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TITLE: Special Purpose Entities and their role in Megaprojects: a new focus for understanding megaproject behaviour.

Abstract

Special Purpose Entities, "SPE", are legal joint ventures (usually a limited company of some type or a limited partnership) created to fulfil a specific objectives. The main two applications of SPE in project management are project partnering and project financing, particularly for the delivery (and sometimes operations) of megaprojects.

SPEs receive little attention from project management researched beyond their treatment as a financial instrument or risk mitigation measure. We contend that the influence of SPEs on a project's behaviour needs to be explored and understood far more holistically. We argue that SPE have a profound effect on project governance, the relationships between actors within the project and ultimately on the project success.

This paper provides a bibliometric analysis to pave the way to this research stream by analysing the historical adoption of SPE in projects, the evolution of the SPE literature and the existing gaps for future researches.

Keywords: Special Purpose Entity; Megaproject; Project Management.

1 Introduction and Aims of the Paper

There is an extremely lengthy and deep tradition in researching projects that attempts to link organizational structure to project behaviour. Foci of project management investigations in this milieu have moved from considering matrix structures to enact projects (Katz & Allen, 1985) to considering "project-based" organisations (Hobday, 2000), (Wikström, Artto, Kujala, & Söderlund, 2010). We contend that project management researchers should now turn their attention to another form of organization that is increasingly being used to deliver megaprojects in particular. This organizational form is known as a "special purpose entity" or an SPE. SPEs comprise the organizational form by which a substantive number of megaprojects are delivered (Megaproject cost action, 2014), (Darrin Grimsey & Lewis, 2004).

SPEs are an extreme version of "project-based organisations" when employed in the context of megaproject delivery. They are legally independent organisations whose sole purpose is the delivery (and sometimes the operation) of a single megaproject (Finnerty, 2013). Megaproject SPEs have longevity, often running into decades, and can "out survive" their initial owners who frequently sell them or are merged themselves into other organisations. These SPE characteristics present unique challenges for project behaviour in terms of the relationships between project actors, project governance and, ultimately, project performance.

Given the prevalence of SPEs in delivering megaprojects, there is a surprising dearth of research focused upon them in the field of project management. Whilst other organization structures are the centre of much attention, interest in SPEs is confined to their role as financial instruments or in mitigating risk. Their holistic influence on wider megaproject behaviour remains largely unexplored. This paper seeks to remedy this situation by taking initial steps in delineating the current state of knowledge in this area and highlighting topics for further investigations.

The aims of this paper are therefore twofold:

• Firstly, the paper provides a more detailed exploration of the construct of an SPE and an historical analysis of its role in megaproject delivery.

• Secondly, the paper presents the results of a bibliometric analysis of current SPE research and uses this to identify gaps in research attention

The paper concludes by articulating a series of research questions that arise from its bibliometric analysis.

2 SPEs and Megaprojects

SPEs are especially relevant typology of organisation in the Megaproject filed and their adoption grew over the last decades. There are two main advantages associated to SPEs that explain the growing adoption in Megaproject industry: its enable to perform project financing and project partnering. Besides, for historic reasons, the available understanding and literature on SPE deeply investigates the theme of Risk management (i.e. risk sharing, risk transfer, etc.) and Finance (i.e. project financing), whether few attention is left on project governance (despite the relevance of the subject for either practitioners or academics).

2.1 History and Definitions of SPEs

One of the most simple and accepted definitions of "Special Purpose Entities" (SPE) is "SPEs are set up as orphan companies with their shares settled on a charitable trust and with professional directors" (Basel Committee on Banking Supervision, 2009).

Traditionally, SPEs have been created as legal entity enabling structured finance and fiscal optimisation. Despite these entities have been widely exploited by financial industry,

international accounting principles and national legislator made several attempts in order to regulate and recognise the SPE.

SPEs have been first used on 1970 when the "Government National Mortgage Association" (Ginnie – Mae) securitized government-insured mortgages (Ketz, 2003). At that time, the regulations regarding SPE were almost inexistent. In the 1990, The International Accounting Standard (IAS) started to issue standards and regulations about SPEs.

One of the first fundamental accounting standards (the so called "IAS 27") only required that firms must report the controlled entities (among them the SPE) on their balance sheets: neither a specific treatment of SPEs nor specific guidelines were available at that time. The IAS 27 was not enough developed allowing several different interpretations; the organisations were able to play in the grey areas covering the ownerships of SPE to hide profits and debits, pursue shady businesses etc.

Consequently, In July 1998 IASC-SIC (Standing Interpretations Committee) recognised that the ambiguity associated to SPE was too much, so it issued the DI-12 (Draft Interpretation 12). This official document included for the first time "pragmatic guidelines", i.e. more clear and detailed guidelines constraining the treatment of SPEs into balance sheet (IASC, 1999). In particular the DI-12 proposed that firms must report SPE in the balance when is able to control the SPE and obtain the majority of the benefits from the SPE's activities (Larson, 2008).

Several Institutions, banks, consultancy firms and industrial operators opposed to this interpretation and claimed technical reasons for avoiding the report of SPEs into the balance sheets (Larson, 2008). Most of those organisations have been later involved in SPE scandals, like the Enron bankruptcy (2001). In the investigation following the improvise Enron bankruptcy the investigators found that SPE were used for create account statements containing false and misleading information and hiding a vast debt (Smith, 2011). Enron leveraged the

weak legislation with financial instruments, based on SPE, like the "commodity prepay". They enabled to hide, temporarily, a certain amount of liability by triangulations of false transactions between a bank institution, his subsidiary (the SPE) and the entity who want to hide part of his depth (in this case Enron) (Smith, 2011).

The Scandal of Enron and similar others, pushed the accountancy standard organisations and legislators to work on a redefinition of the accounting principles, with special emphasis of what should be reported into the official statements and what can be left "off-sheet".

There is often a confusion about "what is it" and "what is not" an SPE, however most of the literature, e.g. (Basel Committee on Banking Supervision, 2009), (UNECE, 2012), agree on two main features differentiating SPE from other forms of organization:

- Fixed and pre-defined purposes: this feature is established with legal means (e.g. corporate statute) or de-facto (e.g. restricted duties, capabilities and power of action). In some cases, SPE issues his operations through predefined management rules (e.g. a set of financial derivate like Credit Default Swap CDS). In these cases (usually called "SPE with autopilot") the "management roles" constrain the purposes. Example of fixed purposes are securitization of assets or liabilities, Leverage Buyout operations, construction and operation with a defined infrastructure, etc.
- Self-fenced organizations: risk of bankruptcy of parent organizations must not affect SPE life and operations. This feature is essential for most SPE applications, e.g. securitization, project financing, etc. This feature is realized thorough legal means; e.g. SPE can be established as an "orphan entity" e.g. the several types of "trust-corporations".

These two features allow the SPE to be used for a broad range of applications: structured finance, project financing, corporate and project partnerships, risk transfer, tax structuring, other off-sheet operations (Basel Committee on Banking Supervision, 2009).

2.2 Using SPEs to Deliver Megaprojects

Since the early ’90 SPE become more and more involved in the design, delivery (and sometimes operate) of Infrastructural Megaprojects (from now on just “Megaprojects”) in wide range of sectors: telecommunication, transportations (highways, railways, etc.), energy production (power plants, grid, etc.), civil infrastructures (dams, bridges, etc.) and mega event. Megaprojects are extremely large-scale investment projects that typically cost more than EUR 1 billion. Megaprojects share an extreme complexity (both in technical and human terms) and a long record of poor delivery (Merrow, 2011), (Ruuska, Ahola, Artto, Locatelli, & Mancini, 2011), (Flyvbjerg, Bruzelius, & Rothengatter, 2003). Megaprojects require a vast amount of financial resources and long planning horizons, for instance the pay back is usually longer than a decade. Moreover, the knowledge and expertise required in the project governance & delivery belongs to a wide range of spectrum, e.g.: legal, financial, technical, environmental, social, etc. Consequently, most of the megaprojects are delivered by one or more SPEs. Since, as previously explained, the SPEs have been originally designed for structured finance and tax optimisation, it is unsurprising that project management researchers have not investigated the impact of SPEs on the behaviour of projects particularly in their influence on project governance.

Before the widespread use of SPE, a complex and strictly hierarchical (consisting in several tiers) supply chain of contractors and suppliers was used to delivers Megaprojects. Linkages among stakeholders consisted of a network of client/supplier contracts (Clough, Sears, & Sears, 2005).

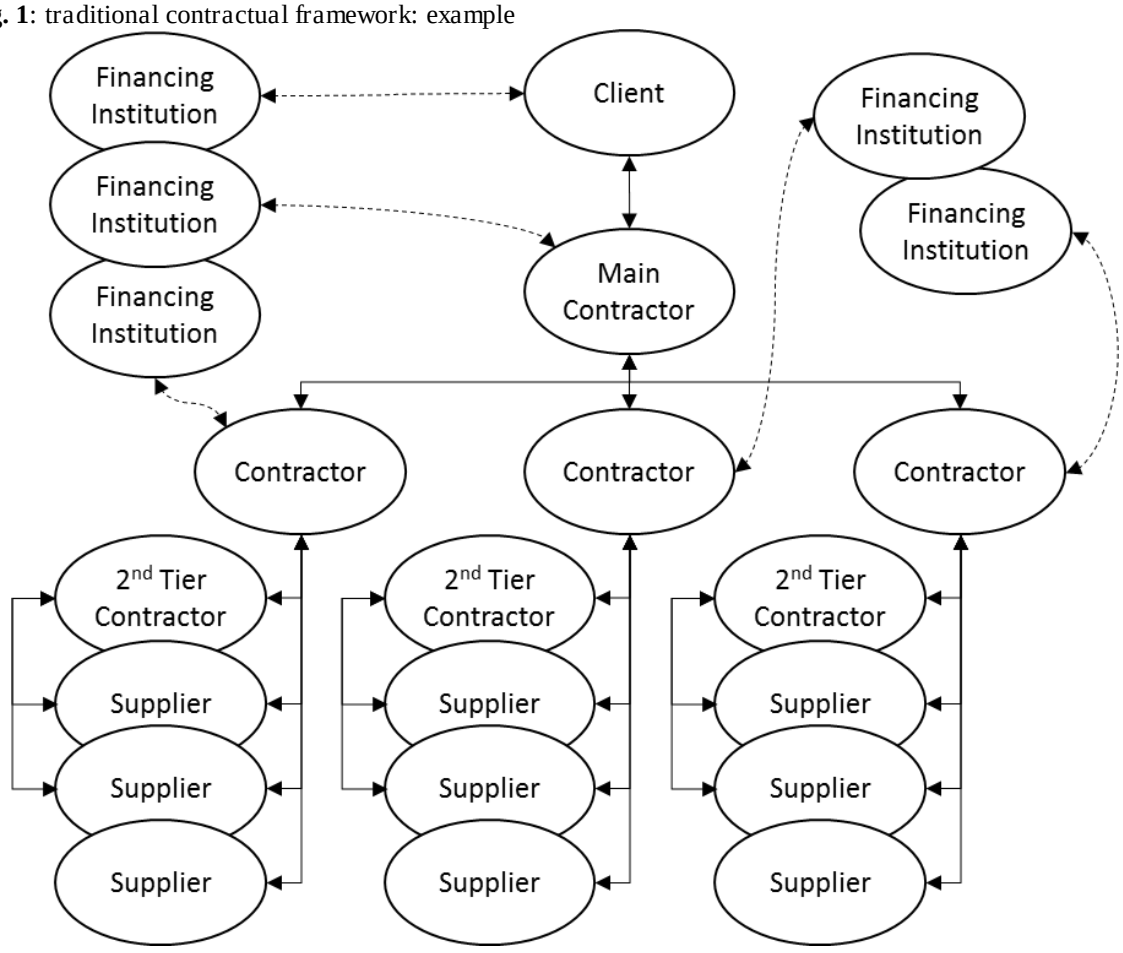
This research consider as “traditional contractual framework SPE” project organisations characterised by:

- Network of industrial operators having a strictly definite role into the project, e.g. contractor, suppliers, etc.

- Whether each industrial operators transfer scope and risk tanks trough contractual relationships.
- Whether contractual relationships are "client-supplier" (one to one) between two subjects. The resulting project network therefore the link of several independent client-supplier relationships.
- Where project management leadership is associated to a main contractor acting as system integrator (Brusoni, 2005). Client directly or indirectly (by an agent) control the work performed by the main contractor.

Fig. 1 exemplifies the contractual relationships characterising the "traditional contractual network".

Fig. 1: traditional contractual framework: example



The "traditional contractual framework" has two main shortcomings in delivering megaprojects: a misalignment of interest between the internal stakeholders and a limited ability to attract financial resources.

Firstly, the misalignment of interests among project stakeholders, particularly the stakeholders involved in the project governance is typical of both typologies of relationships: contractual based (hard relations) and principal-agent (Kelleher Jr, Smith, & Hancock, 2011). Misalignment of interests is a prerequisite of other related issues: opportunistic behaviours, litigation among partners, higher transaction cost, etc. (Reuer & Ariño, 2002), (Müller & Turner, 2005).

Secondly, the limited ability to attract external financial resources exists because of the fragmentation of project delivery chain. In projects, the ability to attract financial resources depends on the perceived risk by lenders. Other things being equal a bigger company, respect to a small company, is able to attract more financial resources at lower cost: the synergic integration of stakeholder's capabilities (financial resources, knowledge and experience, technological means, etc.) allow higher financial guarantees (Finnerty, 2013). The "traditional contractual framework" does not exploit these synergies at systemic level because:

- Network of contracts: the network is based on multiple linkages "client-supplier" (i.e. contract between owner and main contractor, contracts between the main contractors and first tier suppliers, etc.). Indeed some actors have higher visibility, power and control over the network (e.g. main contractor), the logic by which contractual relationships are designed is local rather than systemic (Clough et al., 2005).
- Duration of the contract: under "traditional contractual framework", most of project stakeholders are committed to the project for a limited period, i.e. design and deliver the project; with the exception of project client/owner. After this initial stage, other stakeholders use to deal with the infrastructure (e.g. maintenance, facility services, etc.).

As result, the traditional approach is not oriented to the systemic integration of stakeholder capabilities during the entire project lifecycle.

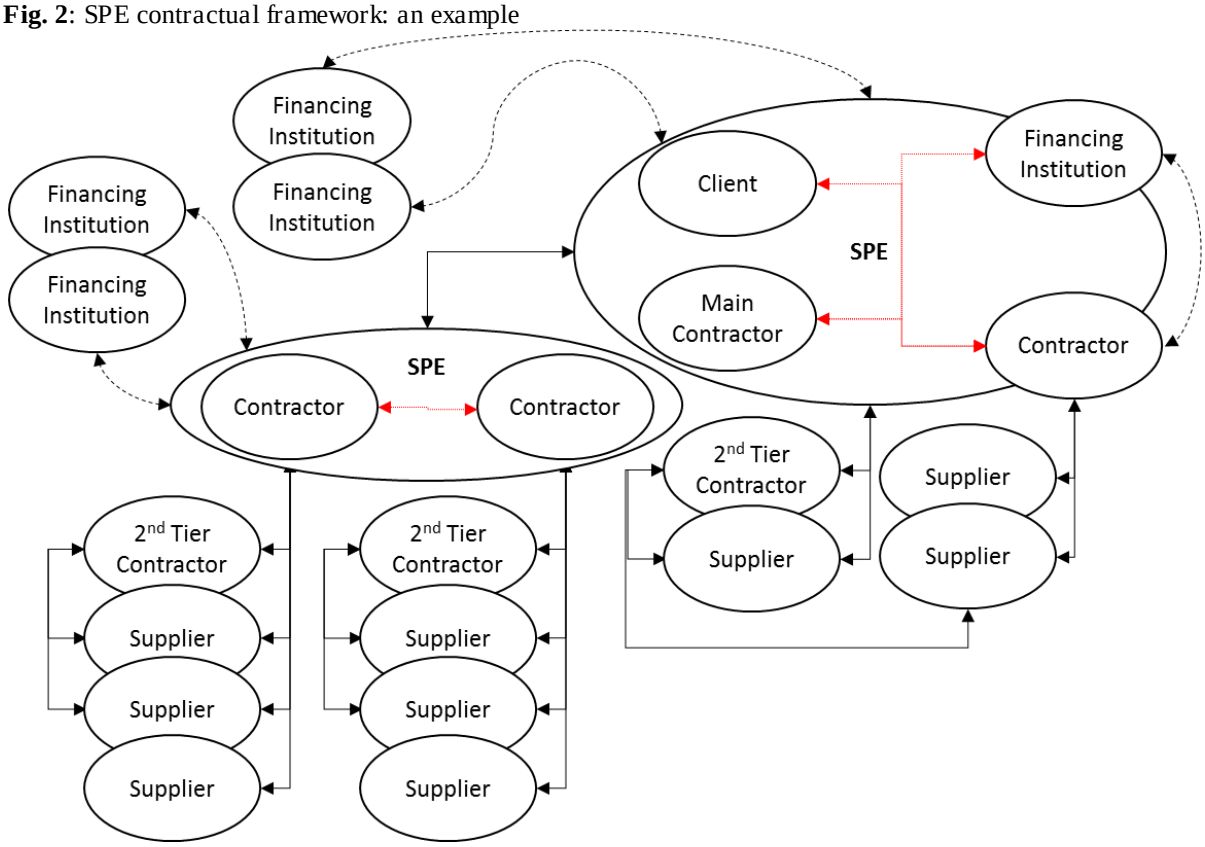
- Synergies between project stakeholders: under the "traditional contractual framework", organizations do not pool resources together; therefore, resource synergies difficultly take place. By contrast, SPE approach enables to integrate stakeholder resources into a single organization empowering synergies.

In order to increase the availability of external finances and align the interests of stakeholders, approaches to delivering projects based on Special Purpose Entities (SPE) have emerged since the early 90's (European PPP Expertise Centre, 2012), (Brealey, Cooper, & Habib, 1996).

Since then, megaprojects have increasingly adopted an SPE "traditional contractual framework": now about half of these are designed and delivered with SPE (Megaproject cost action, 2014).

The SPE framework permits to merge the traditional stakeholders into ad-hoc companies (the SPEs) with their own assets & liabilities, resources & capabilities (corresponded by the SPE partners) and for their performance (resulting from the joint action of SPE partners). **Fig. 2** introduces graphical example showing the relationships (internal in red colour and external in black) characterising new paradigm.

Fig. 2: SPE contractual framework: an example



The adoption of SPE for the design, delivering and sometimes the operation of megaprojects growth over time (Finnerty, 2013). Exact statistics are quite difficult to present because of:

- The ambiguity associated to definition/recognition of SPEs: there are different types of SPE, which are defined and treated differently depending on the country considered (Basel Committee on Banking Supervision, 2009). In order to cope with this issue, the statistics about SPE consider indirect drivers (e.g. companies, without neither worker nor assets, having a defined life, etc.) (OECD, 1996). This solution enables to identify general patterns associated to SPE but it includes some degrees of ambiguity into the statistics.
- The lack of data and insights about SPE: this is because SPEs are treated as off-sheets financial vehicles. Legal provisions about information disclosure are weaker for SPEs with respect common enterprises (Basel Committee on Banking Supervision, 2009), (OECD,

1996). Public-Private Partnerships (PPP) make exception because of both: the public purposes of SPE and the applicable laws and regulations (Carmona, 2010).

This paper investigates the adoption of SPE in the megaprojects field by considering existing statistics on PF and PPP.

(Grimsey et al) argue that doesn't exist a unique definition of PPP, rather: *"Depending on the* country concerned, the term can cover a variety of transactions where the private sector is given the right to operate, for an extended period, a service traditionally the responsibility of the public sector alone, ranging from relatively short term management contracts (with little or no capital expenditure), through concession contracts (which may encompass the design and build of substantial capital assets along with the provision of a range of services and the *fi*nancing of the entire construction and operation), to joint ventures where there is a sharing *of ownership between the public and private sectors. Generally speaking, PPPs fill a space between traditionally procured government projects and full privatisation."*

The literature associated to these two domains is larger with respect the one related to SPE. By considering PF and PPP is easier to find data and statistics. Then, adoption of SPE approach in industry is assessed indirectly by considering the related topics. PF and PPP are the most important project-based applications of SPE.

During 90's, the megaproject industry started to adopt SPE approach, the first move took place in UK thorough Private Finance Initiative (PFI); this aimed to involve private sector in financing and managing public infrastructures (Brealey et al., 1996). Progressively several other countries started to embark the PF/PPP framework for developing and operating megaprojects; especially relevant are the following examples: UK, Australia, Netherlands, South Africa, Canada, Japan, etc. (D Grimsey & Lewis, 2005). There is a huge difference between EU countries in the experience of using PPP for the delivery of megaprojects.

Therefore, countries (not only in Europe) developed different institutional and regulatory frameworks associated to PPP and project financing (Medda, Carbonaro, & Davis, 2013).

The rate of growth in the adoption of PPP/PF approaches decreased (and in some countries stopped) since 2008 because of the global crisis (EPEC, 2012). In particular, the economic crisis has three implications (J. Clifton, Díaz-Fuentes, & Revuelta, 2013), (Medda et al., 2013), (Kateja, 2012):

- Lack of liquidity: affecting the availability of funds for private investors (in both developed and developing countries).
- Uncertainty about future markets and service demands: a prerequisite for the PF is the resiliency of the forecast. During the global crisis, future market scenarios are more uncertain.
- Decrease of public commitment on megaprojects: this occurred especially in Europe due to: budget scarceness, vast level of public depth and political commitment on accounting rigour (only developed countries).

All these reasons are exacerbated for developed countries. Developing countries suffer less (or did not suffer at all) this change on tendency. Table 1 shows private investments in PPP megaprojects in BRIC (Brazil Russia, India & China) countries. Table 1 shows that a part of Brazil and Russian Federation and other countries did not suffer financial crisis.

Table 1: Private investments on BRIC-PP, adapted from (Kateja, 2012)

	Brazil		China		Russian Federation		India	
Year	Project Number	TOT Investment (million $)	Project Number	TOT Investment (million $)	Project Number	TOT Investment (million $)	Project Number	TOT Investment (million $)
1990	0	0	1	173	0	0	1	2
1991	0	0	2	2379	4	18	1	614
1992	0	0	6	2414	8	19	2	13
1993	1	0	17	3369	153	54	3	1051
1994	10	544	31	3165	18	1459	6	533
1995	14	1544	15	1447	30	553	16	1691
1996	25	8192	51	8093	27	1461	16	2964
1997	47	24055	70	1322	11	3695	12	5202
1998	65	46656	37	4969	8	1807	19	2041
1999	19	16854	26	7247	4	918	21	4012
2000	36	20779	26	8131	4	1939	11	2732
2001	27	1812	46	2207	4	3055	16	4008
2002	30	8372	77	5486	2	2879	15	6118
2003	21	6911	81	9396	8	4466	27	3572
2004	19	709	64	3916	4	6202	20	921
2005	22	10207	89	9342	7	625	22	8102
2006	21	12463	83	10153	8	7433	72	22352
2007	20	18833	103	8595	16	19927	56	22472
2008	43	30844	61	2089	11	19633	39	28323
2009	47	39125	46	612	1	5953	44	37296
2010	18	16733	17	942	4	16097	94	71898
Total	485	28732	949	112852	332	103817	513	234204

It is expected that the development of PPP/ PF infrastructures (delivered with SPE) will restart to grow in the next future. Developing countries already showed a continuous growth in the sector, while developed countries are embarking policies to stimulate the development of large infrastructures; with this respect, PPP and PF approaches are especially relevant. For example, the European Union is pushing for the harmonisation of PPP legislation and the Project Bond initiative (European Investment Bank, 2012). Nowadays about half of megaprojects are delivered by SPE and the other half by companies with the "traditional approach" (Megaproject cost action, 2014).

2.3 Project Financing and Project Partnering in Megaproject SPEs

SPEs are flexible organisation that permit a wide range of application; among the others, there are two peculiar applications exploited in delivering Megaprojects: Project Financing and Project Partnering.

Project financing aims to gain financial advantages for the project shareholder in terms of financial commitment and cost of depth. Particularly in Megaprojects, when the "traditional contractual framework" is not suitable, the application of project financing is a quite common approach (Finnerty, 2013). Project financing is characterized for long due diligence and negotiation process at the beginning of project. This happen because external financial organizations want to assure sufficient guarantees to legitimate the increase of leverage and decrease of cost of depth. During this phase identification and transfer of risk is the most important aspect to issue. Project Shareholders aim to demonstrate that project is viable and is affected by low risk; then specific measures may take place, e.g. off-take contracts. Design of SPE is another measure enabling a clear cutting of project risk: the project vehicle is affected only by the project risk and not to all other risks affecting shareholder organizations. This because of the "self-fenced" feature characterizing any SPE. Therefore, the design of SPE enable to frame: management, duties, financial commitment of the project. As a result SPE can be also understood as the technical mean enabling financial and management engineering (Yescombe, 2002).

Project partnering is the second most important applications associated to the use of SPE in Megaprojects. **Project partnering** aims to gain synergies among project stakeholders by aligning their interest (C. Clifton & Duffield, 2006). There are several typologies of partnerships, for instance: corporate partnership, joint venture, consortium (Darrin Grimsey & Lewis, 2004). These expressions have more than one meanings: they have both a generic meaning (like in the Oxford dictionary) and specific one specific of the domain considered

(legal, business etc.). Moreover, inside the same domain (e.g. legal) the terms have different meaning in different countries. Table 2 summarises, in a simplified way, the main differences between different typologies of partnerships. These differences consider two main drivers: length of the partnership and availability of a legal entity as partnering vehicle. According to this framework the SPE are the legal entities enabling joint ventures among project stakeholder.

Table 2: Characterization of different typologies of partnerships

	Length Of The Partnership	**Based On Legal Entity**
Partnership (general meaning)	All (long term or short term basis)	Depends (either yes or not)
Corporate partnership	Long term basis	Yes (e.g. under common law: Limited Partnership LP, Limited Liability Partnership LLP)
Joint Venture	Short-term basis (e.g. design of a new product, construction of an infrastructure, etc.)	Yes (i.e. SPE)
Consortium	All (long term or short term basis)	no (e.g. partnership is based on traditional contractual framework)

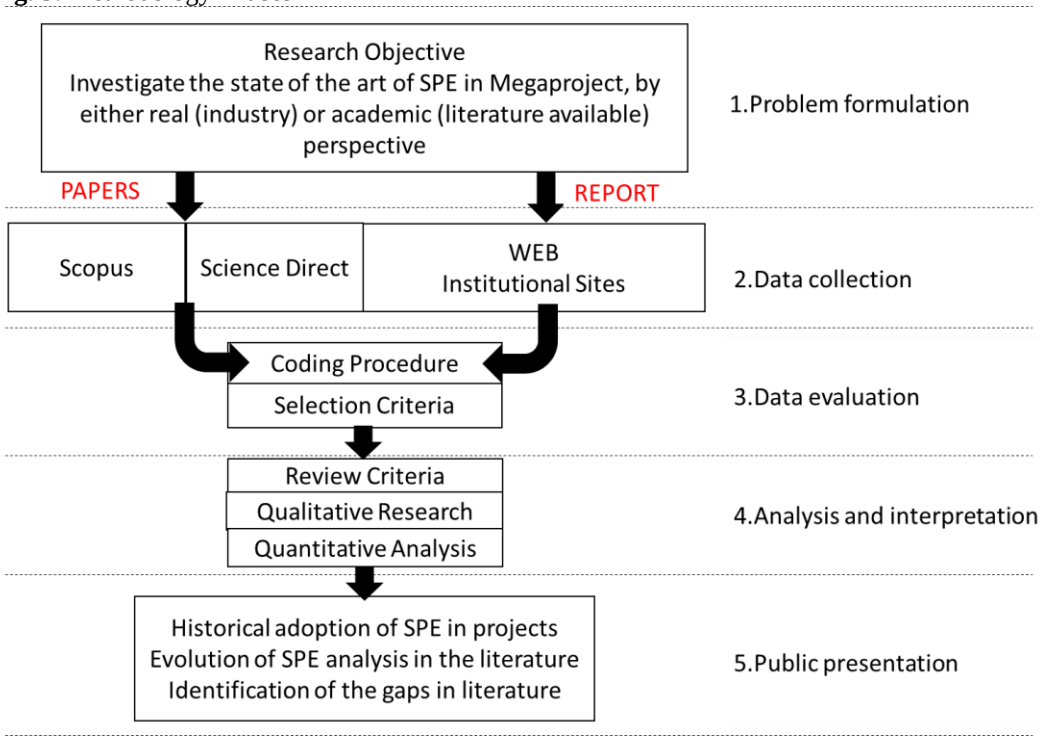
A popular type of partnering trough SPE used (not only) in megaprojects is the Public-Private-Partnerships (PPP). A PPP is a government service or private business venture funded and operated through a partnership of government and one or more private sector companies.

3 The Bibliometric Analysis

3.1 Methodology phases

The methodology employed in the research consists of the following steps: problem formulation, data collection, data evaluation, analysis and interpretation, public presentation. These phases are not intended to be perfectly sequential rather cyclic and interactive. Fig. 3 summarizes the five phases composing research methodology by matching these with research questions and contributions.

Fig. 3: Methodology Phases



Phase 1: Problem formulation

The objective of the research is to investigate the state of the art of SPE in Megaproject, by either real (industry) or academic (literature available) perspective. Three main outcomes are:

- historical adoption of SPE in projects;
- evolution of SPE analysis in the literature;
- Identification of the gaps in literature.

Phase 2: Data collection

The research is based on secondary data from:

- international journal papers (from Scopus and Science Direct server);
- international conference papers (from Scopus and Science Direct server);
- books;
- report of national and international organizations (e.g. Basel Council, OECD, national statistic organizations or regulatory authorities).

The collection follow two paths: the first is associated to papers (international journals and conferences) and books, the second is associated to institutional reports.

The first collection path (for journal and books) relies on web server Databases (DBs): Scopus and Science Direct. The authors selected a set of keywords associated to SPEs. The keywords are then assembled in search strings with the other parameters presented in Table 3.

The second path consist on the collection of institutional documents among with the most relevant sources are reports. Among the other, the most important institutions considered are: Financial Accounting Standards Board, International Accounting Standards Board, World Bank etc. The criteria adopted to select the reports are:

- significance of the report in the eyes of research objective and RQs;
- most updated reports;
- importance of the issuing organization (both at national and international level).

In summary the data collected consist of: 2166 Journal Papers, 1094 Conference Papers, 66 Books and 24 Reports: 3350 documents in total

Table 3: Search parameters for the literature collection (Scopus and Science Direct)

	WEB Database	
	Scopus	**Science Direct**
Keywords Rots	Special Purpose Entit*, Special Purpose Vehicle*, Project Financ*, Structured Financ*, Off Sheet Fianc*, Secutitization*, Shell compan*	
Subjects considered	Engineering, Business, Management and Accounting, Decision Sciences, Economics, Econometrics and Finance	Bank, Cash flow, Decision support, Developing country, Energy policy, Firm, Interest rate, Project management, Renewable energy, Renewable management, Risk management, Stock market, Supply chain, Supply chain, Sustainable development and World bank
Year of publication	All	

Phase 3: Data Evaluation

The 3350 documents collected at previous phase are all individually ranked (by considering four grades of relevance) and coded. The ranking is determined according to (Pittaway, Robertson, Munir, Denyer, & Neely, 2004) principles. The ranking is based on a relevance scale from zero (absence) to three (High) considering the following elements: Theory

Robustness, Implication for Practice, Methodology, data supporting arguments, Generalizability, Contribution. Documents (about 50) with "relevance" 2 or 3 are read entirely and then further analysed in the following phases.

The coding phase, for all the 3350 documents collected is based on a tagging procedure considering: abstract, title and keyword of each source collected. Tagging procedure is based on the following fields:

- CATEGORY: is the domain i.e. legal, financial, management related. These tags are not mutually exclusive.
- FIELD: is it the main topic, e.g. off-sheet accounting, bankruptcy, project financing, etc..
- SECTOR: e.g. manufacturing, banking, etc..
- LOCATION: e.g. city, country etc..
- METHODOLOGY ADOPTED e.g. survey, statistical analysis, quantitative modelling, etc.

Phase 4: Analysis and Interpretation

The critical review is: focused on outcomes, oriented to literature integration, based on neutral perspective, gives a representative coverage, is organized either in a conceptual and historic manner (depending on the paragraph considered) and considers as audience general scholars (no deep or specific knowledge is required).

Phase 5: Public Presentation

The public presentation includes three main contributes:

- historical adoption of SPE in projects: obtained from the review of institutional reports and journal papers;
- evolution of SPE analysis in the literature: obtained from the statistical analysis (phase 4);
- identification of the gaps in literature: obtained from the statistical analysis (phase 4).

3.2 Analysis Results

The bibliometric analysis is helpful to understand the evolution of the literature about SPE over the last 40 years and to identify the gaps that still need to be addressed by future research.

This paragraph, based on the methodology presented in section §3.1, divides the sources (i.e. the document collected) according the specific topic discussed. In particular the sources has been clustered according to three topics: Special Purpose Entity - SPE, Project Financing - PF, Public Private Partnership - PPP and they relative overlaps (i.e. more than one topic discussed) as in Fig. 4.

Fig. 4: topic-sets considered into literature analysis

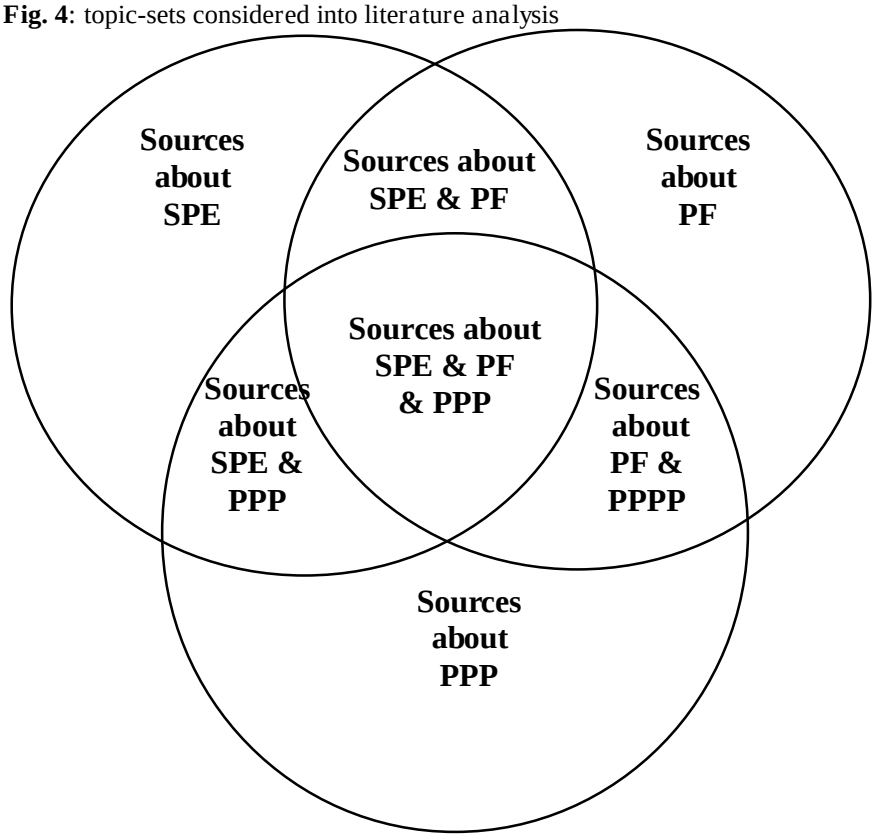


Table **4** reports in detail the sample of 3350 sources analysed: more than 90% are Journal and Conference Papers. This table shows that most of the existing literature belongs to the PPP and PF domains without an explicit reference to SPE. Fig. 5 shows the number of publications (total and for set) from 1968 to 2013. There is a growing number of publications since 2002, most of these belonging to PF and PPP topics (without an explicit reference to SPE). Conversely, the

publications about SPE (and related overlaps) are still a number too low to define a definite trend. Moreover, the graph shows that the "SPE topic" is still vastly under-researched. Fig. 6 presents the publications associated to Project Management (PM) and Finance (F) domains. These data are obtained by counting all the paper having "Project Management" or "Finance" into: title, abstract or keywords. Project Management and Finance have been chosen because are domains closely related and comparable with SPE. Similarly, Fig. 7 compares (as percentage) the publications associated to the three sets. Fig. 8 reports for all the different subcategories (of Fig. 4) the cumulative and relative number of publications in the period considered.

In short, these Figures show that:

- the publications associated to the three sets (PM, F, Total SPE) reported a similar exponential growth (Fig. 6);
- on average the number of publication about SPE (alone or with other topics) had an escalation since 2001 (Fig. 5 and Fig. 7);
- the escalation is shared from all the different sets (and relative overlaps) even if the rates are different (Fig. 8).

Fig. 8 in particular shows that in last ten years, the publications associated to PM and F grew slower in comparison to SPE (and related topics), with the exception of PF. This result emphasizes the growing interest on SPE. Looking at the results is important to keep in mind the size of the samples analysed because the comparison is issued on relative basis. Some topics (PM, F, PF, PPP) reported thousands of publications while other much lesser (i.e. SPE&PF, SPE&PPP, SPE&PF&PPP reported less than ten, SPE less than hundreds and PF&PPP in the order of hundreds publications). It is easier to have a rapid relative growth where few publications are available because the size of the sample is limited. Therefore, the rates of

growth associated to small size samples are less significant by the statistical point of view. This also explain the irregular shape of: SPE&PF, SPE&PPP and SPE&PF&PPP curves.

Table 4: Sample of sources analysed.

SURCES	SPE	PF	PPP	SPE&PF	SPE&PPP	PF&PPP	SPE&PF&PPP	TOT ABS	TOT REL
JOURNAL	47	1242	785	5	6	80	1	2166	62%
CONFERENCE	27	627	379	1	0	60	0	1094	31%
BOOK SERIE	7	85	65	0	0	12	0	169	5%
CHAPTER	1	10	28	0	1	4	0	44	1%
BOOK	1	16	3	0	0	2	0	22	1%
PROCEEDING	2	7	4	0	1	1	0	15	0%
REPORT	0	6	3	0	0	0	0	9	0%
TOT ABS	85	1993	1267	6	8	159	1	3519	
TOT REL	2%	57%	36%	0%	0%	5%	0%		

Fig. 5: existing literature (from 1968 to 2013): SPE, PF, PPP and related overlaps. : 2011 - *2013's data are* provisional

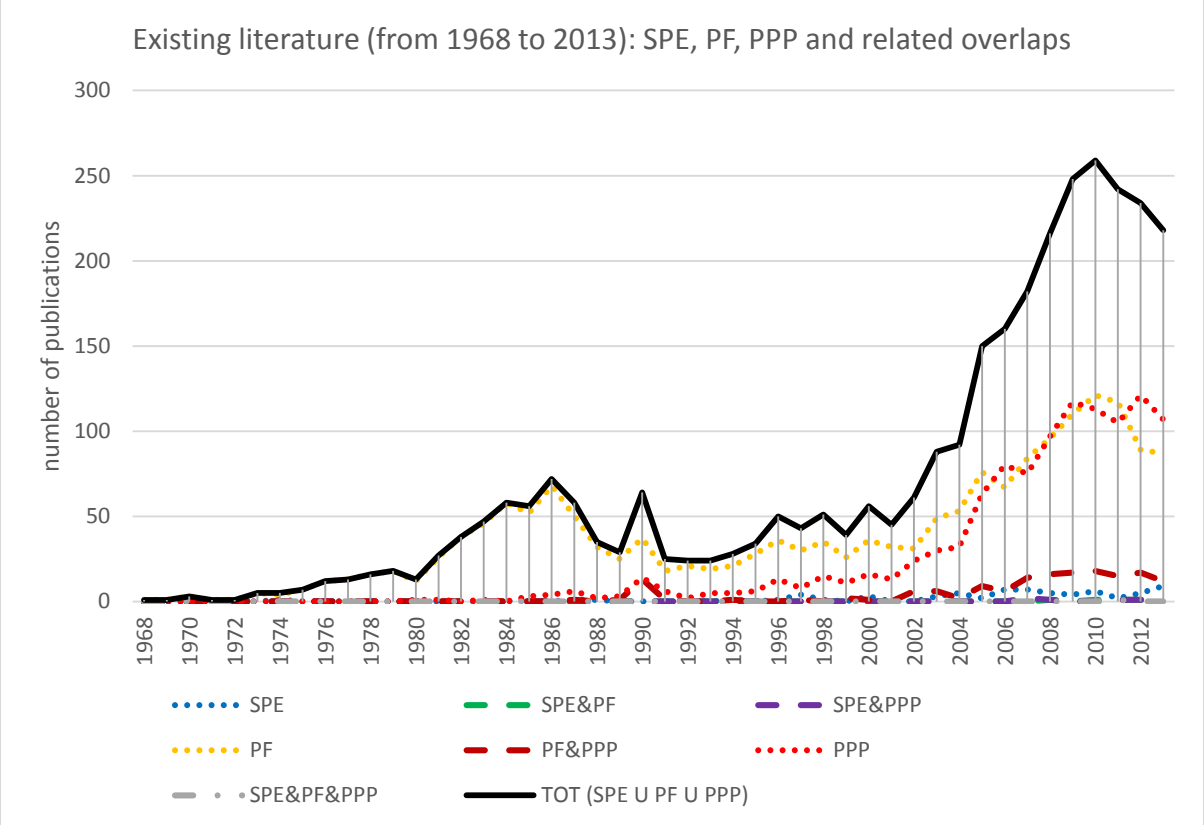


Fig. 6: Existing literature (from 1968 to 2013): Project Management (PM), Finance (F) and TOT (SPE U PF U PPP). Logarithmic scale

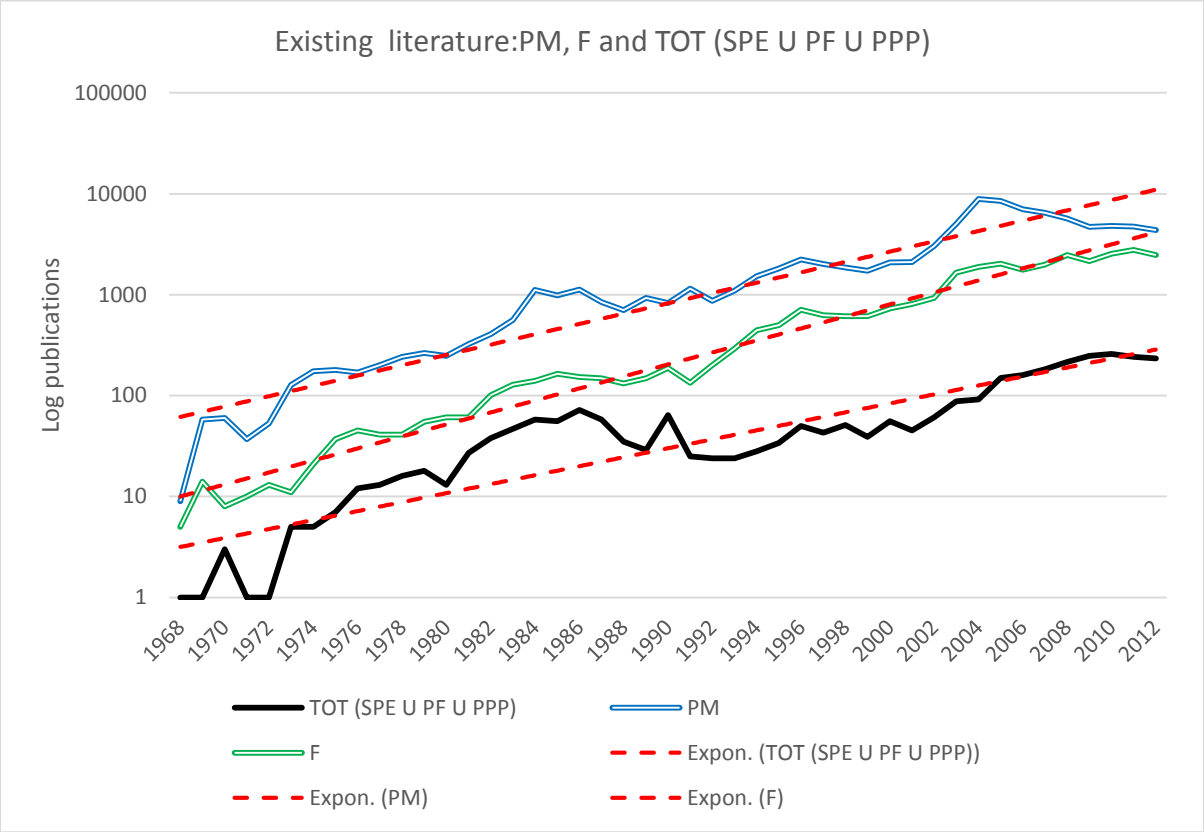


Fig. 7: Existing literature (from 1968 to 2013) on relative basis: Project Management (PM), Finance (F) and TOT (SPE U PF U PPP)

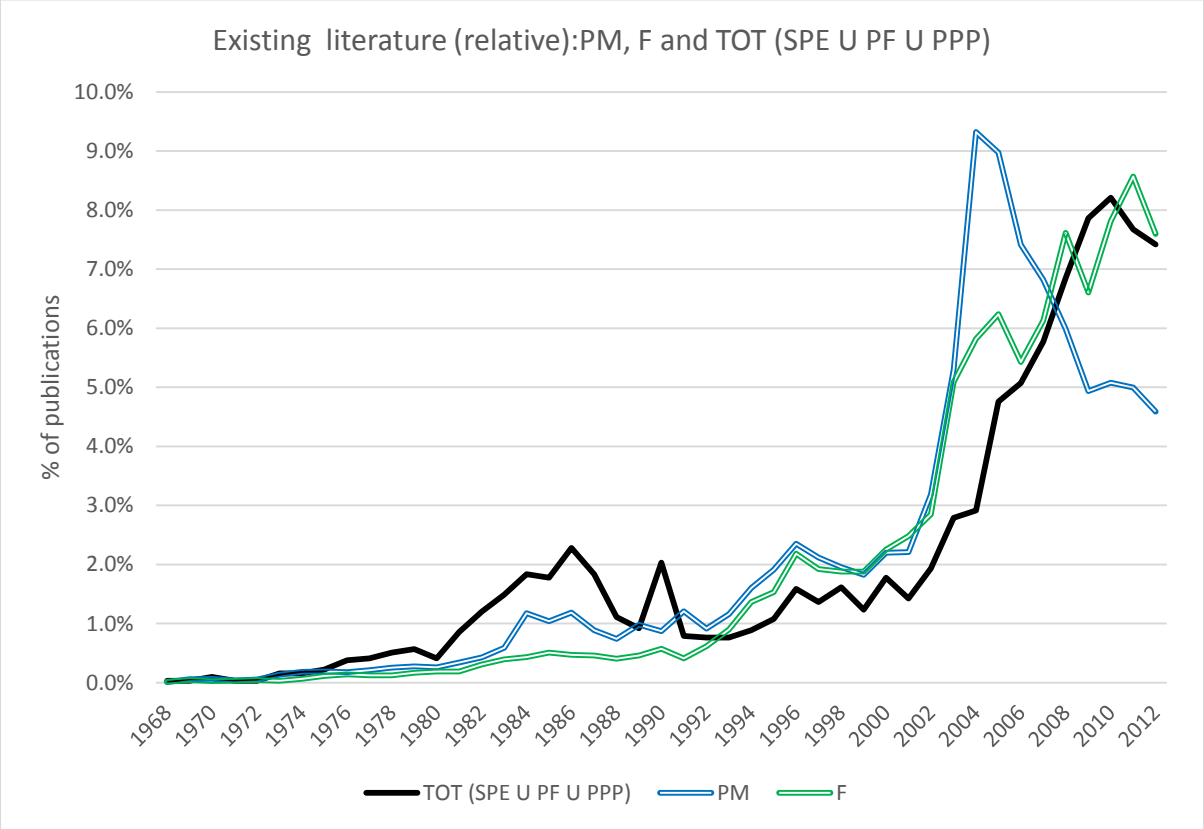
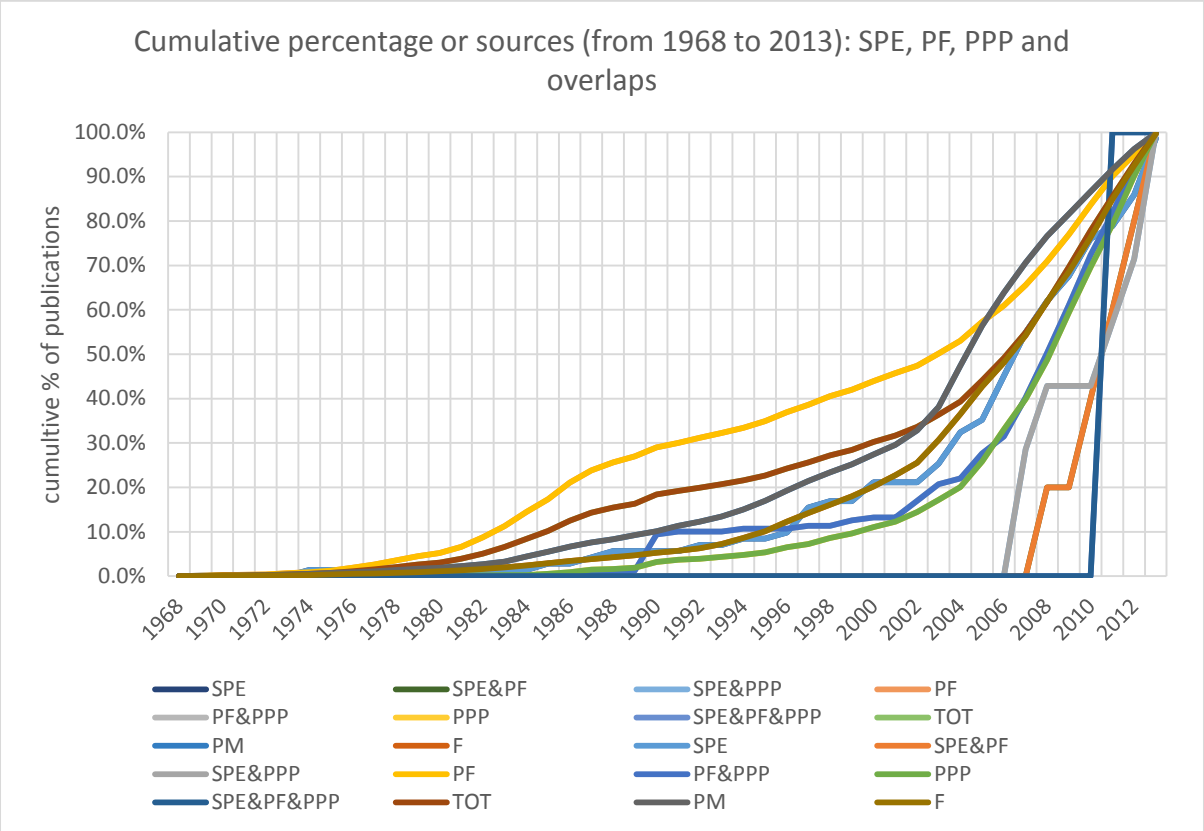


Fig. 8: Cumulative percentage or sources (from 1968 to 2013): SPE, PF, PPP and related overlaps



4 Discussion, Conclusion and Further investigations

4.1 Discussion and Conclusions

The analysis of the SPE literature and the tables and graphs reported in section (§3.2) provide several significant insights:

- SPE are a fundamental aspect of the project delivery chain and in particular the project governance;
- there is huge gap in the literature related to SPE (Table 4);
- the number of publications related to SPE, and related topics, grew significantly in the last ten years (Fig. 6);
- the number of publications related to SPE shows higher Relative Rate of growth with respect Project Management (PM) and Finance (F) (Fig. 6, Fig. 8).

The literature coding and analysis described into the methodology section (§3.1) enables to identify the existing gaps associated to the SPE literature. The main results are summarised in Fig. 9. The figure disaggregates the sources analysed by considering two axes: “Disciplines” and “Topics”.

“Disciplines” are the general disciplines analysed; i.e. economy and finance, management, legal, product development, social behaviours, contracting, project. “Topics” are the specific topics addressed by more than one discipline: i.e. securitization and taxes, strategic alliances, knowledge and technology transfer, risk management (mostly transfer), project procurement and supply chain configuration, project financing, project governance, games theory applied to partnership.

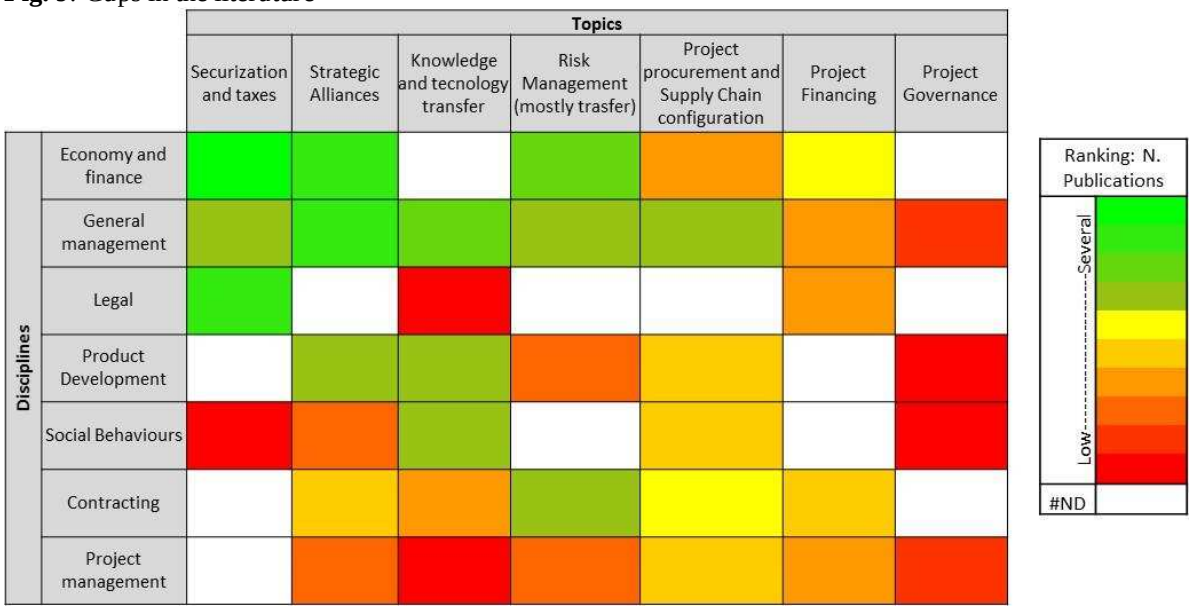
Both matrix axes (Fig. 9) are ranked according to the number of publications available: the top-left corner presents the “Disciplines” and “Topics” whether most publications are available, the bottom-right one present the “Disciplines” and “Topics” where fewer publications exist.

Consequently “Disciplines” and “Topics” on the top-left have been deeply analysed in the literature, while the ones located in the bottom-right are literature gaps (because of the vast margin of growth associated to its).

Fig. 7 shows that most of the existing literature on SPE refers to the Economics & Finance subject, in particular: Securitization and taxes, Strategic alliance, Risk Management. By contrast, the literature gaps are mainly in the disciplines of Contracting and project management, particularly for the topics of strategic alliance, knowledge and technology transfer, Risk management, project financing and project governance. Further detailed analysis shows that other gaps are related to enabling factors and barriers for the delivery and design of SPE; partners behaviour: collaboration vs opportunistic behaviours.

The few papers available in project management are based on surveys or single case study. The project management papers dealing with SPEs analyse them the in civil and construction industry (especially by considering the PPP) or from the product development perspective.

Fig. 9: Gaps in the literature



The objective of the research is to investigate the state of the art of SPE as a key governance element for the delivery of megaprojects. The study focuses on three main aspects: (1) historical adoption of SPE in megaprojects, (2) evolution of the SPE topic in the literature and (3) the identification of existing gaps in the literature.

Firstly, the SPE approach is widely used worldwide and nowadays is the most relevant approach in terms of number of projects and GDP used for delivering (and sometime operate) megaprojects. All these figures emphasize the relevance of the SPE in economic and social terms. The historical analysis shows a continuous grow (since 90's until now) in the adoption of the SPE approach in megaprojects. Most of the developed countries had a different trend in the last six years due to the global crisis. A continuous growth in the adoption of SPE approach is expected in the next future.

Secondly, the literature shown an increasing attention of scholars to SPE and related topics (PF, PPP and overlaps between these). Therefore the rate of growth associated to SPE literature (and related topics) is demonstrated to be high, comparable to the ones associated to Project Management (PM) and Finance (F).

Thirdly, the research found the literature gaps relating to the overlaps of two drivers: disciplines and topics. Specifically for the project management the main gaps are related to: procurement and supply chain configuration, strategic alliances, project financing, project governance.

In summary, the value of the research is twofold: demonstrate the relevance of SPE in megaproject and identify the vast lack of publications in some critical areas of knowledge. These gaps are relevant for both practitioners and academics.

This research paves the way to a new research stream related to the investigation of SPE for the delivering of megaprojects.

This research aims to impact on both academics and practitioners by identifying a critical research stream in Megaproject domain. This research stream is particularly relevant because SPE is a very common approach to deliver Megaproject, then a better understanding of the governance principles may help project management community to deliver better infrastructures.

4.2 Further Investigations

The paper seeks to identify main streams of research over the topic "project governance through SPE": Megaproject performance, Stakeholder management, SPE design.

For each of these streams, the research identifies some of the most critical and unanswered open questions; the authors aim to refine and answer to these questions in the further researches. These streams might be understood as different perspectives by which consider the same underlying issue: project governance through SPE.

The first stream of further researches identifies as unit of analysis the casual relationships taking place between the SPE (in terms of design or behaviour) and the Megaproject performance.

Megaproject performance are understood in a broad sense (because of intrinsic characteristics of Megaprojects): not only the traditional iron triangle (Time, Cost and Quality/Scope) but also the long-term benefits in economic, social and environmental terms.

Some of the main unanswered questions, concerning SPE & Megaproject performance, are:

- How can the design of SPE affect Megaproject performance?
- How can the design of SPE be improved in order to increase the performance in megaprojects?
- Which are the main differences between SPE and "traditional contractual framework" with respect their impacts on Megaproject performance?
- Which way can SPE increase the sustainability of Megaprojects?

The second stream focuses on the relations between stakeholder management and the governance of SPE. Stakeholder management is herein understood as both internal and external with respect the SPE.

In particular, the stream aims to identify how the SPE structure affects the internal stakeholders (or actors) by considering systemically: their relation of power, the decision-making procedures, the evaluation criteria and the soft aspects characterising SPEs.

On the other hand, the stream aims to identify the role and the typical behaviours that the SPE have externally: i.e. in relation with Megaproject stakeholders (e.g. utilities, regulator, external contractors, etc.).

Besides, the boundaries of SPE are not always clear especially because of the dynamic involvement of actors and stakeholders (e.g. an actor may be perceived external in some project

phases and internal in other ones), hence a clear understanding of the dynamic boundaries of SPE is demanding.

Some critical questions associated to this second stream (Stakeholder Management through SPE) are:

- Which are the organisational boundaries of SPE? How do they evolve during project lifecycle?
- Which way SPE approach affect stakeholder management (during the whole lifecycle of infrastructure)?
- How to design SPE in order to manage the control of the sponsor during the whole infrastructure's lifecycle?
- How to design SPE in order to maximize the control from public institutions?
- Which typologies of corporation better fit with SPE purposes?

The third research stream focuses on effective design of SPE and it is strictly dependent to the results of the previous two research streams.

The deliverables of this stream may be extremely valuable for both academics and practitioners: e.g. principles governing SPE, identification of different typologies of SPEs that fits with specific aims or circumstances, the rationales governing the design of SPE (with special emphasis on project governance). Some of possible research questions may be:

- Which approaches, means and principles enable to design flexible and resilient SPE?
- Which are the prerequisites and preconditions enabling SPE approaches in megaproject?

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