The Risks Assessment in the Project Financing Initiative for the Cemetery Expansion Intervention in a Small Town in Southern Italy

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Abstract. In the present research the risks matrix related to a transformation intervention to be carried out through the Project Financing (PF) operational tool, has been developed. With reference to the expansion and management of the cemetery of a small town located in Southern Italy, the identification and allocation of the risks among the parties involved – private investor and Public Administration – have been implemented. Furthermore, the verification of the feasibility by the Public Administration in the use of the PF operational tool has been performed, by analyzing the results obtained by the project *proposer subject* in financial terms. The risk assessment constitutes a support tool for the public Administration in the decision-making processes aimed to evaluate the PF proposals by the *proposer subject* in order to ensure an appropriate and detailed investigation on the Public Private Partnerships mechanism and to avoid complications and contingencies that could lead to initiative failure. In this sense, the present analysis allows to evaluate the advantages for public and private subjects to use the PF mechanism in bridging the existing gulf between the scarce public resources and the investment demand of expansion and/or redevelopment of urban cemeteries.

Keywords: Public-Private Partnership · Project Financing · Expansion intervention · Municipal cemeteries · New realization project · Small town · Risks matrix · Business plan

1 Introduction

In the context of the Public Private Partnerships (PPP), the Project Financing (PF) constitutes an increasingly being used operational tool for regions and municipalities able to bridge the gap between the available financial resources and the investment needs for the realization and/or redevelopment of infrastructures and collective services [1–3, 11]. Moreover, the PF allows to channel the efficiency and the qualitative standard of the private sector in the renovation of public interest properties and abandoned areas located on urban territory.

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In general terms, the PF represents a complex procedure in which different fields are involved – legislative, economic and financial –. The Public Administration may use it in order to carry out projects with great technical difficulties and high capital requirement. The PF, in fact, is a contractual tool intended to ensure the cooperation between public entities and private investors in the context of initiative for the territorial development [16].

The satisfaction of the public interest deriving from the realization of the infrastructure is verified without direct public financial burdens. Thus, the central feature of the PF mechanism concerns the financial backing of the planned investments by the private investor, i.e. the design phase and the realization, in exchange for the project direct or indirect management.

Therefore, the financing procedure is not adaptable to all initiatives that require high investments, but only to those able of generating profits, in order to ensure the positive financial balance for the private investor in terms of profit deriving from the cash flows related to the intervention higher than the zero value.

In general, in PPP procedures the public subject has to assess not exclusively the public interest related to the proposal, but to verify its financial feasibility to include the project in the interventions to be realized planning [14].

In the context of the cemetery construction, the PF has over time become a procedural tool implemented by Public Administration for realization and management of cemetery areas, especially due to the convenience in financial and risks terms [8, 17].

The progressive involvement of private sector in projects related to cemetery spaces attests the growing interest in the PF able to allow also the small towns' public entities, unable to bear the required costs for the renovate or expansion of cemeteries, to outsource the redevelopment and management of these.

In the Italian context, the dimensions reached by PF market in the cemetery sector in terms of number of started interventions and activated investments are significant - i.e. among the most relevant are mentioned the projects realized in the cities of Foligno (2003), Avellino (2005), Taranto (2004), Castel Maggiore (2005), Sassari (2007), Pescara (2007), Messina (2008), Latina (2007), Potenza (2009), Venosa (2009), etc. [5].

Through the PF contractual mechanism, the public subjects could obtain a savings in economic and administrative terms. During the concession period, in fact, the Public Administration monitors the agreement performance, as it does not be directly concerned with the niches construction and management. Furthermore, the long-term duration of the public private cooperation allows the Public Administration to avoid the congestion risk of cemeteries and, consequently, to prevent sanitary criticality associated to it. From the private point of view, the interest in PF projects regards the low construction and management costs, the certainty of market demand stability, the competitor absence, operating in a monopoly regime with no other economic operators.

2 Aim

The present research concerns the framework outlined. The paper concerns the application of the PF procedure to a case study related to the expansion of the municipal cemetery of a small town located in Southern Italy.

The work aims to analyze the procedure for the identification and allocation of the risks associated to the realization and management of PF project among the parties involved – Public Administration and private investor. Furthermore, with reference to the mentioned transformation project, the work intends to verify the feasibility by the Public Administration in the use of the PF operational tool by analyzing the assessment carried out by the *proposer subject*. The present study has been developed by the authors and commissioned by Public Administration for assessing the effectiveness in the use of PF procedure for the initiative considered.

In this sense, the results of the research could be a support tool for the Public Administration in the decision-making processes aimed to evaluate the PF proposal by the *proposer subject* in order to ensure an appropriate and detailed investigation on the PPP mechanism. An effective study on the construction, profitability and demand risks of the initiative and a proper description of the economic and financial balance risk represent central phases in the PF convenience assessment.

The paper is structured as follows. In Sect. 3 the different risk typologies connected to a PPP realization and/or renovation project according to Italian legislative references have been illustrated. In Sect. 4 the case study, related to the expansion and the management of the cemetery of a small town located in Southern Italy to be carried out through the PF procedure, has been described. In Sect. 5, the matrix of the main risks associated to the project realization and management considered has been developed to validate the PF initiative. Finally in Sect. 6 the conclusions of the work have been reported.

3 The Risks Assessment

In the existing literature concerning the PPP operational tools for urban redevelopment interventions analysis, several contributions are aimed to define the risks for the parties involved in the transformation initiative – public subjects and private investors [4, 9, 12]. In the Italian context of the PPP operational tools, the National Anti-Corruption Authority (ANAC) Guidelines No. 9 indicate the distribution and allocation of initiative risks between the parties involved on the basis of their respective risk management competences [15]. In particular, the ANAC Guidelines No. 9 point out that the contracting authorities have to identify and assess the specific construction and management risks by allocating them to the subjects with the highest control capacities of them. This is confirmed in the reference literature aimed at analyzing the risks components of a PPP projects: for example, Iyer and Sagheer [10] have pointed out that the initiative success depends on the efficient risks transfer to the sector that can best manage them or Grimsey and Lewis [7] have analyzed the risks of PPP arrangements from the perspectives of the various parties, by explaining the contractual relations between the subjects in infrastructure projects and the most performing mechanisms of distributing risks during different phases of the project.

Furthermore, in order to assess the subject ability to manage each risk, the verification of the possibility to adopt suitable measures for the reduction of likely negative effects, i.e. insurance policies, shall be carried out.

The Guidelines include the risks matrix among the PPP contract documents, aimed at regulating ex-ante modalities and limits for the project financial economic conditions review.

The risks analysis provides to the public administrations a greater awareness of the critical issues that could be arise during the concession period and helps to strengthen the bargaining among the subjects involved – private and public –. In this sense, the risks matrix is part of the made up of contest documents for the tenders evaluation aimed to support the decision processes for the transformation investment implementation. Furthermore, during the execution phase, this document allows the public subject for an adequate monitor on the risks transfer and retention.

In the Italian legislative context, the arts. 3 par. 1 and 180 par. 3 of Legislative Decree No. 50/2016 [13] highlight that in PPP contracts the risk transfer to the private sector implies the allocation to this subject to the *construction*, *availability* and *demand* risks for the entire procedure period. These risk typologies are included in *operative* risk, i.e. associated to the management of works or services from the demand or the supply side or both points of view.

Moreover, the *construction* risk, as defined in art. 3 par. 1 of Legislative Decree No. 50/16, is related to delay in delivery times, non-compliance with project standards, increased costs, technical problems and failure to finish the planned work. With regards to this risk category, the ANAC Guidelines No. 9 include the specific risks connected to *i)* the design phase, for the occurrence of necessary project variations, resulting from design errors or omissions, such as to significantly affect the time and costs of carrying out the work; *ii)* an project execution that does not conform to the initial project, linked to failure to comply with the fixed standards; *iii)* an increase in the cost of production factors or inadequacy or unavailability of those planned in the project; *iv)* a wrong costs and construction times assessment; *v)* the contractual breaches by suppliers and subcontractors; *vi)* the unreliability and inadequacy of the technology used.

The *availability* risk, as defined in art. 3 par. 1 of Legislative Decree No. 50/16, is associated to the ability, on the part of the concessionaire, to provide the agreed contractual services, both in terms of volume and expected quality standards. The ANAC Guidelines include the risk items related to *i)* an extraordinary and not foreseen maintenance, deriving from inadequate design or construction, with a consequent increase in costs; *ii)* a non-compliance with the performance indicators of the structure or the services provided; *iii)* the total or partial unavailability of the asset and/or of the services to be provided.

In cases of profitable activities, the risk of *demand* for the services provided for, is associated to the lack of users and, therefore, of cash flows to be obtained in operational phase. The specific risks included in this risks typology concerns *i)* the contraction in market demand in terms of a reduction in overall demand for this service; *ii)* the contraction in specific demand, linked to the occurrence in the reference market of a competitive supply from other operators that negatively affects the current demand.

The attainment of the *economic-financial balance* (arts. 180, par. 7 and 165 pars. 3, 4, 5 of Legislative Decree 50/2016) represents the fundamental condition for the correct allocation of construction, availability and demand risks in PPP procures. Defined as the simultaneous presence of economic convenience and financial sustainability conditions - art. 3, par. 1 of Legislative Decree 50/2016 -, the economic-financial balance allows to ensure the project capacity to create value during the contract period and to generate an adequate profitability level for the invested capital (economic convenience)

and to generate sufficient cash flows to guarantee the initial capital repayment (financial sustainability).

The ANAC Guidelines report the main performance indicators for the verification of the economic-financial balance of the initiative - Net Present Value (NPV), Internal Rate of Return (IRR), Revenues and Costs Ratio (R/C), Debt Service Cover Ratio (DSCR) and Long Life Cover Ratio (LLCR).

The initiative bankability strongly affects the risks connected to an economic-financial imbalance: the resources availability to cover costs on the financial market in fixed time, the sustainability of these resources and the reasonable return on invested capital constitute the *funding risk*.

With reference to the *financial risk*, i.e. the risk of an increase in interest rates and/or failure to repay one or more loan installments, with a consequent costs rise or the impossibility of continuing the operation, the analysis of this risk component provides for the assumption of different progressively increasing interest rates to assess effects the main on the economic-financial balance, in terms of performance indicators results.

The whole PPP intervention risks assessment includes the risks connected to the obtaining permits (opinions, licenses, authorizations, etc.) from public and private entities. In this risk category, the *commissioning risk* is the likelihood that the work will not have approval, from other public subjects or from the community (stakeholders with regard to the intervention to be carried out), with consequent *i)* delays in the realization, *ii)* occurrence of controversies, or in extreme cases, *iii)* failure of the of the awarding or the entire PPP procedure.

The *administrative risk* is connected to the considerable delay or refusal in the granting of authorizations by competent public and private entities, or also to the granting of authorizations with additional requirements, by causing delays in the realization phases.

Furthermore, the *expropriation risk* concerns delays deriving from expropriation operations or higher costs of expropriation due to wrong planning and/or estimation.

In the same risk category, the *environmental and/or archaeological risk* is linked to the soil characteristics, to the possible reclamation due to soil contamination and to archaeological finds, thereby delays in the project realization and increases in costs for environmental remediation or archaeological protection. Finally, the *legislative-political-regulatory risk* derives from variations in the normative framework and from programmatic policy decisions that cannot be contractually foreseen, by causing increase in costs for adaptation.

The summary of the risks system related to the transformation and management projects carried out through the PF operation tool is rounded off by the *default risk* – i.e. the likelihood that users are unable to pay the price of the services offered -, the *residual value risk* – associated to the return of the asset characterized by a lower market value compared to that expected at the end of contractual relationship -, the *technical obsoleteness risk* – i.e. linked to the faster obsoleteness of plants, by determining higher maintenance costs -, the *above and below service interference risk* – connected to the different typologies services in the part interested by the intervention (electricity, cables, fiber optics, etc.).

In Table 1 a synthetic overview of the main risk categories illustrated is reported.

Table 1. The main risk categories in PPP projects

Operative risk	
Construction risk	Design risk
	Risk of project execution
	Risk of increase in production factors cost
	Risk of wrong costs and construction times assessment
	Risk of contractual breaches by suppliers and subcontractors
	Risk of unreliability and inadequacy of the technology used
Availability risk	Risk of extraordinary and not foreseen maintenance
	Performance risk
	Risks of the asset total or partial unavailability
Risk of *demand*	Risk of contraction in market demand
	Risk of contraction in specific demand
Risk of economic-financial imbalance	
Funding risk	
Financial risk	
Residual value risk	
Commissioning risk	
Administrative risk	
Expropriation risk	
Environmental and/or archaeological risk	
Legislative-political-regulatory risk	
Default risk	
Technical obsoleteness risk	
Interference risk	

4 Case Study

The case study concerns a hypothesis of project financing for the construction of niches and the management for a period of twenty years of the municipal cemetery of a small town located in Southern Italy. The town covers an area of about 40 km^2, with a population just over 25,000 inhabitants.

4.1 Description of the Cemetery Expansion and Management Project

The project proposed provides for the construction of cemetery niches in the area established for the expansion of the municipal cemetery and their subsequent management. The initiative plays a strategic role for the small town due to the current needs, equal to

476 niches, and to the centrality of this service for the community, as confirmed by the inclusion of the intervention in the Municipal 2017–2019 public works Programming Document.

In particular, the project concerns the realization of 3,968 niches divided into five lots – lot A composed by 812 niches to be built in the first year of the management period, lot B of 2,176 in the second year of the management period, lot C of 140 niches in the fourteenth year of the management period, lot D1 constituted by 448 niches to be realized in the fifteenth year of the entire period considered equal to twenty years and lot D2 of 392 niches in the seventeenth year.

The niches will be built with reinforced concrete walls on a continuous foundation consisting of a reinforced concrete slab. The external shell and the tombstones will be built by using of local materials and the roof will be protected by two layers of water-proofing membrane. The project also provides for the modernization of the pedestrian viability through a paving in pressed bricks, such as to those already existing in other cemetery areas. The trees in the area intended to the niches in lot D will be explanted and replanted in a suitable cemetery spaces.

The project envisages different measures aimed at optimizing management costs, such as the inclusion of votive LED lights, and at allowing the accessibility to the people with low modality, thanks to the absence of architectural barriers and to the presence of an electric vehicle to facilitate the users' movement.

4.2 The PF Procedure

The hypothesis assumed is that the Public Administration and a private investor conclude an onerous and written agreement for a fixed time period - equal to twenty years -, in order to expand and manage the municipal cemetery. The PF procedure provides that the new construction interventions are carried out by the private investor, in exchange for the temporary use of the new portion of cemetery for the fixed time period. In particular, under this assumption the private investor bears the realization costs and manages the new cemetery portion for the entire twenty-year concession period. The revenue items for the private investor will derive from the niches concession, whereas for the Public Administration a royalty equal to 250 € for each niche has been defined to be paid.

The verification of the effective use of PF in terms of financial feasibility from the private investor point of view related to intervention is carried out through the cash flows analysis.

With reference to the case study analyzed, the cash flow analysis has been developed by *proposer subject* and it shall be validated by the authors to verify the outputs obtained in terms of intervention profitability and risks. Starting from the market demand description, by considering the resident population trend and the National Institute of Statistics (ISTAT) mortality and birth rates [18] (Fig. 1), in the cash flows analysis, for each concession year, the costs (investment and management) and the revenues have been assessed and the performance indicators have been determined.

Finally, for the assessment of the risk linked to the economic-financial balance, a cash flows analysis, named new analysis, has been developed. It should be observed that some hypothesis have been borrowed from the *proposer subject* analysis, as considered valid: if a different hypothesis has been introduced in the Manuscript it is highlighted.

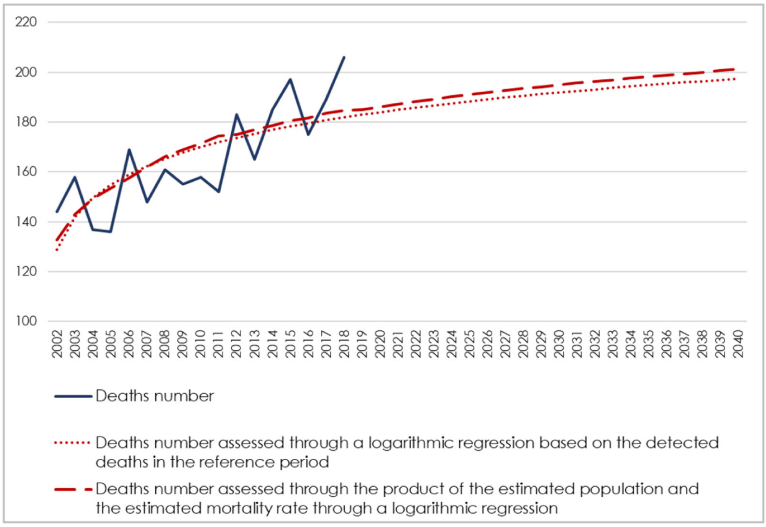

Fig. 1. Number of deaths detected and estimated

Thus, with reference to the case study, the main assumptions of the new analysis can be summarized as follows:

- the period of the analysis is equal to twenty years;
- the construction costs are assessed by considering the unitary costs reported in Regional Price List of Public Works of the year 2019. In the absence of the unitary price, the new realization costs are assessed by price lists of public and private works, currently used in the Region and by the data reported in the "Building typology prices" list [6], and are validated by consulting local operators and construction companies. Moreover, the unitary construction cost related to the case study cemetery project niches is consistent with the parametric unitary costs related to other similar Italian cemetery projects, recently built. In the *proposer subject* cash flows analysis the total construction cost was assessed equal to 3,500,000 €, whereas in the new cash flows analysis the total construction cost assessed is 3,700,000 €, by determining a percentage variation equal to ±6%. In particular, in the new analysis the estimated amounts for the different project components are higher compared those calculated by the *proposer subject*, with increases that vary from +4% to +14%, by depending on the lots (Fig. 2). This variation is in line with the difference in spending capacity between an ordinary investor, i.e. the cost assessment related to the reference price lists, and the specific investor, i.e. the *proposer subject*.

- the 36% of the investment costs related to the niches realizations intervention are borrowed from a credit institution, through a 20-year mortgage to be returned through constant annual down payments with an interest rate equal to 5.00%;

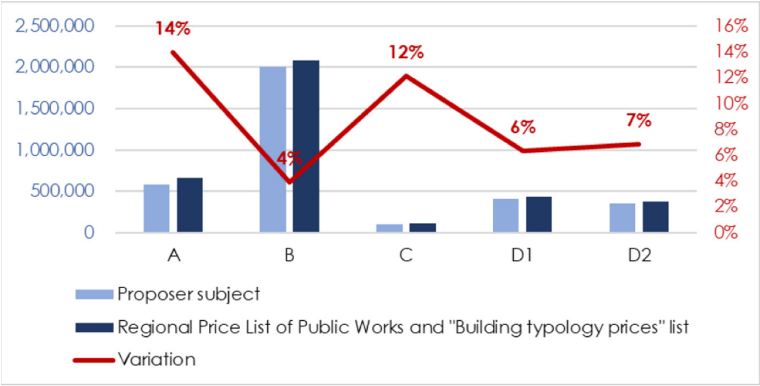

Fig. 2. Comparison between costs estimated by the proposer subject and costs assessed through the price lists

- the technical costs – for the definitive plan, a draft convention, the economic-financial plan, the specification of the service characteristic and of the management – are assessed equal to 60,000 €;
- the general expanses – including the fees for specialized technicians and professionals, the costs of the insurance for the construction phase, etc. – are assessed equal to 100,000 €;
- the management costs include the expenses for equipment, the ordinary maintenance costs, the personnel and insurance costs, the expenses for utilities. These costs are assessed by considering those currently borne by Public Administration for the existing cemetery portion;
- the revenue items concern the niches concession and the services as burial, bones-washing, votive lights, etc. The revenues are determined following the demand curve assessed. The market demand depends on two main factors: *i)* the number of deaths expected during the concession period, by deducting the burials, cremations or dead to be placed in private chapels *ii)* the previous market demand (476 niches). Therefore, on the basis of the estimations carried out, the annual deaths number has been estimated equal to 162, i.e. the annual expected average deaths number - equal to 190 – reduced by 15% by considering the potential cremations, burials and dead to be placed in private chapels. The amount estimated is different from the *proposer subject* analysis (180 niches/year) and represents a prudential initial data for the cash flow assessment. With regards to the tariffs implemented by the *proposer subject* in his analysis for the niches concession and for installation of slabs and accessories are equal to 2,500 – 2,600 €/niche. This amount is consistent with the current ordinarily tariffs charged in the specific reference context by Public Administration and, therefore, they are retained in the new analysis;
- for each niche, a royalty equal to 250 € has been defined to be paid to the Public Administration: this monetary amount is include in the tariff paid for the niches concession;

- the discounting rate is fixed equal to 7% (in *proposer subject* analysis it was set equal to 5%). This amount has been determined taking into account the risks of similar initiatives in the reference market.

Finally, the comparison between the performance indicators – NPV, IRR and R/C- assessed in the new analysis and those determined by *proposer subject* has been performed, in order to verify the financial feasibility of the initiative in stressed situations (with more prudential assumptions).

In Table 2, the NPV, IRR and R/C obtained in the new analysis and in the *proposer subject* analysis are reported.

Table 2. Performance indicators determined in *proposer subject* analysis and in the new analysis.

Indicator	*Proposer subject* analysis	New analysis
NPV (€)	2,100,000	1,200,000
IRR	36.2%	32.4%
R/C	1.5	1.2

It should be observed that the economic-financial balance is ensure in the stressed situation assumed in the new analysis. However, the likelihood that the economic-financial balance is not ensured is high, by considering a possible variation of the taxes and duties system, of regulatory framework, the longer time for the granting of authorizations and unforeseen geological or geotechnical characteristics.

5 The Risks Matrix

In order to assess the different risk categories related to the expansion and management project of the cemetery considered in the present analysis, the matrix risks has been developed.

The Table 3 reports a framework of the main risk typologies connected to the project. The investigation allows to carry out an exhaustive analysis of the risks transfer to the various subjects involved in the initiative – private and public sectors -, by explaining the likely root causes, the specific strategic measures aimed at avoiding or, at least, at reducing the effects of negative phenomenon. With reference to each risk item illustrated in Sect. 3 of the present paper, in the Table 2 a qualitative indication of the likelihood that it occurs, the economic effects deriving from its occurrence and the subject to whom the risk is transferred are shown. In particular, the likelihood of each risk occurring has been evaluated by using a verbal scale, as such indicated by ANAC Guidelines No. 9 – nil, minimum, low, medium and high. The assessment process by which the likelihood of risk has been measured, is included in the Table through a synthetic description of the specific aspect of the intervention: thus, the each intervention critical issue and weakness is explored in order to identify and manage the most complex and risky elements of the PF initiative considered.

Table 3. Risks matrix related to the cemetery expansion and management project.

Risk typology	Likelihood of risk occurring	Economic effects assessed	Subject to whom the risk is transferred
Project design and execution risks	**Low** The standardized building typology, associated to specific construction indications, makes it unlikely dissimilarities between the project planned and the work completed	+8% of the construction costs	Private
Risk of increase in production factors cost and risk of wrong costs and construction times assessment	**Medium-low** The technical specifications of the project detect a low level of technical-realization complexity. However, in a concession period of twenty years a costs increase is plausible	+6% of the assessed costs	Private
Risk of the contractual breaches by suppliers and sub-contractors	**Not estimated**		Private
Risks of unreliability and inadequacy of the technology used	**Nil** The construction technologies are easy to implement and the plant component is limited, consolidated and widespread		
Risk of an extraordinary and not foreseen maintenance	**High** In the PF proposal carried out by *proposer subject* there is no explicit reference to extraordinary maintenance. However, in the ordinary maintenance, to be borne by the private investor, only the interventions aimed at contrasting the ordinary usury of structures and plant, the equipment and cleaning materials costs are included	+1% of the assessed costs	Public
Performance and asset total or partial unavailability risks	**Low** The construction complexity is limited and the *proposer subject* is suitable for the project realization both in terms of quantity and expected quality standards. The management model is consistent with similar activities carried out in nearby towns by the *proposer subject*		Private

(*continued*)

Table 3. (*continued*)

Risk typology	Likelihood of risk occurring	Economic effects assessed	Subject to whom the risk is transferred
Risk of contraction in market demand	**Medium-low** As a precaution, in the assessment the widespread phenomenon of requesting a concession for niches before actual use has not been considered	In the *proposer subject* analysis (180 niches/year) at the last concession period 414 unallocated niches will be, i.e. a foregone revenues of about 870,000 € for the private investor and a loss of royalty of about 100,000 € for the Public Administration	Private and public
Risk of contraction in specific demand	**Nil** There are no possible competitors: the regime provided is unilateral monopoly characterized by a single supplier (i.e. the Public Administration through the private investor) and numerous applicants (i.e. the relatives of the deceaseds)		
Risk of economic-financial imbalance	**High** The likelihood that the economic-financial balance is not determined is high, by considering a possible variation of the taxes and duties system, of regulatory framework, the longer time for the granting of authorisations and unforeseen geological or geotechnical characteristics	NPV: −1 million € TIR: −4%	Public
Funding risk	**Medium** The credit institution shall declare its interest and availability to finance the initiative, by specifying the monetary amount	+1.4 million €	Private
Financial risk	**Low** The possibility related to an increase of interest taxes is remote, as it is connected to macroeconomic conditions variations	+100,000 € of interests for increasing of interest rate of 50 bps	Private

(*continued*)

Table 3. (*continued*)

Risk typology	Likelihood of risk occurring	Economic effects assessed	Subject to whom the risk is transferred
Residual value risk	**Medium-low** Assuming *i)*162 niches/year granted, *ii)* 500 €/niches for the tariff for the renewal of the concession contract after the period of 99 years, *iii)* 7% for the discounting rate fixed, at the end of the concession the residual value is equal about to 4,795 €, to which correspond a present value of 1,240 (1 January 2021). At the end of concession period, the management and maintenence costs will not bear to Public Administration but they will bear to another private subject. In the residual value assessment, possible niches not granted for which the full concession tariffs, in addition to the royalty equal to 250 € for the Public Administration, have not been considered	At the end of the concession, the *proposer subject* assumes that all niches will be granted. The residual value is constituted exclusively by the discounted value deriving from the renewal of the concession for a further 99 years, in compliance with the provisions of Presidential Decree 285/1990	
Commissioning risk	**Low** There are no public entities that can hinder the project implementation and the community has informally expressed a positive opinion on the initiative, given the existing unsatisfied demand		Public
Administrative risk	**Low** The intended use of the property laid down in land-use plan is consistent with the function planned in the intervention		Public
Expropriation risk	**Almost nil** It is not necessary to proceed to expropriation since the area is already intended to municipal cemetery		Public

(*continued*)

Table 3. (*continued*)

Risk typology	Likelihood of risk occurring	Economic effects assessed	Subject to whom the risk is transferred
Environmental and/or archaeological risk	**Low** There are no environmental constraints and, given the intended use and location of the intervention area, there is no incompatibility between the project and the land use		Public
Legislative-political-regulatory risk	**Almost nil** The unsatisfied need to expand the municipal cemetery and the absence of costs to be borne by public subject make nil this risk typology		Public
Default risk	**Medium-high** Although the proposed tariffs are consistent with those current applied by Public Administration for the niches concession, the tariffs review mechanism defined by *proposer subject* afford to uncontrollably increase them		Public
Technical obsoleteness risk	**Low** The planned plants will built with consolidated construction technologies: there is no risk of technical obsolescence, especially by considering effective maintenance interventions measures		Public
Interference risk	**Almost nil** In the area intervention, the presence of various services (electricity, cables, fiber optics, etc.) is confirmed by official documents		Public

6 Conclusions

In the PPP context, the PF operational tool represents an effective procedure to carry out cemetery expansion, new realization and/or redevelopment interventions in Italian cities. The risks matrix constitutes a fundamental document among those place made up of contest, as it is relevant for the proposal/proposals assessment. The identification of the risks associated to the project and the explanation of the each risk occurring likelihood allows to analyze in a detailed manner the initiative and to allocate the different risks typology between the subjects involved – Public Administration and private investor. Furthermore, the risks matrix helps a constant monitoring of risks retention during the construction and management phases in order to avoid or, at least, to reduce the effects

of negative occurrences that could led to the initiative failure, i.e. increase in costs or construction time or, in extreme case, interruption of the works.

The case study considered in the present research has concerned a hypothesis of project financing for the construction of niches and the management for a period of twenty years of the municipal cemetery of a small town located in Southern Italy. For each risk category, as regulated by Italian legislative references (Legislative Decree No. 50/2016 and ANAC Guidelines No. 9) the likelihood of its occurring has been assessed by using a verbal scale, in order *i)* to provide for an exhaustive framework of the different project components, *ii)* to give specific indications to the Public Administration and the private investor about the respective risk items that should check and *iii)* to support the risk management phase. The research has pointed out the relevance of risks assessment from the preliminary design stages able to identify likely critical issues of the project and to define the PPP agreement terms for parties involved. In particular, it should be highlighted that the low risk of the intervention – due to the absence of demand risk, to the constructive simplicity, etc. - allows the PF to be a useful tool for the construction and management of cemetery projects, as confirmed by the numerous situations in which it has been applied. Further insights of the research may concern the development of a more detailed Cost-Benefit analysis for the social impacts investigation of the initiative. As the case study shows, the main limitations of the risk matrix concern: *i)* the use of verbal sentences which could be inadequately interpreted; *ii)* the absence of a summary indicator of the various risk typologies. To overcome these limits an improvement of risks matrix could be carried out, for example by assessing the likelihood of risks occurring through quantitative measures and indicators and by aggregating the results through a multi-criteria approach, in order to compare different project proposals too.

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