directed content analysis approach suggested by Hsieh and Shannon (2005). We analyzed the 44 suitable responses and formed initial themes and subthemes (Hsieh & Shannon, 2005), that are consistent with the theoretical basis of process approach.

The first step was to code challenges connected to one main theme, "Project schedule management challenges". After doing so, we attentively read respondents' comments and considered them, and then categorized the challenges into 39 subthemes under one main theme, e.g., "incomplete list of activities", "mistakes in project schedule", and "poor schedule control".

The next step was to arrange the subthemes into themes of high order. The results of the analysis allowed us to create a hierarchy of 39 subthemes within 11 higher-order themes, e.g., "Inadequate quality of the schedule management plan" and "Delays in development of the schedule management plan" corresponding with process approach. The refinements and initial coding are available in Table 1.

Table 1. Themes and subthemes coding aligned with processes approach

<table>
<tr><th>Initial coding</th><th>Refined coding leading to creation of sub-themes</th><th>Project schedule management processes</th><th>Final coding showing main and sub-themes structure</th><th>Total number of references</th></tr>
<tr><td>Mistakes and inaccuracies in the document</td><td rowspan="6">Inadequate quality of the schedule management plan</td><td rowspan="9">Schedule management planning</td><td rowspan="9">Schedule management planning
Inadequate quality of the schedule management plan
Delays in development of the schedule management plan</td><td rowspan="9">24</td></tr>
<tr><td>Information deficiency of the document</td></tr>
<tr><td>Low level of systematization of the document</td></tr>
<tr><td>Lack of reflection on important aspects of schedule management</td></tr>
<tr><td>Poor structure of the document</td></tr>
<tr><td>Discrepancy between the aim of the document and its contents</td></tr>
<tr><td>Prolonged duration of document development</td><td rowspan="3">Delays in development of the schedule management plan</td></tr>
<tr><td>Delays in editing intermediate versions of the document</td></tr>
<tr><td>Late review and approval procedure</td></tr>
<tr><td>Incomplete list of activities</td><td rowspan="4">Incorrect list of activities</td><td rowspan="3">Defining and sequencing activities. Activity</td><td rowspan="3">Defining and sequencing activities. Activity duration estimation</td><td rowspan="3">32</td></tr>
<tr><td>Inaccurate definition of activities</td></tr>
<tr><td>Incorrect activity attributes</td></tr>
<tr><td>Incorrect milestone list</td><td rowspan="2"></td></tr>
<tr><td>Incorrect relationships</td></tr>
</table>

Omitting some important relationships Poor-quality planning the sequence of activities	Incorrect sequence of activities	**duration estimation**	Incorrect list of activities Incorrect sequence of activities Inaccurate estimation of activity duration	
Mistakes in estimation of activity duration Incorrect application of analogous estimating Incorrect application of three-point estimating	Inaccurate estimation of activity duration			
Prolonged development of the schedule Late start of the preparation of the schedule Exceeding time limitations for the schedule approval	Delays in development of the project schedule	**Schedule development**	**Schedule development** Delays in development of the project schedule Inadequate quality of the project schedule	27
Mistakes in project schedule Incorrect definition of resource requirements Ineffective optimization of resources Mistakes in schedule compression Absence of a defined critical path	Inadequate quality of the project schedule			
Exceeding planned duration of certain activities Late achievement of milestones Exceeding total planned project duration	Exceeding planned project duration	**Schedule control**	**Schedule control** Exceeding planned project duration Inadequate quality of schedule control Late schedule control Improper project status updates	53
Incomplete and unsystematic control Poor schedule control Improper documentation of control results	Inadequate quality of schedule control			
Prolonged duration of control procedures Untimely control	Late schedule control			
Incorrect work performance data Irrelevant work performance data Irregular project status updates Late project status updates	Improper project status updates			

After that we decided to further study the coded data under each theme and subtheme to discover differences, similarities, and patterns to allow for a proper interpretation. For instance, the revised version of the section titled "Inadequate quality of the schedule management plan" consists of the following problems: "mistakes and inaccuracies in the document", "information deficiency of the document", "low level of systematization of the document", "lack of reflection on important aspects of schedule management", "poor structure of the document", and "discrepancy between the aim of the document and its contents". The chosen approach to data coding follows that of earlier studies (e.g., Hsieh & Shannon, 2005; Ninan et al., 2020). The findings are demonstrated in greater detail in Analysis of Results section.

We employed all the resources at our disposal to obtain the most reliable and valid results, and to achieve this goal it was important to introduce certain criteria. First, respondents had to be very

knowledgeable in the field of project management and their answers were backed by data from projects of different types. Second, we implemented a specific working process to allow authors recode the data to a certain extent before they agreed on the naming of themes: one of the authors analyzed the data, and then the other authors checked the coding separately and made some suggestions. Third, we introduced detailed, systematic, and replicable data coding, which allowed for high validity and reliability of our findings. The coding and analysis provided in the research is aligned with the recently published studies in a similar context (e.g., Ninan et al., 2020).

5. Analysis of Results

The analysis of results are available in Table 2. As previously mentioned, they are aligned with process approach on the basis of PMBoK® Guide.

Table 2. Summary of project schedule management challenges and possible countermeasures

Identified challenges	Causes of the challenges	Suggested countermeasures
1. Schedule management planning		
1.1. Inadequate quality of the schedule management plan	(1) Lacking qualifications of the project manager, (2) poor project management standardization, (3) low quality of planning, (4) extensive workload of the project manager on other projects, (5) time limitations of planning.	Increasing qualifications of the project manager; involving experts; implementation of lessons learned; improving project prioritization.
1.2. Delays in development of the schedule management plan	(1) Low priority given to the project in the project portfolio, (2) prolonged duration of the plan review and approval procedure, (3) lack of attention towards planning, (4) periodical changes of the plan's contents.	Regulating the duration of the schedule management plan development; optimization of its review and approval procedure.
2. Defining and sequencing activities. Activity duration estimation		
2.1. Incorrect list of activities	(1) Project scope changes made by the customer in the process of project planning, (2) the project manager lacked necessary knowledge of the project scope, (3) lack of attention paid to definition of certain activities, (4) incorrect activity attributes (imposed dates, constrains, etc.), (5) limited amount of time allocated to planning.	Recording the accountability of the customer for any changes in project scope; increasing qualifications of the project manager.
2.2. Incorrect sequence of activities	(1) Large number of activities in the project, (2) high level of project innovation, (3) insufficient knowledge of project specifics by the project manager, (4) unsystematic and superficial definition of the relationships, (5) the project manager did not have necessary experience in planning.	Increasing qualifications of the project manager; using expertise of the project team members.
2.3. Inaccurate estimation of activity duration	(1) Lack of consideration for factors that influence activity duration, (2) poor knowledge of the project management software, (3) insufficient amount of time allocated to planning, (4) difficulties in the activity duration estimation, (5) incorrect application of tools and techniques of project time estimation, (6) insufficient risk estimation.	Providing trainings on project management software; regulating the duration of schedule management planning; involvement of a risk manager; implementation of lessons learned.
3. Schedule development		

3.1. Delays in development of the project schedule	(1) Difference in location between project team members, (2) the project manager had a shortage of time for planning, (3) communication system was not effective enough, (4) increased difficulty of the development of project schedule using bottom-up estimation.	Employment of remote work technologies; improving the quality of communication between project team members; involving experts.
3.2. Inadequate quality of the project schedule	(1) High level of innovation and complexity of the project, (2) short deadlines for planning, (3) inadequate control of project schedule development, (4) difficulty in planning the availability of project human resources.	Providing trainings on project management software; regulating the duration of schedule management planning; application of resource calendars.
4. Schedule control		
4.1. Exceeding planned project duration	(1) Deficient project schedule control, (2) inadequate qualifications of project team members, (3) prolonged implementation of changes in the project, (4) inaccurate planning of the project team members' responsibilities, (5) ineffective responsibility delegation by the project manager, (6) lacking motivation of project team members.	Improving project performance monitoring system; increasing the qualifications and motivation of project team members; controlling the number of parties involved in the approval of project changes.
4.2. Inadequate quality of schedule control	(1) Improper use of work performance measurement techniques, (2) lack of time of the project manager to implement proper control, (3) different locations of work sites and the project manager, (4) inadequate qualifications of the project manager.	Increasing qualifications of the project manager; employment of remote work technologies to control project performance.
4.3. Late schedule control	(1) Ineffective project communication system, (2) a large number of project contractors, (3) application of the schedule compression technique (crashing).	Improving the quality of communication between project team members; motivating contractors to provide timely feedback.
4.4. Improper project status updates	(1) Difference in location between project team members, (2) incorrect use of project management software to update project status, (3) ineffective reporting system, (4) subjectivity in the estimation of the work progress, (5) improper project schedule control.	Implementing remote work technologies; regulating reporting system; organizing real-time project performance control, such as video control, etc.; motivating project team members to duly update work performance data.

5.1 Schedule management planning

5.1.1 Inadequate quality of the schedule management plan

According to the analysis results, inadequate quality of the schedule management plan appears to be one of the key challenges of project schedule management. That extends to mistakes and inaccuracies, information deficiency and low level of systematization of the document, lack of reflection on important aspects of schedule management, poor structure of the document, and discrepancy between the aim of the document and its contents.

The problem was caused by poor project management standardization (respondents 12, 34), low quality of planning (respondents 3, 22, 31, etc.), existing time limitations of planning (38), and lacking qualifications of the project manager (respondents 14, 42). Respondents 42 stated the following:

The project manager did not have the appropriate experience in project management, so the quality of the document was inferior.

Respondent 8 emphasized the extensive workload of the project manager on other projects:

The project manager worked on several projects at once that had a variety of negative consequences, for instance, it decreased the quality of the project schedule management plan.

5.1.2 Delays in development of the schedule management plan

Another challenge that pertains to schedule management planning lies in delays in the development of the schedule management plan, including prolonged duration of document development, delays in editing its intermediate versions, and late review and approval procedure.

One of the reasons appears to be low priority given to the project in the project portfolio (respondents 2, 19). Respondent 2 said:

Higher priority given to the implementation of other projects in the company has led to untimely development of the project schedule management plan.

Respondents 5, 40 accentuated periodical changes in the plan's contents, and respondents 17, 27, 36 pointed to prolonged duration of review and approval procedure due to a large number of involved parties. According to the respondent 20, the lack of attention towards planning caused delays in development of the schedule management plan.

5.2 Defining and sequencing activities. Activity duration estimation

5.2.1 Incorrect list of activities

As stated by the participants of the survey, one of the discovered challenges is the incorrect list of activities, which extends to incomplete list and inaccurate definition of activities, incorrect activity attributes, and incorrect milestone list.

It happened because the project manager lacked necessary knowledge of the project scope (respondent 7) and due to the little attention paid to definition of certain activities (respondent 9). Respondent 13 said that the problem lies in project scope changes made by the customer in the process of project planning:

The customer has repetitively made changes in the project scope in the process of planning, and that facilitated correction of the WBS and the activity list.

Some participants have also mentioned the limited amount of time allocated to planning (respondents 10, 43), as well as incorrect activity attributes, including imposed dates and time constraints (respondent 39).

5.2.2 Incorrect sequence of activities

The next identified challenge concerns mistakes in planning the sequence of activities, which involves incorrect relationships, omitting some important relationships, and poor-quality activity sequencing.

The problem was induced by the large number of activities in the project (respondents 1, 16, 44), the high level of project innovation (respondent 35), and the insufficient knowledge of project specifics by the project manager (respondents 21, 32). Respondent 32 indicated the following:

> *The project manager formerly specialized in software development projects, and because of that, after he was appointed for this construction project, he was not fully aware of the project specifics and could not properly plan the sequence of activities.*

The participants of the survey named other reasons, such as unsystematic and superficial definition of the relationships (respondent 40), and the project manager's insufficient experience in planning (respondents 15, 25, 41).

5.2.3 Inaccurate estimation of activity duration

The inaccurate estimation of activity duration appears to be another challenge. That includes mistakes in estimation of duration of certain activities, incorrect application of analogous estimating, and three-point estimating techniques.

Respondents 18 and 22 emphasized the insufficient amount of time allocated to planning:

> *The customer set a very challenging project completion date, and the project manager was concerned with meeting it, which caused the planning stage to be very limited in time. In turn, the amount of time allocated to the activity duration estimation was lacking and the estimates were not always realistic.*

The participants have also indicated other reasons, such as the lack of consideration for factors that influence the activity duration (respondents 10, 23, 32), the poor knowledge of the project management software (respondent 41), difficulties in activity duration estimation (respondents 4, 16), and incorrect application of tools and techniques of project time estimation (respondent 33). Respondent 6 pointed to the insufficient risk estimation:

> *The estimation of the activity duration involved little risk analysis, therefore, time estimates were often too optimistic.*

5.3 Schedule development

5.3.1 Delays in development of the project schedule

One of the challenges that pertain to the development of project schedule lies in delays in this process, which includes late start and prolonged duration of the preparation of project schedule, and exceeding time limitations for the schedule approval.

The participants indicated high level of difficulty of the development of project schedule with application of bottom-up estimation (respondent 26) and difference in location between project team members (respondents 24, 35) to be the source of the problem. Respondent 35 stated the following:

Organizing effective development of project schedule appears to be difficult, since many team members are far away from each other, and some of them work in different time zones.

It was also noticed that the project manager had a shortage of time for planning (respondent 30) and communication system was not effective enough (respondent 5).

5.3.2 Inadequate quality of the project schedule

The survey showed inadequate quality of the project schedule to be the other challenge that pertains to project schedule development, which involves mistakes in project schedule, incorrect definition of resource requirements, ineffective optimization of resources, mistakes in schedule compression, and absence of a defined critical path.

That happened because of the high level of innovation and complexity of the project (respondent 35), and short deadlines for planning (respondents 4, 23, 43). Respondent 23 clarified:

The amount of time allocated to planning was too little, and it was not enough for proper schedule development, which resulted in activities taking more time than planned.

The participants indicated some other reasons, such as inadequate control of project schedule development (respondent 37), and difficulty in planning the availability of the project human resources (respondents 2, 31).

5.4 Schedule control

5.4.1 Exceeding planned project duration

The first discovered challenge of project schedule control is exceeding planned project duration, including the duration of certain activities and the entire project, as well as late achievement of milestones.

Some participants stated that deficient project schedule control (respondents 1, 12, 25, etc.) and prolonged implementation of changes in the project (respondent 27) were the cause of the problem.

Respondent 14 said that lacking motivation of the project team members has negatively influenced the ability to complete the project on time:

It was obvious that the project manager did not motivate the project team members properly, and they have not finished the tasks effectively, which in turn made them unable to complete the project on time.

Moreover, many respondents (3, 20, 42, etc.) reported inadequate qualifications of the project team members and inaccurate planning of project team members' responsibilities, partly due to ineffective responsibility delegation by the project manager (respondents 15, 21) to cause the problem.

5.4.2 Inadequate quality of schedule control

The second challenge is inadequate quality of schedule control, which extends to poor schedule control, incomplete and unsystematic control, and improper documentation of control results.

Respondents 11, 24, 29 stated that the cause of the problem lies in different locations of work sites and the project manager. Respondent 29 specified:

> *Construction projects require the project manager to be present when accepting the completed works. Otherwise, control quality can drop, as it happened in the project.*

The participants also named other reasons – improper use of work performance measurement techniques (respondent 27), lack of time of the project manager to implement proper control (respondents 17, 33, 44), and inadequate qualifications of the project manager (respondents 14, 30, 38).

5.4.3 Late schedule control

The third discovered challenge of project schedule control is late schedule control, which includes prolonged duration of control procedures and untimely control. Ineffective project communication system (respondents 19, 34) was one of the reasons of the challenge and it led to the late feedback.

Respondent 34 stated the following:

> *Communication between project team members was not planned and organized properly, therefore, sometimes the project manager did not receive actual work performance data.*

Other reported causes of the challenge are a large number of project contractors involved in the project execution (respondent 39) and overuse of human resources due to application of the crashing schedule compression technique (respondent 13).

5.4.4 Improper project status updates

The next challenge of project schedule control is improper project status updates, that involves transferring incorrect and irrelevant work performance data, as well as providing irregular and late project status updates.

Most of the participants (respondents 12, 24, 35, etc.) put emphasis on the difference in location between project team members. Respondent 12 said the following:

The fact that most of the project team members were located far from the project manager made duly updating project status more difficult.

Respondent 25 claimed that the reason for improper project status updates is incorrect use of project management software, while respondents 16, 28, 40 pointed to subjectivity in the estimation of work progress. In addition to that, other respondents named the ineffective reporting system (respondents 18, 26) to be the root of the problem that led to improper project schedule control (respondent 29).

6. Discussion and Conclusion

In the study we have analyzed project schedule management challenges with the application of process approach in the following processes – schedule management planning, defining and sequencing activities, activity duration estimation, schedule development, and schedule control.

Efficient planning appears to be a core part of any successful project, and schedule management planning is one of the ways to manage a project effectively (Serrador, 2013; Suresh & Sivakumar, 2019). The results of the investigation showed a variety of challenges that pertain to project schedule management planning. PMI (2017) describes schedule management planning process as elaborating the policies, procedures, and documentation for planning, developing, managing, executing, and controlling the project schedule. The schedule management plan is the main output of the process, which includes a set of criteria and the activities for creating, monitoring, and controlling the project schedule.

Lack of quality that appears in the schedule management plan can potentially make it less effective, and that in turn can lower the efficiency of project schedule management, while delays in the development of the schedule management plan can adversely affect the initiation of the schedule management processes and prolong the project duration.

The results of the investigation created a room for a set of measures needed to reduce or mitigate these challenges – raising qualifications of the project manager, involving experts, applying lessons learned, bettering project prioritization, regulating the duration of the schedule management plan development, and optimizing its review and approval procedure.

Defining and sequencing activities are the processes of determining and documenting the particular actions that have to be performed to create the project deliverables and relationships among the project activities. Activity duration estimation is the process of estimating the time periods necessary to finish individual activities with specific resources. The activity list, activity attributes, milestone list, project schedule network diagrams, and duration estimates are the main outputs of these processes (PMI, 2017).

Incorrect list of activities, mistakes in planning the sequence and duration of activities can potentially produce incorrect project funding requirements, extend the duration of certain activities and the entire project, as well as lead to accidents in the financing of the project.

To fix the mentioned problems, organizations can employ training on project management software, document the accountability of the customer for any changes in project scope, raise qualifications of the project manager, apply expertise of the project team members, control the duration of schedule management planning, invite a risk manager, and implement lessons learned.

Developing a viable project schedule can be considered one of the hardest challenges a project manager can face (Nor et al., 2021). According to PMI (2017), the process of schedule development requires the definition of activity sequences, durations, resource requirements, and schedule limitations to produce a schedule model for project realization, monitoring, and controlling. The schedule model can be modified only by applying formal change control procedures and is used as a basis to compare it to documented results. The project schedule is a product of a schedule model that demonstrates project activities, their planned dates, durations, resources, etc.

Delays in determining project schedule can cause late approval of the project management plan and increase the project duration. Inadequate project schedule quality can cause irregularities in project financing, decrease the effectiveness of schedule control, lead to delays in execution of project activities and handling contractors, and extending the total duration of the project.

The challenges have to be addressed by the application of remote work technologies, improvement of the quality of communication between project team members, involvement of experts, provision of trainings on project management software, regulation the duration of schedule management planning, and application of resource calendars.

Control is accepted as a mechanism that helps prevent project failure and keep it within the schedule (Olawale, 2020). The process of schedule control is aimed to monitor the status of the project to make the project schedule relevant and manage changes to the schedule baseline. The main outputs of this process are work performance information, schedule forecasts, and change requests (PMI, 2017).

Exceeding project schedule can extend the payback period, decrease the value of NPV and other indicators of financial effectiveness of the project. Late and low-quality control, improper project status updates can facilitate difficulties or mistakes in the process of decision making, insufficient coordination in executing project tasks, exaggerated amount and misinterpretation of information, and that can have an adverse effect on project delivery.

In this investigation we suggest that the key countermeasures to reduce or mitigate the consequences of these challenges are increasing qualifications of the project manager, controlling the number of parties involved in the approval of project changes, employment of remote work technologies to control project performance, improving the quality of communication between project team members, motivating contractors to provide timely feedback, regulating reporting system, organizing real-time project performance control, and motivating project team members to update work performance data on time.

In conclusion, systematic analysis of challenges connected to project schedule management, research of their triggers, effects, and implementation of possible countermeasures will open a path for a more effective project schedule planning, allow to increase the efficiency of decision-making process, lower the possibility of schedule overruns and prevent many difficulties and mistakes during the project life cycle.

7. Implications, Limitations and Future Research Direction

The investigation makes some contributions to theory and practice in the following ways. First, the study identified various project schedule management challenges, their causes, effects and suggested recommendations to help meet these challenges based on process approach. The obtained results can be applied to the project schedule management knowledge area of the process-based project management standards, for instance, PMBOK® Guide (2017). The classification of challenges connected to the project schedule management processes provides managers with an opportunity to focus on the most troubling challenges in a systematic and holistic manner and create an extensive plan to mitigate the challenges and enhance the project work.

Second, to the best of our knowledge, this investigation is a first work that have analyzed project schedule management challenges through the prism of process approach, which can help increase the understanding of challenges in other project management knowledge areas. This will open possibilities for researchers to create a common view on such challenges by implementing process approach and form a theory on strategies that will allow for meeting the discovered challenges and improving planning and execution of projects.

It is also important to note that the research has some limitations. First, while the investigation has successfully allowed us to accumulate deep knowledge on the topic similarly to other qualitative studies, the findings may be considered subjective, since they were formed based on the opinions of experts in project management. Second, only projects that were executed in the framework of the traditional project management approach were subject to investigation in the research. Third, the respondents share a single country of origin – Russia, and therefore it is recommended to practice caution in applying the results to a broader (international) context.

Despite this, the study provided a variety of ideas for further investigation. First, it would be useful to perform more thorough (e.g., qualitative and quantitative) studies for analyzing inter-relationships among challenges to create a profound understanding of such challenges. Second, further studies could investigate challenges in other project management knowledge areas, such as project quality management, project resource management, project stakeholder management, etc. Third, future studies are crucial to investigation of challenges from international or industry-specific outlook to develop specific knowledge. Fourth, it appears that there is a demand to examine projects, carried out based on agile methodology. Last, further studies can use different approaches as their underpinning lenses to investigate such challenges.

References

Abwunza, A.A., Peter, T.K., & Muigua, K. (2020). Explaining delays in construction arbitration: A process-control model approach. *Journal of Legal Affairs and Dispute Resolution in Engineering and Construction*, 12(2), 1-40.

Ahbab, C., Daneshvar, S., & Celik, T. (2019). Cost and time management efficiency assessment for large road projects using data envelopment analysis. *Teknik Dergi*, 30(2), 8937-8959.

Ahsan, K. & Gunawan, I. (2010). Analysis of cost and schedule performance of international development projects. *International Journal of Project Management*, 28, 68-78.

Al-Hajj, A. & Zraunig, M.M. (2018). The impact of project management implementation on the successful completion of projects in construction. *International Journal of Innovation, Management and Technology*, 9(1), 21-27.

Amer, J.A. (2020). Challenges in construction project management as faced by millennials in developing countries. *PM World Journal*, 9(7), 1-11.

Asmitha, P. (2019). Time delay and cost overrun in construction projects. *IRE Journals*, 3(5), 44-51.

Bukłaha, E., Wyrozębski, P., Trocki, M., Grucza, B., Metelski, W., Kandefer-Winter, K. et al. (2016). Project management – challenges and research results. Warsaw School of Economics Press, 1-215.

Chang, A. (2002). Reasons for cost and schedule increase for engineering design projects. *Journal of Management in Engineering*, 18(1), 29-36.

China, L.S. & Hamid, A.R. (2015). The practice of time management on construction project. *Procedia Engineering*, 125, 32-39.

Da Silva, E.C. & de Oliveira, V.R. (2017). Project cost management: Challenges for an industry. *RAIMED: Revista de Administração*, 7(2), 27-49.

Ekanayake, H., Bin Idar, R., & Fadhil Mohammad, M. (2019). Traditional project management approach, industry challenges and key attributes: A case study of construction project management in Sri Lanka. *Asia Pacific Journal of Advanced Business and Social Studies*, 5(1), 52-64.

Famiyeh, S., Amoatey, C.T., Adaku, E., & Agbenohevi, C.S. (2017). Major causes of construction time and cost overruns: A case of selected educational sector projects in Ghana. *Journal of Engineering, Design and Technology*, 15(2), 181-198.

Harvey, J. & Aubry, M. (2018). Project and processes: A convenient but simplistic dichotomy. *International Journal of Operations & Production Management*, 38(6), 1289-1311.

Hsieh, H.F. & Shannon, S.E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, 15(9), 1277-1288.

International Organization for Standardization. The process approach in ISO 9001:2015. Geneva, Switzerland.

Ika L.A. (2009). Project success as a topic in project management journals. *Project Management Journal*, 40(4), 6-19.

Imad, H.U., Akhund, M.A., Ali, T.H., Khoso, A.R., & Siddiqui, F.H. (2018). Time overrun in pre-construction planning phase of construction projects. *Journal of Civil and Environmental Engineering*, 12(9), 817-821.

Isern, G. (2015). Intercultural project management for IT: Issues and challenges. *Journal of Intercultural Management*, 7(3), 53-67.

Kahvandi, Z., Saghatforoush, E., Ravasan, A.Z., & Mansouri, T. (2018). An FCM-based dynamic modelling of integrated project delivery implementation challenges in construction projects. *Lean Construction Journal*, 2018 issue, 63-87.

Kaminsky, J. (2021). Who are we talking to? Situating construction engineering and management knowledge. *Journal of Construction Engineering and Management*, 147(2), 06020003.

Kembro, J., Näslund, D., & Olhager, J. (2017). Information sharing across multiple supply chain tiers: A Delphi study on antecedents. *International Journal of Production Economics*, 193, 77-86.

Khalid, F.J. (2017). The impact of poor planning and management on the duration of construction projects: A review. *Multi-Knowledge Electronic Comprehensive Journal for Education and Science Publications*, 2, 1-20.

Larsen, J., Shen, G., Lindhard, S., & Brunoe, T. (2016). Factors affecting schedule delay, cost overrun, and quality level in public construction projects. *Journal of Management in Engineering*, 32(1), 1-10.

Li, X., Xu, J. & Zhang, Q. (2017). Research on construction schedule management based on BIM technology. *Procedia Engineering*, 174, 657-667.

Luacky, E.O., Adegoke, O., & Norani, N. (2014). Project management challenges and difficulties: A case study of information system development. *International Postgraduate Business Journal*, 6 (1), 99-113.

Monyane, T.G., Emuze, F.A., & Crafford, G. (2018). An identification of cost management challenges in public sector projects. *Journal of Construction Project Management and Innovation*, 8, 2127-2137.

Mossalam, A. (2018). Projects' issue management. *HBRC Journal*, 14(3), 400-407.

Niederman, F., Müller, B., & March, T.S. (2018). Using process theory for accumulating project management knowledge: A seven-category model. *Project Management Journal*, 49(1), 6-24.

Ninan, J. (2020). Online naturalistic inquiry in project management research: Directions for research. *Project Leadership and Society*, 1, 100002.

Nyqvist, D. (2015). Time management challenges in major refurbishment projects. Uppsala Universitet, 1-58.

Nor, R.N., Jusoh, Y.Y., Mohamed, F.C., Hassan, S.A., & Shari, M.F. (2021). Project scheduling management in the software industry. *Turkish Journal of Computer and Mathematics Education*, 12(3), 2136-2145.

Oburu, A.O. (2020). Effective project time management. *International Academic Journal of Information Sciences and Project Management*, 3(6), 47-55.

Olawale, Y.A. (2020). Challenges to prevent in practice for effective cost and time control of construction projects. *KICEM Journal of Construction Engineering and Project Management*, 10(1), 16-32.

Olawale, Y.A. & Sun, M. (2014). Construction project control in the UK: Current practice, existing problems and recommendations for future improvement. *International Journal of Project Management*, 33(3), 623-637.

Osman, L.A. & Mohamud, A.O. (2022). The impact of time delay on construction projects cost overrun: A case study on some of construction projects in Mogadishu-Somalia. *Journal of Positive School Psychology*, 6(4), 3884-3895.

Papulova, E. (2020). Promoting process approach to management. *SHS Web of Conferences*, 83, 01050, 1-8.

Parizotto, L. de Almeida, Tonso A., & Monteiro de Carvalho, M. (2020). The challenges of project management in small and medium-sized enterprises: A literature review based on bibliometric software and content analysis. *Gestão & Produção*, 27(1), 1-23.

Patil, G.V. (2016). Project management challenges. *Journal of Multidisciplinary Engineering Science and Technology*, 3(11), 6019-6024.

Patton, M. (1990). Qualitative evaluation and research methods, Sage, London.
PMI (2017). A guide to the project management body of knowledge (PMBOK® Guide), Sixth Edition. Project Management Institute, USA.

Ray, K., Sengupta, G., & Gangly, K. (2019). Project management challenges in India. *International Journal of Emerging Technologies and Innovative Research*, 6(2), 473-476.

Raydugin, Y.G. (2014). Holistic view on unknown unknowns in project risk management, in: *Developing Business Strategies and Identifying Risk Factors in Modern Organizations*, IGI Global: Hershey, 82-93.

Sachan, A., Raj, A., & Manjula, R. (2016). Project management – The challenges and their resolutions. *International Research Journal of Engineering and Technology*, 3(11), 1008-1012.

Saukko, L., Aaltonen, K., & Haapasalo, H. (2020). Inter-organizational collaboration challenges and preconditions in industrial engineering projects. *International Journal of Managing Projects in Business*, 13(5), 999-1023.

Sergi, V., Crevani, L., & Aubry, M. (2020). Process studies of project organizing. *Project Management Journal*, 51, 3-10.

Serrador, P. (2013). The impact of planning on project success. *The Journal of Modern Project Management*, 1(2), 28-39.

Shibani, A., Mahadel, O., Hassan, D., Agha, A., & Saidani, M. (2021). Causes of time overruns in the construction industry in Egypt. *International Research Journal of Modernization in Engineering Technology and Science*, 3(1), 510-531.

Silva, J., Ávila, P., Patrício, L., Sá, J.C., Ferreira, L.P., Bastos, J., & Castro, H. (2022). Improvement of planning and time control in the project management of a metalworking industry – Case Study. *Procedia Computer Science*, 196, 288-295.

Simushi, S. & Wium, J. (2020). Time and cost overruns on large projects: Understanding the root cause. *Journal of Construction in Developing Countries*, 25(1), 129-146.

Stellingwerf, R. & Zandhuis, A. (2013). ISO 21500 guidance on project management: A pocket guide. Van Haren Publishing, Zaltbommel.

Stumpf, G.R. (2000). Schedule delay analysis. *Cost Engineering*, 42(7), 32-43.

Suresh, D. & Sivakumar, A. (2019). Impact of schedule management plan on project management effectiveness. *International Journal of Engineering and Advanced Technology*, 9(1), 3351-3355.

Susanti, R. (2019). Cost overrun and time delay of construction project in Indonesia. *Journal of Physics: Conference Series*, 1444, 012050.

Takagi, N. & Varajão, J. (2019). Integration of success management into project management guides and methodologies. *Procedia Computer Science*, 164, 366-372.

Teubner, R.A. (2018). IT program management challenges: Insights from programs that ran into difficulties. *International Journal of Information Systems and Project Management*, 6(2), 71-92.

van den Heuvel, S. & Bondarouk, T. (2017). The rise (and fall?) of HR analytics: A study into the future application, value, structure, and system support. *Journal of Organizational Effectiveness: People and Performance*, 4(2), 157-178.

Walkowska, M. (2020). Challenges to effective project management – Team, motivation, organization – Literature review. Nottingham Trent University, 1-13.

Zhang, Y., Marquis, C., Filippov, S., Haasnoot, H.-J., & van der Steen, M. (2015). The challenges and enhancing opportunities of global project management: Evidence from Chinese and Dutch cross-cultural project management. *Harvard Business School Working Paper*, 15-063, 1-28.

About the Authors

Dr. Roman Titarenko

International Business School Suzhou,
Xi'an Jiaotong-Liverpool University,
Suzhou, China

Dr. Roman Titarenko is an Associate Professor of Practice at International Business School Suzhou, Xi'an Jiaotong-Liverpool University. He worked extensively in the project management industry before pursuing a career in education. Roman has got a significant working experience as a project manager and a business development director for international companies and private institutions operating in Russia – e.g., Coca-Cola Hellenic, The Stockholm School of Economics as well as Russian companies operating internationally.

He obtained his PhD degree from Russian State University of Management in 2001 where he conducted research related to the development of the conceptual model of the project management certification program. It greatly contributed to the creation of the project management certification system in Russia (IPMA-SOVNET certification).

From 2009 until joining XJTLU, Roman worked as an Associate Professor at some Russian universities, such as Russian State Social University and Plekhanov Russian University of

Economics. He also gave lectures as a Visiting Professor at La Rochelle Business School (Excelia Group, France) and Cracow University of Economics (Poland). He is a certified project manager (IPMA Level C) by International Project Management Association.

His research interests lie primarily in project management, risk management, and strategic management. He can be contacted at Roman.Titarenko@xjtlu.edu.cn

Dr. Nuno da Camara

International Business School Suzhou,
Xi'an Jiaotong-Liverpool University,
Suzhou, China

Dr. Nuno da Camara is a Senior Associate Professor of Practice at International Business School Suzhou, Xi'an Jiaotong-Liverpool University. He is currently Director of the International MBA at IBSS-XJTLU and teaches courses on organisational behaviour, HR management, change management and emotional intelligence.

Nuno worked in industry for 14 years, as a corporate communications professional in the financial services sector, and later as a consultant advising companies on reputation management. He has worked for large organisations like Aviva, Clifford Chance and J P Morgan, as well as specialist agencies like Smithfield Financial and ReputationInc. He has also consulted with a variety of private, not-for-profit and public organisations on stakeholder research, employee engagement and change programmes.

Previously, he was Senior Lecturer and MBA Director at the University of Southampton in the UK. He did his PhD at Henley Business School (University of Reading) and his Masters at the London School of Economics (LSE) in the UK. Nuno is also a qualified executive coach and has a strong interest in leadership development.

His research interests lie primarily in employee motivation, organisational culture, corporate reputation, strategy and project management. He can be contacted at Nuno.Camara@xjtlu.edu.cn.