Causes of Delays in Portuguese Construction Projects

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Abstract: Delays are frequent in engineering and construction projects all over the world. Delays can have severe impacts, such as time and cost overruns and conflicts between stakeholders, and can also lead to total abandonment of the contract. This paper presents the findings of a survey conducted to identify the most important causes of delays in the Portuguese construction industry. Among the respondents were representatives from all stakeholders involved: contractors, consultants and developers. The Relative Importance Index was adopted to classify the relative importance of the 46 identified causes of the delays. The results show that the main causes of delay were slow decision making by developers, change orders, unrealistic contract duration and specifications in contracts, financial constraints on the contractor and the type of bidding and award of contract process. Additionally, factor analysis revealed eight high-level causes that aggregate 30 of the original causes. These findings are expected to contribute to expanding the knowledge in the scientific community of construction management, in particular in the field of supply chain management, and helping the Portuguese industry in the reduction and prevention of delays in construction projects.

1 INTRODUCTION

Delays in construction projects have always been a global issue regardless of the type of project. In construction, a delay can be defined as the time overrun either beyond the completion date specified in the respective contract, or beyond the date the contract parties agree upon for delivery of a project (Assaf and Al-Hejji, 2006).

The construction process is usually divided into 3 distinct phases: planning, design and construction, and it is in this last phase, which involves many unpredictable factors, that most delays usually occur (Chan and Kumaraswamy, 1997). Time performance is one of the basic parameters for evaluating the success of a construction project and must always be one of the main concerns in project management. A project is considered successful if it meets the requirements of 3 major indicators: time, cost and quality. Rwelamila and Hall (1995) also found that the timely completion of a project was frequently seen as one of the major parameters for evaluating project success. With this in mind, it is no surprise that project duration is a decisive criterion for developers when choosing a contract.

When a project faces delays it is usually extended or accelerated and both solutions have additional costs implied. Project delays are so frequent that it is common practice for a contingency cost to be included in the contract, which is normally a percentage of the total contract price, to cover cases of delay (Chan and Kumaraswamy, 1997). A range of problems can arise as a consequence of delays, particularly problems of a financial nature, which often result in conflicts between the stakeholders involved: contractors, consultants and developers. Despite all the efforts to prevent delays, the complexity of project design and construction makes it often difficult to identify the causes of the delays. Precisely identifying the causes may be even more difficult because many of them are often interconnected (Alkass et al., 1996), meaning that delays can be a consequence of each another.

In Portugal the scenario is no different and delays affect a large percentage of construction projects. However, in recent years, the financial crisis has led to a major stagnation in the construction industry, forcing several companies to declare bankruptcy or move abroad. With all the resulting financial constraints, the market is

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becoming increasingly more competitive and optimizing the cost and time factors has become essential for contractors. Accordingly, identifying the causes of delays is a key factor for process optimization.

A number of papers have been produced over the last two decades in relation to this matter but most of them have been far from the Portuguese context. The aim of this research work is, thus, to identify the main causes of delays in the Portuguese construction industry and understand the links between them. It is also important to understand the differences of opinion between the various stakeholders involved in construction projects.

2 LITERATURE REVIEW

Many researchers have studied the causes and effects of delays in the construction industry in recent decades. Mansfield et al. (1994) identified 16 major causes of delays and cost overruns in Nigerian construction projects by means of a questionnaire survey that was conducted with contractors, consultants and developers. They concluded that the main causes of delays and time overruns had to do with finance and payment arrangements, poor contract management, shortage in materials, inaccurate estimates and price fluctuations.

Ogunlana et al. (1996) conducted a study on causes of delays in Thailand, analyzing 12 skyscraper projects in Bangkok. They identified 26 causes of delays and concluded that material shortages, especially cement, lack of qualified workforce, change orders by the developers and inadequate contractor experience were the most important ones.

Chan and Kumaraswamy (1997) conducted survey-based research in Hong Kong with contractors, consultants and developers with a view to classifying the relative importance of 83 causes of delays. They concluded that the main causes of delay were poor site management and supervision, unforeseen ground conditions, low speed of decision making involving all project teams, developer initiated variations and necessary variations of work.

Odeh and Battaineh (2002) conducted survey-based research in Jordan to identify the main causes of delays in traditional construction projects. Contractors and consultants were asked to complete a questionnaire to evaluate the relative importance of 28 pre-selected causes. They concluded that the major causes of delays were inadequate contractor experience, developer interference, delay in progress payments by the developer, slow decision making by the developer, improper planning, low productivity level of labour and problems with subcontractors.

Doloi, Sawhney, Iyer, and Rentala (2012) conducted a survey to identify the main causes of delays in different types of construction projects in India. They selected a group of 45 causes and classified them according to the respondents' answers. The most important causes of delays indicated by the respondents were delays in material delivery by vendors, non-availability of drawings on time, financial constraints on the contractor, increases in scope of work and obtaining permissions from local authorities. Using factor analysis, they identified lack of commitment, inefficient site management, poor site coordination and improper planning as the most critical (extracted) factors in construction delays.

Gündüz, Nielsen and Özdemir (2012) conducted a survey to determine the relative importance of 83 different causes of delays in the Turkish construction industry. They surveyed 64 specialists in the field and concluded that inadequate contractor experience, ineffective project planning and scheduling, poor site management and supervision, design changes by the developer and late delivery of materials were the most important causes of delays.

Fallahnejad (2013) carried out a study on causes of delays analyzing 24 gas pipeline projects in Iran. He used a questionnaire to evaluate the relative importance of 43 different causes, concluding that the main causes of delays were inability on the part of contractors to provide imported materials, unrealistic contract durations imposed by the developer, slow delivery of materials by the developer, slow land expropriation due to resistance from occupants and change orders by developers.

It is clear from the studies in the literature reviewed that the causes and effects of delays in construction depend on the type of construction project and on the country where the project is undertaken. Some of the authors also recommended that similar studies should be conducted in other countries and types of construction projects (Assaf and Al-Hejji, 2006; Sambasivan and Soon, 2007). Accordingly, the study presented herein contributes to expanding knowledge on causes and effects of delays in construction projects, in particular in Portugal.

3 RESEARCH METHODOLOGY

For this research project a questionnaire survey methodology was used to determine the importance of the causes of delays in the construction industry. Major progress has been made in investigations based on survey research methodology in recent years (Vickery, 1998). Several authors have used survey research methodology in similar studies (Chan and Kumaraswamy, 1997; Doloi et al., 2012; Gündüz et al., 2012; Manavazhi and Adhikari, 2002; Mansfield et al., 1994; Odeh and Battaineh, 2002; Sambasivan and Soon, 2007).

Questionnaire design is a key part of survey research methodology. It is important that the questionnaire is clear and has no mistakes or discrepancies in its design. To accomplish this, basic ground rules for social surveys were adopted in questionnaire design (Fowler, 2009). The questionnaire was developed to assess the importance of the causes of delays. To this end a five point Likert scale was adopted (1 - very low; 2 - low; 3 - average; 4 - high; 5 - very high).

After a meeting with experts from the Portuguese construction industry, a total of 47 causes of delays reported in the literature were considered enough to capture the Portuguese reality and were include in this research. These causes were divided into 9 categories, namely: developer-related causes, contractor-related causes, consultant-related causes, material-related causes, Labour and equipment-related causes, design-related causes, contract and contractual relationships-related causes, external causes and authority-related causes.

After the questionnaire design was concluded a pilot test was carried out with a limited number of companies to check the effectiveness in collecting information and to identify possible mistakes or misunderstandings. After this pilot test some changes were made in the questionnaire. The questionnaire was then distributed by electronic mail to a selected sample of 150 contractors, 100 consultants and 70 developers.

Sample selection plays a decisive role in survey research methodology and mistakes in this process will reduce confidence in the results. Furthermore, non-respondents can alter a sample frame and lead to non-response bias, which can compromise the validity of the results. To avoid these issues, all recommendations by Forza (2002) regarding sample size and design and non-response bias were taken into consideration. Of the 320 questionnaires sent out, 139 were returned: by 62 contractors, 46 consultants and 31 developers. With the responses obtained from the survey, the data was then analysed using statistical tools.

4 RESULTS

4.1 Ranking of Causes

The Relative Importance Index (RII) method was adopted in this study to evaluate the relative importance of causes of delay. This methodology is common in survey research and has been used by several authors (Aibinu and Jagboro, 2002; Assaf, Al-Khalil and Al-Hazmi, 1995; Chan and Kumaraswamy, 1997; Doloi et al., 2012; Frimpong, Oluwoye and Crawford, 2003; Gündüz et al., 2012; Odeh and Battaineh, 2002; Sambasivan and Soon, 2007). For each cause the respective RII is calculated as in Eq. (1):

$$RII = \sum W/A \times N \quad (1)$$

Where

W - Importance given to each cause (1 to 5)
A - Highest weight (A = 5)
N - Total number of respondents

The ranking of causes is presented in table 1. The most important cause, in the opinion of the respondents, was “slow decision making by the developer”. Timing of decision-making is crucial in construction projects and delays in this process can halt the work progress. The following causes in the top 5, again according to the respondents, were: “change orders”, “unrealistic time schedule and specifications in contract”, “financial constraints on the contractor” and “type of bidding and contract award process”. Respondents also indicated “delay in progress payments by owner”, “improper planning and scheduling”, “developer interference, “increase in scope of work” and “mistakes and discrepancies in drawings” as important causes of delay. Along with this ranking, it is important to identify the differences of opinion between the various types of respondents. Contractors indicated “slow decision making by the developer” as the major cause of delays. Consultants identified “unrealistic time schedule and specifications in contract” as the most important causes of delay, while developers indicated “financial constraints on the contractor” as the major cause.

For a better comparison between the respondent types, table 2 presents the ranking of categories of causes according to each type and the global ranking. “developer”-related causes and “contract and contractual relationships”-related causes are the

Table 1: Ranking of causes of delay.

Causes of delay	RII	Rank	Causes of delay	RII	Rank
Developer-related causes			Material-related causes (cont.)		
C1 - Delay in progress payments by developer	0.770	6	C26 - Changes in material specifications during construction	0.717	13
C2 - Slow decision making by developer	0.849	1	C27 - Delay in materials procurement	0.721	12
C3 - Developer interference	0.736	8	C28 - Change in material prices	0.523	43
C4 - Delay in handing over the site to contractor by developer	0.574	38	Labour and equipment-related causes		
C5 - Increase in scope of work	0.732	9	C29 - Lack of qualified Labour	0.626	30
C6 - Change orders	0.845	2	C30 - Low Labour productivity	0.651	27
C7 - Bureaucracy in developer's organization	0.670	22	C31 - Equipment availability and failure	0.574	38
Contractor-related causes			C32 - Inadequate equipment	0.596	34
C8 - Delays and changes of subcontractors	0.655	26	Design-related causes		
C9 - Inadequate construction methods	0.626	30	C33 - Mistakes and discrepancies in drawings	0.728	10
C10 - Improper planning and scheduling	0.755	7	C34 - High complexity of drawings	0.587	35
C11 - Mistakes during construction	0.645	28	C35 - Delay in producing design documents	0.632	29
C12 - Inadequate contractor experience	0.677	18	Contract and contractual relationship causes		
C13 - Site accidents	0.474	47	C36 - Bidding and contract award process	0.828	5
C14 - Poor site management and supervision by contractor	0.577	37	C37 - Unrealistic time schedule and specifications in contract	0.845	3
C15 - Financial constraints on part of contractor	0.843	4	C38 - Mistakes and discrepancies in contract	0.666	24
C16 - Delay in site mobilization by contractor	0.657	25	C39 - Lack of motivation for contractor to finish early	0.560	41
Consultant-related causes			C40 - Lack of communication between parties	0.696	16
C17 - Inflexibility of consultant	0.668	23	C41 - Disputes and negotiations between parties	0.711	14
C18 - Delay in approval of drawings	0.674	20	External causes		
C19 - Delay in quality control	0.621	32	C42 - Unforeseen site conditions	0.687	17
C20 - Lack of control over subcontractor	0.521	44	C43 - Problems with neighbours	0.566	40
C21 - Waiting time for approval of tests and inspections	0.598	33	C44 - Unavailability of utilities in site	0.511	45
Material-related causes			C45 - Weather conditions	0.672	21
C22 - Inadequate material quality	0.585	36	Authority-related causes		
C23 - Damaged materials	0.511	45	C46 - Changes in government regulations	0.530	42
C24 - Shortage in materials	0.677	19	C47 - Delay in obtaining permits from authorities	0.726	11
C25 - Delay in material delivery	0.711	14			

most important categories of causes of delays. The major difference in the responses from the different types of respondents is in the importance given to "contractor"-related causes; consultants and developers agree as to the decisive importance of this category but contractors attach more importance to "design"-related causes and "consultant"-related causes. The main conclusion is that consultants and developers agree more with each other than with contractors. Since data was collected based on a Likert-scale, it can be considered as interval data, correlation analysis is an effective method to study relationships between these types of variables (Sekaran and Bougie, 2010). Therefore, the same

conclusion can be inferred analyzing the Spearman's rank of correlation (Assaf and Al-Hejji, 2006), presented in table3, which tests the degree of agreement between respondent types with a statistical significance of 0.001. One can also conclude that the most significant differences in opinions are between contractors and developers.

4.2 Factor Analysis

Factor analysis is a statistical tool that reveals correlations between variables that do not appear to be related and groups them into a much smaller number of underlying factors (Doloi, 2009). Factor analysis was useful in this study to identify correlations between causes of delay that didn't seem related at first, and it has been used before in similar studies (Doloi et al., 2012). To evaluate the adequacy of the survey results for factor analysis, the KMO and Bartlett's test of sphericity were conducted (Field, 2013).The result of KMO value was 0.748, which is higher than 0.5, the minimum value suggested by Kaiser (1974). Eight factors were extracted representing 30 causes of delay; 17 causes of delay were found to have no significant correlation with another one. These eight factors explained approximately 70% of total variance and are presented in table 4. The factor analysis was carried out using principal components analysis of the statistical package for social sciences (SPSS).

To validate that extracted factors measure what they are intended to, it is necessary to cross check if the causes within each factor are related to each other (Doloi, 2009). To measure the degree of correlation between causes of delays in each factor, the Pearson correlation coefficient was calculated and presented in tables 5 to 12. For coefficient values greater than 0.7 correlation is deemed to be strong and for coefficient values between 0.3 and 0.7 correlation is considered moderate. All correlation coefficients between causes present values higher than 0.3, so one can conclude that the factors extracted from factor analysis contain related causes.

Along with this correlation analysis it is also necessary to conduct a reliability analysis to ensure the consistency of measured causes and its scale (Doloi et al., 2012). To this end, Cronbach's alpha test was carried out on the causes of delays of each factor and on all 30 causes of delays extracted from the factor analysis. The results of this test are presented in tables 5 to 12. Although there is no established minimum for an acceptable value of Cronbach's alpha (Cα), Doloi (2009) suggests the following scale: $C\alpha > 0.9$ - excellent; $0.9 > C\alpha > 0.8$ - good; $0.8 > C\alpha > 0.7$ - acceptable; $0.7 > C\alpha > 0.6$ - questionable; $0.6 > C\alpha > 0.5$ - poor and $0.5 > C\alpha$ - unacceptable. All Cronbach's alpha values are greater than 0.6 and overall result is 0.917 which is considered excellent. Therefore, all results of the factor analysis can be accepted and have statistical meaning.

Table 3: Spearman's rank of correlation coefficients categories.

Entity	Contractor	Consultant	Developer
Contractor	1		
Consultant	0.727	1	
Developer	0.648	0.831	1

The first factor (inefficient site management) contains 6 causes of delays all of them directly related to inefficient site management by the contractor: delays and changes of subcontractors,

Table 2: Ranking of cause of delay categories.

Category	Respondents							
	Contractor		Consultant		Developer		Global	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Developer	0.764	1	0.701	2	0.727	1	0.74	1
Contract and contractual relationships	0.723	2	0.704	1	0.724	2	0.717	2
Contractor	0.664	6	0.623	3	0.711	3	0.657	3
Design	0.693	3	0.576	6	0.636	5	0.649	4
Material	0.647	8	0.588	4	0.704	4	0.635	5
Authority	0.668	5	0.557	7	0.627	6	0.628	6
Consultant	0.685	4	0.509	9	0.578	9	0.617	7
Labour and equipment	0.633	9	0.582	5	0.591	7	0.612	8
External causes	0.659	7	0.53	8	0.582	8	0.609	9

inadequate construction methods, improper planning and scheduling, mistakes during construction, inadequate contractor experience and poor site management and supervision by contractor. The contractor plays a decisive role in construction projects and the quality of its performance is crucial to avoid delays. If the contractor is not committed to finishing the project on time than its performance will be poor and delays will occur frequently. Contractor performance and commitment brings together all these causes of delay into one unique factor and it is easy to understand the correlation between them.

The second factor (lack of productivity) groups 5 causes of delays related with materials, labour and equipment: shortages in materials, delay in materials delivery, low labour productivity, equipment unavailability and failure and inadequate equipment. Unavailability of equipment or inadequate equipment can significantly decrease labour productivity and it is a clear sign of improper planning and poor site management. In addition, shortage in material, which can be a consequence of delays in materials delivery or improper planning, also leads to a decrease in labour productivity. Low labour productivity combined with work stoppages due to shortages of materials or equipment failure can also be considered a major reason for construction delays.

The third factor (poor control) links 4 causes of delay, all of them related to poor control by the consultant: inflexibility of consultant, delay in approval of drawings, delay in quality control and waiting time for approval of tests and inspections. Consultants also play an important role in construction projects and rigidity and inflexibility on their part can cause significant delays in work progress. Consultants have to ensure the quality of the contractor's performance and have the power to stop the work progress to perform tests and inspections. Therefore, if a consultant takes too long on this process or is inflexible on its demands, delays can occur and work schedules can be compromised.

The fourth factor (lack of commitment) associates 4 causes of delay related with various categories: lack of control over subcontractor, inadequate quality of materials, change in materials' prices and lack of motivation for contractor to finish early. Although these causes of delays may seem unrelated, their correlation relies mostly on the subcontractor's commitment. Lack of motivation on the part of the contractor means that it is sloppier in the process of choosing and controlling the subcontractors, making it harder for the consultants to control and monitor all of them. Because of this, subcontractors feel free to lower the quality of materials and change their prices in order to increase their profits.

The fifth factor (lack of communication) groups together 3 causes of delays related with the contract and contractual relationships: unrealistic time schedule and specifications in contract, lack of communication between parties and disputes and negotiations between parties. In order to be competitive, contractors reduce time schedules beyond reasonable terms and then are unable to meet their initial proposal. This issue immediately originates time overruns and frequently leads to disputes between parties that slow down or stop work progress. In addition to this, lack of communication between all parties involved also leads to disputes and negotiations.

The sixth factor (interference of the developer) links 3 developer-related causes of delays: slow decision making by the developer, developer interference and change orders. Along with the contractor and the consultant, the developer plays a major role in construction projects. All these causes of delay are related to developer interference in the process, so the correlation between them makes sense. Slow decision making and interference can slow down or even stop the work progress and generate delays. Change orders by the developer also lead to scheduling modifications that can delay the completion of a project.

The seventh factor (financial constraints) associates 3 causes of delays related with financial issues: delay in progress payments by developer, financial constraints on the contractor and the bidding and award of contract process. These causes of delays are directly related with the financial problems faced by both the developer and contractor. Delays in progress payments by the developer force the contractor to use their own financial resources to supply the project activities, otherwise the work will be halted. The type of bidding and award of contract process is also associated with these causes due to its financial nature. Developers frequently choose the lowest bidder in awarding their contracts. In order to be more competitive and offer lower prices, contractors reduce their profit margins and become more vulnerable to payment delays.

The eighth factor (excess of and changes in bureaucracy) contain 2 causes of delays related with bureaucracy: bureaucracy in the developer's organization and changes in government regulations.

Table 4: Factor analysis.

Factors extracted	Factor loading	Factors extracted	Factor loading
Factor I - Inefficient site management		Factor IV – Lack of commitment	
C8 - Delays and changes of subcontractors	0.660	C20 - Lack of control over subcontractor	0.725
C9 - Inadequate construction methods	0.650	C22 - Inadequate material quality	0.536
C10 - Improper planning and scheduling	0.818	C28 - Change in material price	0.660
C11 - Mistakes during construction	0.753	C39 - Lack of motivation for contractor to finish early	0.617
C12 - Inadequate contractor experience	0.652	Factor V - Lack of communication	
C14 - Poor site management and supervision by contractor	0.710	C37 - Unrealistic time schedule and specifications in contract	0.576
Factor II – Lack of productivity		C40 - Lack of communication between parties	0.597
C24 - Shortages in materials	0.592	C41 - Disputes and negotiations between parties	0.770
C25 - Delay in materials delivery	0.596	Factor VI - Related to developer	
C30 - Low labour productivity	0.624	C2 - Slow decision making by developer	0.833
C31 - Equipment unavailability and failure	0.714	C3 - Developer interference	0.794
C32 - Inadequate equipment	0.737	C6 - Change orders	0.546
Factor III – Poor control		Factor VII - Financial constrains	
C17 - Inflexibility of consultant	0.717	C1- Delay in progress payments by owner	0.689
C18 - Delay in approval of drawings	0.802	C15 - Financial constraints on contractor	0.567
C19 - Delay in quality control	0.762	C36 - Bidding and award of contract process	0.624
C21 - Waiting time for approval of tests and inspections	0.756	Factor VIII – Excess of and changes in Bureaucracy	
		C7 - Bureaucracy in developer's organization	0.736
		C46 - Changes in government regulations	0.610

Table 5: Pearson correlation between causes for factor I (C_α=0.867).

	C8	C9	C10	C11	C12	C14
C8	1					
C9	0.508	1				
C10	0.582	0.541	1			
C11	0.553	0.540	0.647	1		
C12	0.376	0.364	0.554	0.632	1	
C14	0.359	0.580	0.514	0.484	0.587	1

Table 6: Pearson correlation between causes for factor II (C_α=0.885).

	C24	C25	C30	C31	C32
C24	1				
C25	0.789	1			
C30	0.509	0.575	1		
C31	0.441	0.531	0.664	1	
C32	0.577	0.545	0.713	0.763	1

Table 7: Pearson correlation between causes for factor III (C_α=0.873).

	C17	C18	C19	C21
C17	1			
C18	0.703	1		
C19	0.570	0.646	1	
C21	0.609	0.616	0.651	1

Table 8: Pearson correlation between causes for factor IV (C_α=0.750).

	C20	C22	C28	C39
C20	1			
C22	0.648	1		
C28	0.476	0.371	1	
C39	0.386	0.327	0.389	1

Both these causes are related to the formal requirements demanded by the developer and the legislation. Excessive bureaucracy in the developer's organization can delay the work progress in many ways. The most common types of bureaucracy are

excessive paper work and inefficient communication chains. Changes in legislation are also a major problem in construction projects, on account to their external nature and unpredictability.

Table 9: Pearson correlation between causes for factor V (C_α=0.712).

	C37	C40	C41
C37	1		
C40	0.301	1	
C41	0.416	0.634	1

Table 10: Pearson correlation between causes for factor VI (C_α=0.703).

	C2	C3	C6
C2	1		
C3	0.531	1	
C6	0.361	0.440	1

Table 11: Pearson correlation between causes for factor VII (C_α=0.651).

	C1	C15	C36
C1	1		
C15	0.486	1	
C36	0.300	0.391	1

Table 12: Pearson correlation between causes for factor VIII (C_α=0.670).

	C7	C46
C7	1	
C46	0.509	1

Finally, from the seven factors extracted in this study, only 3 can be found in the work of Doloy et al. (2012), (ie, lack of communication, lack of commitment and inefficient local management), reflecting the differences between the contexts.

5 CONCLUSIONS

Based on this research work, one can conclude that slow decision making by the developer is the major cause of delays in construction projects in Portugal. Change orders, unrealistic time schedule and specifications in contract, financial constraints on the contractor, the bidding and award of contract process and delay in progress payments by the developer are also important causes. Another conclusion is that consultants and developers have similar opinions and both of them disagree in certain matters with the contractor. Developer-related causes, contract and contractual relationships-related causes and contractor-related causes are the most important categories of causes of delays.

Using factor analysis it was possible to connect and group several causes of delays into eight major factors that are responsible for delays in Portuguese construction projects, namely: inefficient site management; lack of productivity; poor control; lack of commitment; lack of communication; developer interference; financial constraints; and excess of and changes in bureaucracy.

This research contributes to the development and expansion of construction management knowledge in the scientific community, particular in the field of project management, and helps the Portuguese industry to prevent the causes of delays and, accordingly, mitigate their effects.

Although the sample size is considerable (139 respondents), a greater number of respondents could provide more information and increase the statistical significance of the results. Moreover, the sample is not equally distributed among the types of respondents and, despite all the measures taken, this could give rise to some bias in the responses. One last limitation of this research is that the results achieved, whilst comparable with similar published studies, are specific to the Portuguese realty.

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