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Organisational forms in Megaprojects: Understanding the ‘Special purpose  
Entities’

An ontological analysis

## **Abstract**

Megaprojects are characterised by complexity, uncertainty and a long record of poor delivering. Most of them are delivered with organisational forms called ‘Special Purpose Entities’ (SPEs). Despite the key role played by SPEs there is a huge gap in the project management literature about SPEs and their links with project performances. This paper paves the way to this research stream by building the ontology of SPEs, which is critical since there is a vast misperception about ‘what are’ and ‘what do’ and ‘why are necessary’ the SPEs. In particular, there are three main domains of studies: Legal, Financial and Management (predominantly project management). In the project management domain the SPEs have the main purposes of establish partnerships and enable the project financing.

Key Words: Megaprojects, Project delivery chain.

## **1 Introduction and background**

Megaprojects are extremely large-scale investment characterized by:

- Vast complexity in organizational and technical terms (Turner 2009), (Koppenjan 2005);
- A politically sensitive and uncertain environment (Turner 2009), (Koppenjan 2005);
- A physic/ tangible outcome: having vast impact on environment and society for long time horizons (Davies et al. 2009);
- The capital intensive nature of the investments (Floricel & Miller 2001).

Usually, Megaprojects are defined considering their economic dimension: i.e. projects costing more than US\$1 billion (Merrow 2011). However, exist projects that can be considered Megaprojects even if not so expensive (i.e. they are Megaprojects because of their level of complexity, impact into environment and society, etc.) (Warrack 1993).

Examples of Megaprojects are: long bridges, tunnels, highways, railways, airports, seaports, nuclear power plants, large dams etc. Megaprojects share extreme complexity (both in technical and human

terms), remarkable uncertainty (technical, managerial, stakeholders related etc.) and a long record of poor delivery (Flyvbjerg 2006) (Giorgio Locatelli et al. 2014). Their inability to be designed appropriately and delivered on time and budget has profound implications not only for the organisations delivering them but also for the client organisations operating them which are often governments spending public money. Megaprojects requires vast amount of financial resources and long planning horizons, for instance the pay back is usually longer than a decade. Moreover, the knowledge, resources and expertise required in the project governance and delivery belongs to a wide range of spectrum, e.g. legal, financial, technical, environmental, social, etc. Consequently, the large projects requires a network of multiple organisations, most of the time linked in some form of ‘Special Purpose Entities’ (SPEs) - sometimes-called SPVs (Special Purpose Vehicles).

SPEs are organisational forms usually regarded by project managers as a ‘legal-financial’ tricks set by a pool of companies to collect money and get rid of responsibilities. In reality, the situation is more complex and the SPEs have a role largely underestimated by the project management literature. Nowadays, the majority of megaprojects have one or more SPEs as key stakeholder (Megaproject cost action 2014). The stakeholders (banks, EPC companies, public bodies etc.) link together into SPEs to take advantage from: establish the project financing, leveraging the risk transfer, pay less taxes using advanced Tax Structuring, access to advanced financial mechanisms like Structured Finance and other Off-sheet operations. More in general, the SPEs are organisations fully involved in wide range of specific applications: from the securitisation of residential mortgages to the satisfaction of regulatory requirements for Basel I and II; from the financing of a Mega-Infrastructure to privatization of public assets.

In order to satisfy this wide range of applications, there are several typologies of SPEs and a single clear definition of SPE is not available (Sainati et al. 2014). There is a remarkable ambiguity on the subject causing:

- Lack of transparency due to the different treatment of SPEs among jurisdictions. For instance in some countries, SPEs are not considered into the balance sheet and other official corporate

documents. This heterogeneity raises problems in terms of investment evaluation, regulation, distrust, etc.

- Tax avoidance: most of the time SPEs are constituted in low fiscal jurisdictions while the operations (if exist) take place elsewhere (UNECE 2012). The ambiguity in the definition of SPEs enables companies to play in the ‘grey areas’ at their sole advantage (Basel Committee on Banking Supervision 2009), (Larson 2008);
- Ineffective policies: this vast and complex world is difficult to be regulated, controlled and enforced therefore, this is a traditionally de-regulated field. Nevertheless, following several scandals and crisis originated from the use of such instrument, (e.g. Enron bankrupt, 2008 subprime crisis, etc.) the legislators are now pushed to draft more appropriated laws (Smith 2011).

The understanding of SPEs vary significantly depending on the Domain Considered. The literature review (see next section) shows that there are three main and distinct branches of knowledge: Legal, Financial & Project Management. A clear and unified SPEs body of knowledge does not exist, particularly tailored for the project management community.

Still since the early ‘80s, a growing interest about SPE emerged, in particular regarding:

- Economics: growing interest from business companies about these instruments; especially in banking sector (M Feng et al. 2009), (Basel Committee on Banking Supervision 2009) and Megaproject (Medda et al. 2013), (European PPP Expertise Centre 2012), (John D Finnerty 2013).
- Policy: growing interest about legislators, regulators and other institutions: e.g. standard accountancy international institutions (Chasteen 2005), (Callahan et al. 2012), (Larson 2008).
- Academics: a growing number of publications, mostly in the legal and financial domains, have been published.

This paper paves the way to a research stream aiming to define the criteria to design SPEs able to deliver successful megaprojects. Specifically it investigates the state of the art of SPEs by analysing their three main domains: Finance, Legal, and Project Management.

In order to provide a clear understanding of SPE this paper provides an Ontology and a taxonomy of SPEs and tackles these three Research Questions (RQ)

- RQ1: What is a SPE?
- RQ2: When can an organization be defined an SPE?
- RQ3: Which role have the SPEs in megaprojects?

## **2 Methodology**

Since early 80's there is an increasing interest in SPEs from both practitioners and academics. However, there is not a uniform body of knowledge useful for project manager and literature is scattered into three separate disciplines: legal, financial & management (mainly, but not only, project management). Little attempt has been made to systemically unify the SPEs knowledge through definitions, ontologies, taxonomies, findings, etc., particularly in the project management domain.

Ontology is generally defined as: 'a formal, explicit specification of a shared conceptualization' (Gruber 1993). In information science, ontologies are used to formally represent knowledge (explicit and implicit) within a domain. The ontology provides a common vocabulary to denote the types, properties and interrelationships of concepts in a domain (Gruber 1995). The ontological perspective is adopted in a wide variety of situations, particularly in information engineering contexts, where the precise and linked nature of a phenomenon needs to be explored and described in a systematic and non-ambiguous way. Examples of ontologies in the field of management are (Scheuermann & Leukel 2014) for supply chain management and (Tserng et al. 2009) for risk management in construction projects. Consistently with (Cooper 1982) and (Gruber 1993) the ontology building process consists in the following phases: problem formulation, data collection, data evaluation, analysis and interpretation and public presentation (Fig. 1).

**PLEASE INSERT Fig. 1 HERE**

Fig. 1: Methodology Phases

### **Phase 1: Problem formulation**

The problem formulation consists of the three aforementioned research questions.

### **Phase 2: Data collection**

The research leverages data coming from: international journal papers, international conference papers, books, reports of national and international organizations (e.g. Basel council, OECD, national statistic organizations or regulatory authorities). The data collection followed two streams: the first associated with papers (international journals and conferences) and books, the second associated with institutional reports. Journals and books are retrieved from the Scopus and Science Direct databases. The authors selected a set of keywords assembled into search strings as reported in Table 1.

**PLEASE INSERT Table 1 HERE**

Table 1: Search parameters for literature collection (Scopus and Science Direct)

The second stream focuses on institutional documents, mostly reports from accounting standard regulators (Financial Accounting Standards Board, International Accounting Standards Board) banking institutions (National and international such as World Bank), rating agencies (e.g. S&P) and other relevant institutions (e.g. PWC). The criteria to select the reports are:

- applicability of the report to the research questions;
- timing: most recently updated reports;
- significance of the issuing organization (both at national and international level).

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

### **Phase 3: Data Evaluation**

The 3350 documents collected in phase 2 were all individually ranked according to four level of relevance and then coded. Consistently with (Pittaway et al. 2004) the ranking was based on a scale from 0 (not relevant) to 3 (highly relevant) considering the following elements: theory robustness, implication for practice, methodology, data supporting arguments, generalizability and contribution. 54 documents (with a 'relevance' 2 or 3) were scrutinized and then further analyzed in the following phases. The full list of these documents is in Appendix 2.

### **Phase 4: Analysis and Interpretation**

This phase is critical to the generation of an ontology (Randolph 2009), (Ogawa & Malen 1991) since it coalesces the descriptions of SPEs across the three domains (Legal, Financial and Project Management). Special emphasis was given to existing definitions of SPEs (across disciplines) and to the classification of existing applications of SPEs. The analysis then identified the particular characteristics of SPEs in case of megaprojects.

### **Phase 5: Public Presentation**

This phase prepares the ontology for its dissemination. This comprises both a definition and a taxonomy of SPEs. The definition summarizes the common understanding of the SPE across all three domains. The taxonomy shows in detail the differences in the adoption of SPEs by considering the main characteristics and domains associated.



### **3 Results: Ontology of SPE**

The SPEs are ‘fenced organizations having limited pre-defined purposes and a legal personality’.

This definition can be generalized to all three domains (i.e. Legal, Financial and Project Management), and focuses on three key characteristics contraddistinguishing any SPE:

- i. To be defined by specific objectives: SPEs are designed to pursue specific aims and are usually constrained by their lifetime. Limitation in the scope is realized in legal terms or de facto. Usually, this predefinition is realized by: certificate of incorporation, external agreements (e.g. shareholder agreement, loan agreement, etc.) or through the adoption of specific company typology that implicitly limits the scope of the SPEs (e.g. trusts). In other cases, the limitation of purposes takes place because of the operative limits of the SPEs. This is because the SPEs have neither workforce, nor physic assets but only financial assets and liabilities (in this case, the SPEs can only manage the cash flows resulting from the underlying financial resources).
- ii. To be self-fenced: ‘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); (UNECE 2012). Other times, similar artifices enable the perpetration of this dichotomy: SPEs are ‘independent organizations’ BUT they are controlled and sponsored by external organizations. This essential feature of SPEs is either necessary or controversial. Firstly, several applications of SPEs exploit this feature (e.g. securitization, project financing) (Frank J Fabozzi et al. 2008), (Gorton & Souleles 2007), (John D Finnerty 2013). Secondly, the control and transparency of SPEs is a controversial area as described by the following section. A key aspect is the ‘Bankruptcy remoteness’ principle, isolating the SPEs from the risks arising from parents organizations, and in particular from the bankruptcy of the owner (Sewell 2006).
- iii. To has legal personality: the SPEs are legally recognized entities (Basel Committee on Banking Supervision 2009). SPEs are usually: trusts, partnerships, limited liability partnerships,

corporations and limited liability companies (Basel Committee on Banking Supervision 2009), (Mei Feng et al. 2009). This characterization is country specific.

Even if these three characteristics are common to any SPE, they are usually difficult to be assessed directly; therefore this definition has limited practical implication to recognise if an organisational form is an SPE. In particular, the first two key characteristics are difficult to be assessed:

- i. The predefinition of purposes is difficult to be evaluated because of two main reasons:
  1. The predefinition of purposes can take place in really different and complex forms (e.g. compounded contracts involving external actors).
  2. Lack of public data available (i.e. sometimes the loan and shareholder agreements constraining the scope of the SPEs are not publicly available).

- ii. The self-fencing characteristic focuses on the independency of the SPEs with respect on its originators and/or prevalent shareholders. This independency takes place in two main forms (together or alone): at the accounting/information level and at risk/financial level (i.e. due to the bankruptcy remoteness principle). Both forms of independency are difficult to be assessed.

The accounting/information independency is difficult to be assessed because two types of information are required. Firstly, information concerning the mandate that the SPEs are operating on behalf of his originator/prevalent shareholder (in particular the SPEs own and manage assets/liabilities that indirectly belongs to the originators/prevalent shareholders). Secondly, the evidence that the originators/prevalent shareholders of the SPEs are not reporting any information concerning the SPEs into their balance sheets.

The self-fencing characteristic at risk/financial level is based on the bankruptcy remoteness principle. The bankruptcy principle can take place thanks to a sophisticated design of both the SPEs and the contracts involving them. For example, underlying assets are transferred from the originators to the SPEs through one or more economic transactions. At the same time, the

originators and the banks stipulate contracts in order to define how to proceed in the case of the insolvency of the SPEs.

Despite some typologies of SPEs are standardized (e.g. Asset Back Securities - ABS, Collateralized Debt Obligation -CDO, etc.), there are SPEs that are tailored for specific needs (as in the case of SPEs delivering Megaprojects); in this latter case, the bankruptcy remoteness principle take place due to an 'ad hoc' legal solution. Whether the recognition of the 'self-fencing' characteristic is relatively easy for the standardized SPEs (because the SPEs are standardised and operate in specific financial markets), it is extremely difficult in SPEs involving 'ad hoc' legal solution. In this latter case, In order to demonstrate the self-fencing characteristics (at risk/ financial level) the following information need to be considered at the same time:

- The legal and regulatory framework applied to the SPEs and their transactions
- The contracts between the SPEs and other stakeholders (e.g. insurances)
- The contracts between key stakeholders and the SPEs (e.g. shareholder agreement, loan agreement)
- The activities and the risk associated to the SPEs

Usually, this information is not publicly available. In order to enable the recognition of the SPEs, this paper presents an Ontology composed by two main characterizations: external and internal.

The external characterization considers the relationship between the SPEs and key stakeholders, typically the originator and the prevalent shareholder, as introduced by Fig. 2. These links are:

- **Transfer of Assets:** Usually the originators transfer a pool of assets and/or liabilities to the SPEs. Often, the transfers take the form of an economic transactions between the originators and the SPEs. By doing so, the originators alienate the underlying proprieties enhancing the bankruptcy remoteness principle (Gorton & Souleles 2007).
- **Control:** The control of the SPEs can be either internal or external. The internal control can take place due to the dedicated managers or by the so called: 'auto-pilot' (Basel Committee on

Banking Supervision 2009). The ‘auto-pilot’ consist in a sophisticated set of financial schemes, financial derivate and insurances triggering a specific behaviour of the SPEs (e.g. trigger the cash flow to the investors).

The external control is based on external managers, typically working for the originators or prevalent shareholders. However, several typologies of SPEs exist (i.e. this is typical of the real estate sector), and they delegate the management of the underlying assets/ liabilities to external stakeholders (e.g. real estate servicer, financial institutions, etc.) (Frank J. Fabozzi et al. 2008).

- Reporting: SPEs are mostly considered off-balance sheet instruments (International Accounting Standards Board (IASB)-Standard Interpretations Committee (SIC) 2009). However, exception exists, for example the SPEs delivering and operating Megaprojects.
- Impact on originator/ prevalent shareholder performance: despite most of SPEs are off-balance sheet instruments; they have an impact on the performance of the originator/ prevalent shareholder (Chasteen 2005).
- Contracts: Usually the predefinition of purposes of the SPEs take place thanks to several contracts involving the SPE. These contracts are set up at the creation of the SPEs and may involve: the originators/ prevalent shareholders (e.g. shareholder agreement), financial institutions, other investors, supplier, off-taker, etc. (Basel Committee on Banking Supervision 2009).
- Cash flows: the SPEs set up a financial scheme involving the prevalent stakeholders associated to it. The rules governing these financial interlinks are defined by the contracts and by the internal or external control of the SPEs.

For each link of the aforementioned list, Fig. 2 identifies the minimum and maximum cardinality (i.e. the number of links). For example, the SPEs can have from zero to ‘n’ contracts with stakeholders (i.e. there is a wide degree of flexibility around the set defining the contractual links). On the other hand, the SPEs always impact on his originators/ prevalent shareholders (i.e. one or more impacts).

**PLEASE INSERT Fig. 2 HERE**

Fig. 2: External characterization of SPEs

The internal characterization considers the following SPE's attributes: legal characterization, purposes, lifetime, activities undertaken, capabilities & assets and venue. For each of these attributes Fig. 3 presents the typical values in form of taxonomy. In particular, the attributes may refer to specific values depending on the domain considered (i.e. legal, financial and project management).

For each value considered, a square matrix shows the suffix D (i.e. driver) in correspondence of a given domain (i.e. the first position is left to the legal domain, the second to the financial one and the third to the project management one). For example, by considering the attribute 'venue', Fig. 3 specifies that under the perspective of the legal and financial domain the SPEs are usually resident in off-shore jurisdictions. On the other hand, keeping the perspective of the project management domain, the SPEs usually have a physical location.

This Ontology and Taxonomy help to identify the SPEs with information that is usually available. Fig. 3 has been obtained by synthesizing the most relevant paper as described in the methodological paragraph. Table 4 (Annex II) lists the key sources that have been used in order to construct the Ontology and Taxonomy.

**PLEASE INSERT Fig. 3 HERE**

Fig. 3: Ontology of SPEs (internal and external characterization)

### 3.1 SPEs in the Legal Domain

Legal and regulatory definitions are dynamic and country specific. The dynamics comes from the continuous attempts of the legislator to control the evolving applications of SPEs (e.g. securitizations, financial derivative, project financing, etc.). The differences among countries originate from their

specific legal and regulatory frameworks defining SPEs for two main purposes: information transparency and fiscal recognition.

Particularly critical is the recognition of the SPEs into the accounting statements of the sponsor organizations (the SPEs are a 'self-fenced' organizations) as demonstrated in recent scandals (e.g. Enron and Lehman Brothers scandals) (Smith 2011). In order to override this issue in 2005 the Financial Accounting Standards Board introduced the definition of Variable Interest Entity (i.e. an external characterization of the SPEs): 'Variable interests refer to the investments or other interests that will absorb portions of a VIEs expected losses and expected gains (expected residual returns). A variable interest means that the ownership or other interest varies or changes with changes in the VIEs net asset value' (Chasteen 2005).

SPEs, in legal terms, are usually: trust, partnership, limited liability partnership, corporation and limited liability company (Basel Committee on Banking Supervision 2009), (M Feng et al. 2009). This characterization is country specific; e.g. in Switzerland and India SPEs are always trust, in Argentina SPEs take the form of mutual funds, trust or corporation, etc. (Reserve Bank of India 1999). Legal manuals and institutional reports usually consider the nationality of SPEs: these are usually non-resident organizations placed in a countries having special legislation in terms of information disclosure and tax. In particular the SPEs are companies characterized to have all financial relations with non-resident entities (Basel Committee on Banking Supervision 2009); in particular:

- They are held by non-resident entities
- They receive funds from non-resident entities
- They channel funds to non-resident entities

OECD define SPE as: 'Special purpose entities (SPEs) are:

(1) generally organised or established in economies other than those in which the parent companies are resident; and

(2) engaged primarily in international transactions but in few or no local operations.

SPEs are defined either by their structure (e.g., financing subsidiary, holding company, base company, regional headquarters), or their purpose (e.g., sale and regional administration, management of foreign exchange risk, facilitation of financing of investment).’ (Organisation for Economic Co-operation and Development - OECD 2001)

### 3.2 SPEs in the Financial Domain

SPEs are usually employed for the so-called ‘structured finance’ especially for securitization and derivate finance (Frank J Fabozzi et al. 2008). The term ‘securitization’ comes from the original purpose of converting receivables into cash by converting them into a set of securities; nowadays securitization techniques are applied to both assets and liabilities (Larson 2008). Some example of financial product based on SPEs are (Basel Committee on Banking Supervision 2009): Residential mortgage-backed securities (RMBS), Commercial mortgage-backed securities (CMBS), Collateralised debt obligations (CDOs), Collateralised loan obligations (CLOs), Asset-backed commercial paper (ABCP), Structured investment vehicles (SIVs).

In the financial domain, SPEs are characterized by these features (De Nederlandsche Bank 2004): structure, purpose and links with the host economy.

The structure of SPEs refers to the typology of network characterizing the links between SPEs and other related organizations, e.g. sponsor, owner, client, etc. The SPEs structure is strongly dependent to the purpose and the type of activities associated: in general terms network scheme can be differentiated by considering the following typologies of SPEs: Financing / Holding companies, Royalty & Licence companies, Factoring companies, Operational lease companies, Other SPEs. Usually, these activities are undertaken without a proper and active management: a set of sophisticated mechanisms are designed before the creation of the SPEs (i.e. complex network of financial derivate, insurances, etc.). In this case, SPEs are ‘auto-managed’ (also known as ‘autopilot

entities'), e.g. 'Residential Mortgage-Backed Security' (RMBS), 'Commercial Mortgage-Backed Security' (CMBS), 'Collateralized Debt Obligation' (CDOs) etc.

The general purposes associated to SPEs are: risk management & sharing, founding and liquidity, accounting, increasing credit risk, regulatory capital, asset transfer, property investing, other regulatory reasons, other motivations (Basel Committee on Banking Supervision 2009).

Finally, the link with host economy is poor because SPEs are only financial vehicles enabling the design of complex financial products. Usually, SPEs have neither workers nor assets, is resident in a fiscal paradise and is created and owned by financial institution (e.g. major bank, finance company, investment bank or insurance company) (De Nederlandsche Bank 2004).

### 3.3 SPE in the Project Management Domain

Due to the restriction in the purpose, the SPEs are frequently organisations closely linked to the projects itself: time, resources and objectives are contractually defined in advance (differently from the corporate management). There are two main purposes associated to SPEs: project financing and project partnering.

**Project financing** aims to gain financial advantages for the project shareholder by increasing the amount of debt at a lower cost. Particularly in Megaprojects, when the traditional one-to-one contractual framework is not fully applicable, the adoption of project financing is a quite common approach (John D Finnerty 2013). Project financing has a long due diligence and negotiation process at the beginning of project because external financial organizations want to assure sufficient guarantees to legitimate the increase of leverage and decrease of cost of debt. During this phase identification and transfer of risk is the most important aspect to issue. Project Shareholders aim to demonstrate that the project is viable and that is affected by acceptable risk; allowing specific measures to take place, e.g. off-take contracts. Because of its 'self-fenced' structure, the SPEs allow



a clear cutting of project risk: the project vehicle is not affected by the risks affecting shareholder organizations. Therefore, the design of SPEs enables to frame: management, duties, financial commitment of the project. Consequently SPEs can be considered the technical mean enabling financial and management engineering (Yescombe 2002).

**Project partnering** aims to gain synergies among project stakeholders by aligning their interests (Clifton & Duffield 2006). There are several typologies of partnerships, mainly: corporate partnership, joint venture, consortium (Grimsey & Lewis 2004). These expressions have more than one meanings: they have both a generic meaning (like in the Oxford dictionary) and 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 presents the main differences between them. These differences consider two main drivers: length of the partnership and availability of a legal entity as partnering vehicle. As clear from Table 2, SPEs are the legal entities enabling joint ventures among project stakeholder.

### **PLEASE INSERT Table 2 HERE**

Table 2: Characterization of different typologies of partnerships

The alignment of project stakeholders interests took place by considering part of whole lifecycle of the project (this also affect the lifetime associated to SPEs). Project partnering is characterized also by its duration: ‘Design-Built’ (DB), ‘Design Built Operate Maintain’ (DBOM), ‘Design Built Finance Operate Maintain’ (DBFOM), Asset Privatization (Grimsey & Lewis 2004). Often, Megaproject partnerships deal with both public and private organizations; this is the case of Public-Private- Partnerships (PPP).

## **4 SPEs at work: case study**

In order to exemplify what was presented, this paragraph introduces a case study of a SPE in the project management domain: the Andasol solar power station.

The case study has been developed within the Megaproject COST action (Megaproject cost action 2014) and considers a set of four key SPEs assuming the role of: contractor, project client and operator. This is typical of several case studies presented by the Megaproject COST action as shown by the Table 3 (see Annex I).

The Andasol solar power station is located in Andalusia, in the southern Spain. It is the first European parabolic trough solar power plant and is composed of two sub-power plants: Andasol 1 and 2. Each plant has a gross electricity output of 50 MWe and produces around 175 GWh per year. The budget was 300 M€ each pant (600 M€ in total). The project of the Andasol CSP plant was supported by the European Commission because it is First-of-a-Kind and a utility-scale demonstration for technical and economic developments of the solar thermal technology (parabolic trough of the type EuroTrough and thermal storage) (G. Locatelli et al. 2014).

Fig. 4 presents the key stakeholders involved into the Andosol Megaproject.

Fig. 5 describes the evolution of the four SPEs involved into the Andosol Megaproject.

Fig. 6 applies the ontological framework (previously introduced at paragraph 3) the Anadasol case studies. The Ontology presents both the internal and the external characterizations permitting the recognition of the four SPEs involved into the project.

The external characterizations confirm the presence of SPEs by highlighting:

- The Originators/ prevalent shareholders transfer the underlying assets & liabilities to the SPEs: financial assets, intangible assets (licenses and patents), human workforce and physic assets;
- The Originators/ prevalent shareholders issue an external control of the SPEs during the whole lifecycle of solar power plant;

- The Originators/ prevalent shareholders report their participation on the SPEs (i.e. this are on-balance sheet SPEs). However, the SPEs enable a project-financing scheme and most of the finances supporting the project are raised by financial institutions.
- The SPEs have a strong impact (strategic and economic) on their originators/ prevalent shareholders.
- The SPEs issue various contracts: between them and with external stakeholders (e.g. Lump sum Turn Key construction contracts, sell electricity contract to Endesa, etc.)
- The SPEs channel various cash flows to the key stakeholders

The internal characterization highlights and classifies the SPEs involved into the project as shown by Fig. 6.

**PLEASE INSERT Fig. 4 HERE**

Fig. 4: Network of stakeholders involved into the Andasol project (Megaproject cost action 2014)

**PLEASE INSERT Fig. 5 HERE**

Fig. 5 A: Andasol Case Study

Fig. 5 B: Andasol Case Study

**PLEASE INSERT Fig. 6 HERE**

Fig. 6: Ontological framework applied to the Andasol case study

## **5 Conclusion and research agenda**

Often, Megaprojects are delivered by organisations called SPEs. However, despite being key stakeholders of the project governance the SPEs are organisational forms scarcely investigate in the ‘project management literature’. In particular is unclear how to shape SPEs to deliver successful

megaprojects. This paper paves the way to this huge research stream by bringing together in a ‘project management friendly paper’ the very scattered knowledge about SPEs.

SPE organisations have not a uniform treatment across disciplines; in particular, there are three domains: Legal, Financial and Project Management. The research shows that behind the term SPEs, a wide range of applications and organizations exists: i.e. from virtual organizations without a single worker to large utilities developing and operating with large infrastructures (e.g. public transportation). These opposite examples have few characteristics in common, but always the ones that contradistinguish SPEs: limitation in purposes and to be self-fenced organizations.

The research presented in this paper provides an ontology enabling:

- To understand SPEs across different domains (legal, financial and project management)
- To understand if an organization is a SPE
- To understand the applications and uses of SPEs
- To catalogue the different typologies of SPEs

This dis-uniformity, complexity and ambiguity associated to the topic create a huge confusion and brings to several misleading concepts. The ontology shows that SPEs are legal entities characterized by: (1) being self-fenced organizations (like orphan organizations) (2) having predefined purposes (3) having legal personality. The legal and financial domains emphasize similar characteristics in considering the SPEs; in particular: off-balance sheet instruments, resident in fiscal jurisdictions with no workers and only financial assets and liabilities.

Conversely, in the project management domain, the SPEs have the main purposes of establishing partnerships and enabling the project financing. SPEs are usually project-based organizations designing, delivering and operating with large infrastructures.

The research shows that in project the ‘SPEs’ is a fundamental topic that still need a great deal of research, both empirical (case study based) and theoretical. In particular, the research should focus on understanding:

- The impact of SPEs on Megaproject governance: mechanism of control of SPEs, interactions between SPEs and other stakeholders, etc.
- The Impact of SPEs on behaviours of project stakeholder: system of incentives, possible opportunistic behaviours, etc.
- The barriers and preconditions associated to SPEs framework: under which circumstances SPE framework is a feasible contractual approach?
- Which SPEs characteristics enable the project successes in the different types of projects, for instance, it is not clear if banks should join the SPEs in the delivering of a nuclear power plants or if the first tires contractors should be in or out in railway projects. Both options have advantages and disadvantages and the solution of this trade-off must be addressed in future researches.
- Understand the dynamics characterizing the involvement of project stakeholders into SPEs: While SPEs match the Megaproject during the whole lifecycle (design, delivering and operation), project stakeholders vary their involvement into both SPEs and Megaprojects.

## **6 Annex I**

**PLEASE INSERT Table 3 HERE**

Table 3: Involvement of SPE into the cases studies considered within the Megaproject COST

Action

## **7 Annex II**

**PLEASE INSERT Table 4 HERE**

Table 4: Key Ontological documents

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## 8 List of Tables

	WEB Database	
	Scopus	Science Direct
Keywords Rots	Special Purpose Entit*, Special Purpose Vehicle*, Project Financ*, Structured Financ*, Off Sheet Fianc*, Securitization*, 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	1960 – 2014	

Table 1: Search parameters for literature collection (Scopus and Science Direct)

	Duration of the partnership	Partnership vehicle
Partnership (general meaning)	Either Short-medium-long horizons	Based either on: contracts, SPEs, shareholder agreement, other typologies of agreement, etc.
Corporate partnership/ Joint Venture	Medium- Long term horizon	Usually Based on shareholder agreement and/or dedicated companies (i.e. SPEs)
Project Joint Venture	Short-term horizon (e.g. design of a new product, construction of an infrastructure, etc.)	Usually based on SPEs
Public Private Partnership	Short- medium term horizon (e.g. the lifecycle an infrastructure, the concession period, etc.)	Usually based on SPEs
Consortium	Usually short term horizon (e.g. delivery of a project)	Based on two layers of agreements: internal agreement (between the parties involved into the consortium) and external (between the parties involved, i.e. the consortium, and the client). The consortium is not based on a dedicated company (SPEs), rather on the join liability that consortium parties have in the eyes of the client. The extent by which the parties are jointly liable may change depending on both the typology of consortium and the legal and contractual framework applied.

Table 2: Characterization of different typologies of partnerships

		SPE MAIN ROLE			
		Designer	Contractor	Client	Operator
Megaproject COST Action: sample of Case studies	Motorway A2		√	√	√
	Rovigo Liquefied Natural Gas (Lng) Terminal			√	√
	Csp Andasol Solar Power Station		√	√	√
	Anholt Offshore Wind Farm		√		
	Athens Ring Road		√	√	√
	Big City Road Circuit Brno				
	Completion Of Units 3 And 4 Of Nuclear Power Plant (NPP) Mochovce				
	Industrial Zones Development		√		
	Design And Development Of High-Technology Park Sofia				
	Flood Protection Project In Poland; ‘Raciborz Reservoir’				
	High Speed Railway (NBS) Nuremberg-Ingolstadt In Southern Germany (Part Of NBS/ABS Nuremberg – Ingolstadt - Munich)	√		√	√
	Edinburgh Tram Network Project			√	√
	Flamanville 3 Nuclear Power Plant (F13)			√	√
	Greater Gabbard Wind Farm			√	√
	Hinkley Point			√	√
	The High-Speed Project In Portugal		√	√	√
	High-Speed Train In Spain: Madrid-Barcelona-French Frontier (Figueres)				
	High-Speed Train In Spain: Seville-Madrid				
	Norra Länken (‘The Northern Link’)				
	Oasis Class				
Kraftwerk L√Nen (Coal-Burning Power Plant)		√	√	√	
Kraftwerk Moorburg (Coal-Burning Power Plant)					
MOSE Project (Modulo Sperimentale Elettromeccanico – Experimental Electromechanical Module)	√	√	√	√	
Vienna Hospital North			√	√	

Table 3: Involvement of SPE into the cases studies considered within the Megaproject COST

Action

<b>Source</b>	<b>Knowledge Domain, specific topic</b>
(Dominion Bond Rating Service 2014)	Legal, SF
(International Accounting Standards Board (IASB)- Standard Interpretations Committee (SIC) 2009)	Legal, accounting
(Ketz 2003)	Legal-Finance, risk and accounting
(Kollruss 2012)	Legal, tax structuring
(Lander & Auger 2008).	Legal-Finance, accounting
(Larson 2008)	Legal, accounting
(Larson 2002)	Legal, accounting
(Larson & Herz 2013)	Legal, accounting
(Pricewaterhouse Coopers 2011)	Legal-Finance, SF and accounting
(Schipper & Yohn 2007)	Legal-Finance, asset transfer
(Schwarcz 2012)	Legal-Finance, accounting
(Scott 2003)	Legal-Finance, SF and accounting
(Standard & Poor's 2003)	Legal, SF
(United Nations Economic Commission 2011)	Legal-Finance, accounting
(Vinter & Price 2006)	Legal-Finance-Management, PF
(Basel Committee on Banking Supervision 2009)	Finance, typologies of SPE
(Baudistel 2013).	Finance, Bankruptcy remoteness principle
(Bluhm & Overbeck 2006)	Finance, SF
(Bruyere et al. 2006)	Finance, SF & derivate
(Caselli & Gatti 2005)	Finance, SF
(Frank J Fabozzi et al. 2008)	Finance, securitization
(Mei Feng et al. 2009)	Finance
(John D. Finnerty 2013)	Finance, securitization
(Gorton & Souleles 2007)	Finance, securitization
(Kobayashi & Osano 2012)	Finance, SF
(Krebsz 2011)	Finance, securitization
(Lakicevic et al. 2014)	Finance, Leverage Buyouts
(Leland 2007)	Finance, SF
(Lemmon et al. 2014)	Finance, securitization
(Sewell 2006)	Finance
(Yescombe 2013)	Finance, PF
(Akbiyikli 2013)	Megaproject, PF
(Akintoye & Beck 2009)	Megaproject, PPP
(Akintoye et al. 2008)	Megaproject, PPP
(Brealey et al. 1996)	Megaproject-Finance, PF
(Cartlidge 2006)	Megaproject, PPP
(Chowdhury et al. 2012)	Megaproject-Finance, PF
(Corielli et al. 2010)	Megaproject-Finance, PPP & PF
(Demirag et al. 2011)	Megaproject-Finance, PF
(Farrell 2012)	Megaproject, PPP
(Gemson et al. 2012)	Megaproject-Finance, PF
(Grimsey & Lewis 2007)	Megaproject, PPP & PF
(Grimsey & Lewis 2005)	Megaproject, PPP
(Grimsey & Lewis 2002).	Megaproject, PPP
(Hodge & Greve 2005)	Megaproject, PPP
(Ismail & Hassan 2011)	Megaproject, PF
(Li et al. 2005)	Megaproject, PPP & PF
(Meunier & Quinet 2010)	Megaproject, PPP
(Nevitt & Fabozzi 2000)	Megaproject-Finance, PF
(Nisar 2013)	Megaproject, PPP
(Shi et al. 2007)	Megaproject-Finance, PPP
(Smyth & Edkins 2007)	Megaproject, PPP
(Tang et al. 2010)	Megaproject, PPP
(van Marrewijk et al. 2008)	Megaproject, PPP

Table 4: Key Ontological documents

## 9 List of Figures

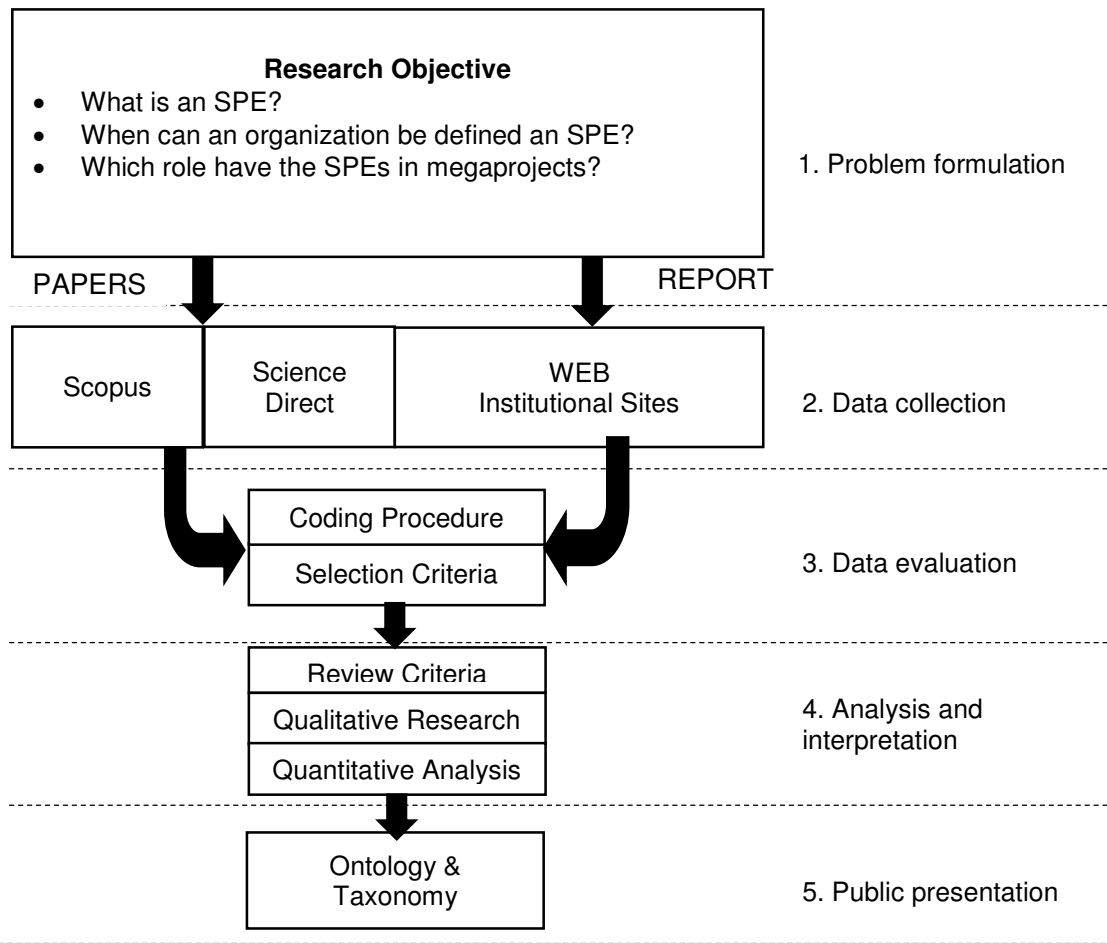


Fig. 1: Methodology Phases

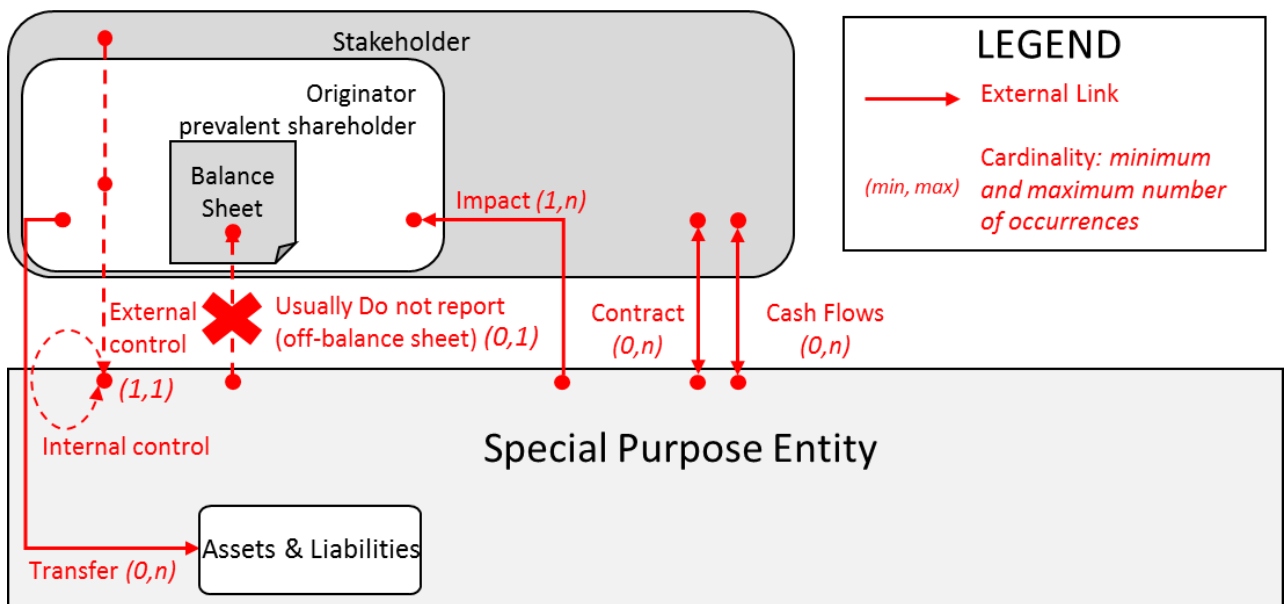


Fig. 2: External characterization of SPEs



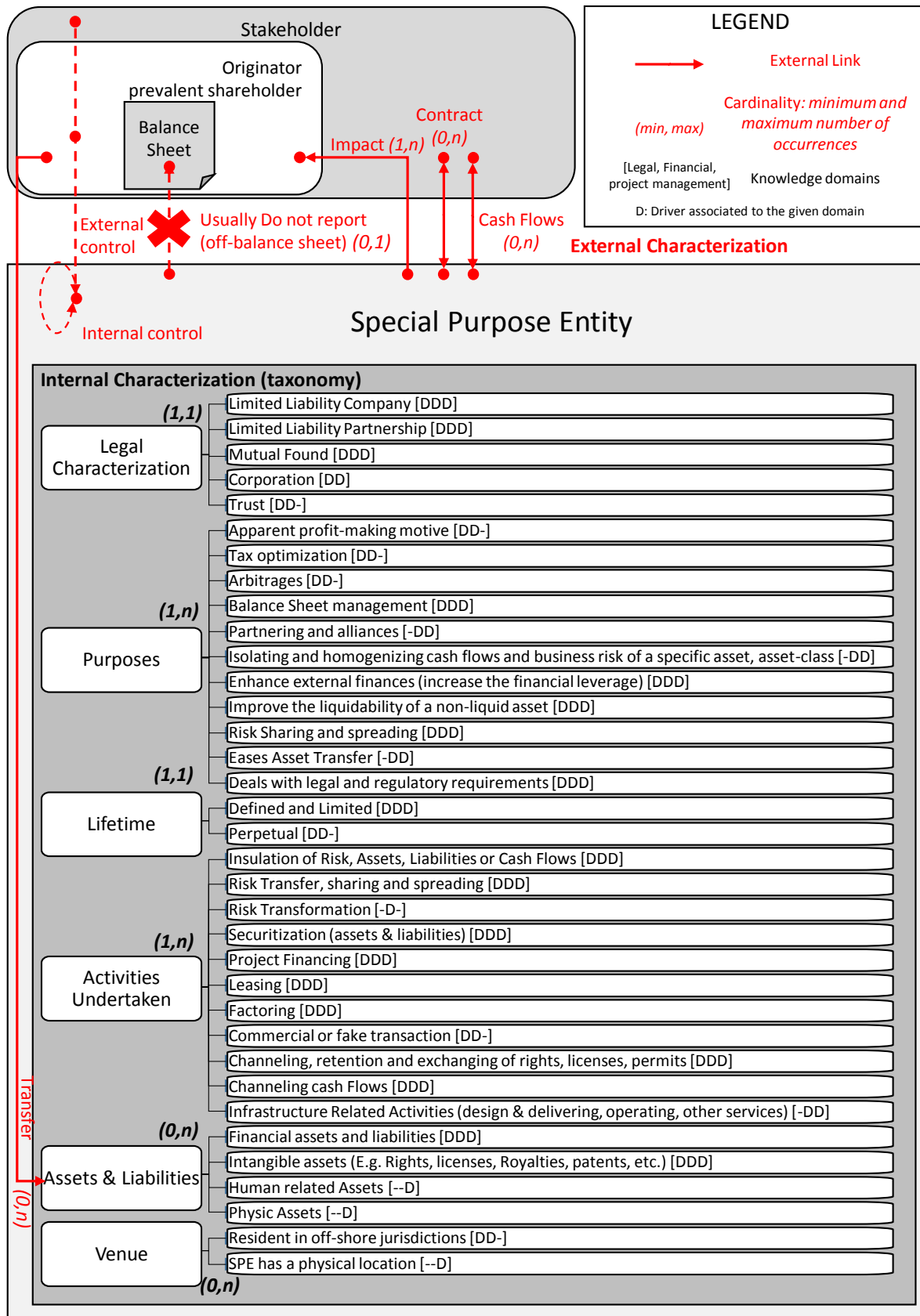


Fig. 3: Ontology of SPEs (internal and external characterization)

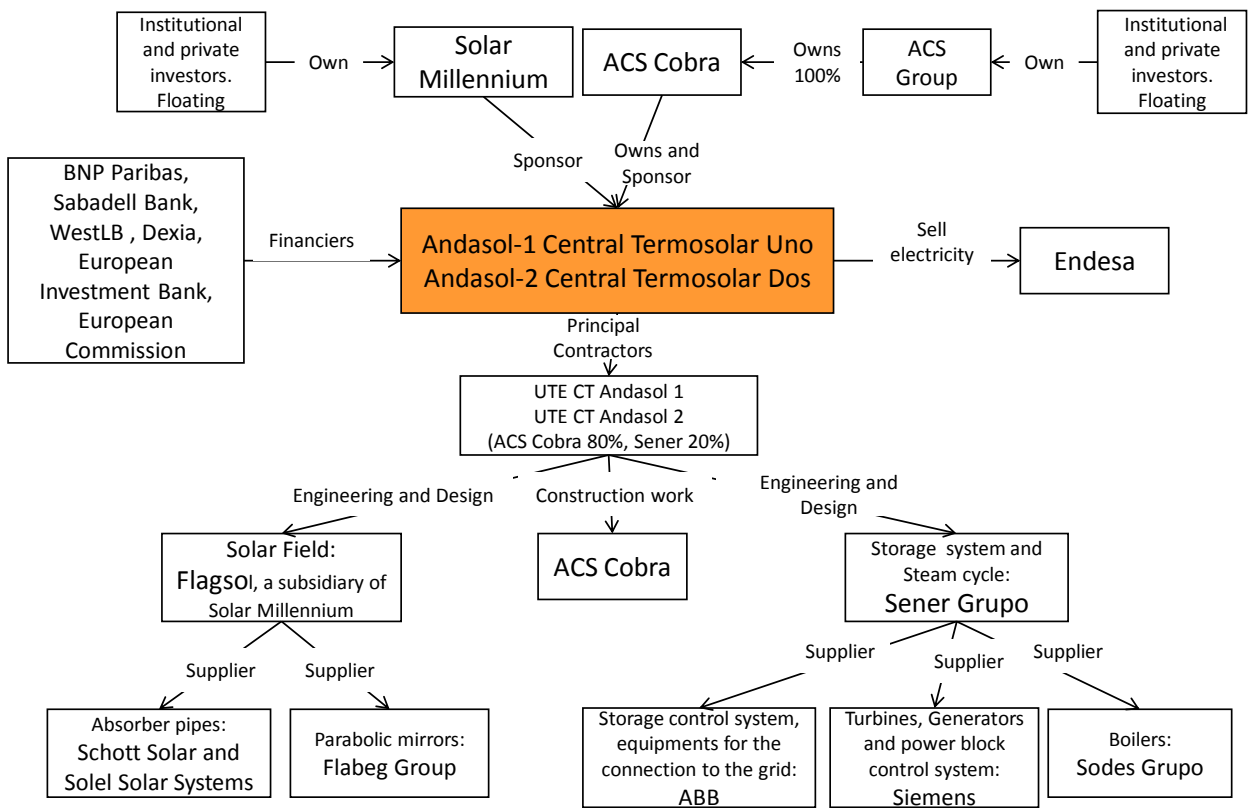
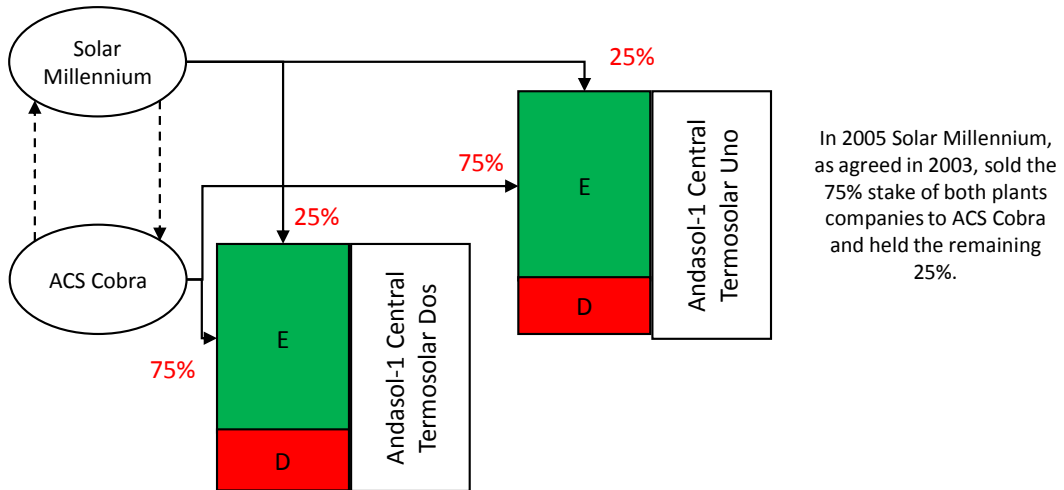
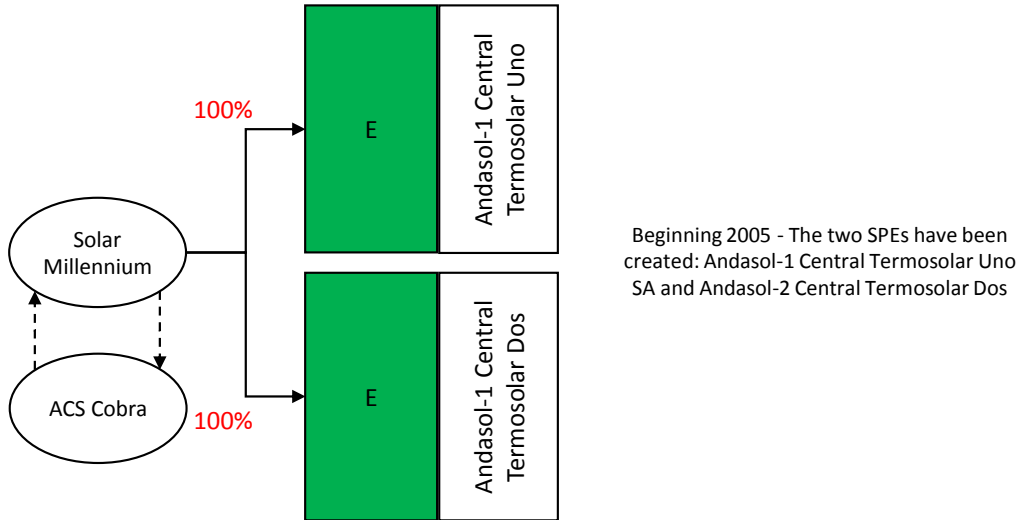
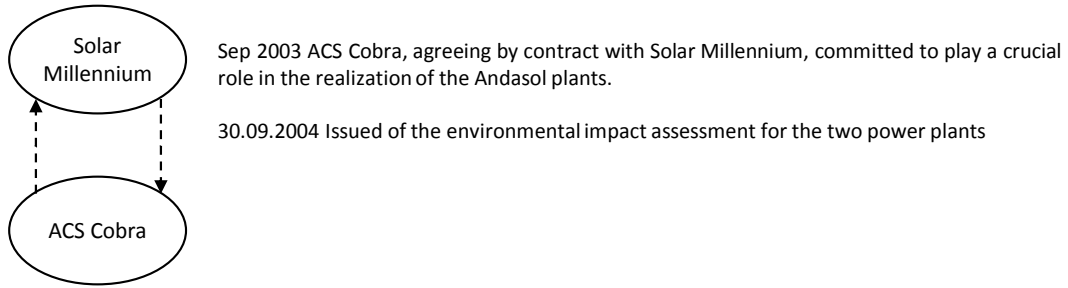


Fig. 4: Network of stakeholders involved into the Andasol project (Megaproject cost action 2014)

**Mutual Agreement**

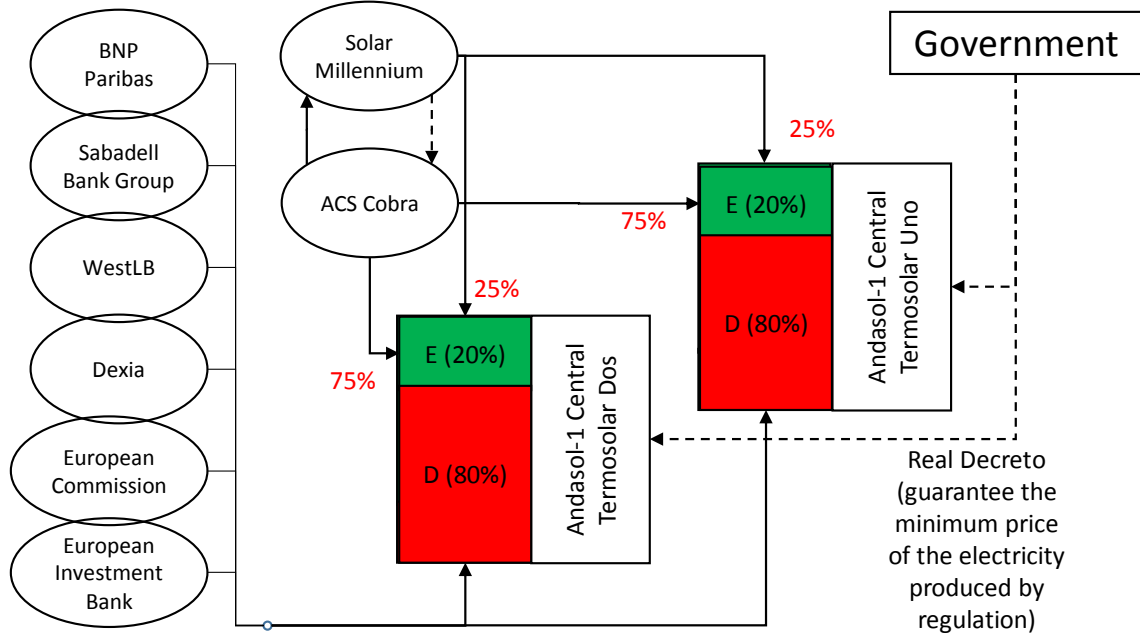


30.01.2006 Declaration of public utility for the plant Andasol 1.  
Spring 2006 - End of Procedure of compulsory expropriation for Andasol 1.

03.11.2006 Declaration of public utility for the plant Andasol 2  
Dec 2006 End of Procedure of compulsory expropriation for Andasol 2

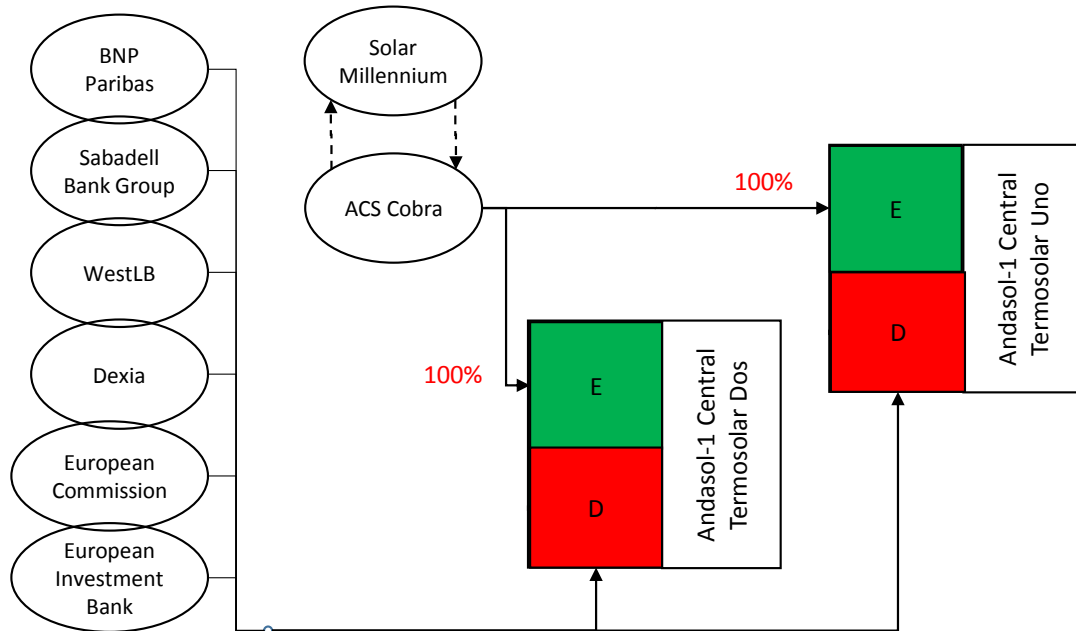
Fig. 5 A: Andasol Case Study

BNP Paribas, Sabadell Bank Group, WestLB and Dexia were the financing banks that have made the financing of the two plants in 2006. The European Investment Bank (EIB) in 2006 granted about 120 million euro loan (60 million for each plant) for the commercial solar thermal power plant Andasol 1 and 2. (EIB, 2006). Andasol 1 has been financed by the European Commission with a grant of 5 million euro. (EC, 2007).



**Andasol 1** Jun 2006 - Nov 2008 – Construction  
 Dec 2008 – Grid on  
 Dec 2008 – Mar 2009- Commissioning  
 Mar 2009 - Commercial operation of Andasol 1

**Andasol 2** Feb 2007 – May 2009 – Construction  
 Jun 2009 - Grid on  
 Jun 2009 – Sep 2009 - Commissioning  
 Sep 2009 - Commercial operation



July 2009 All the stakes in the plants companies of Solar Millennium were sold to ACS Cobra.

Fig. 5 B: Andasol Case Study

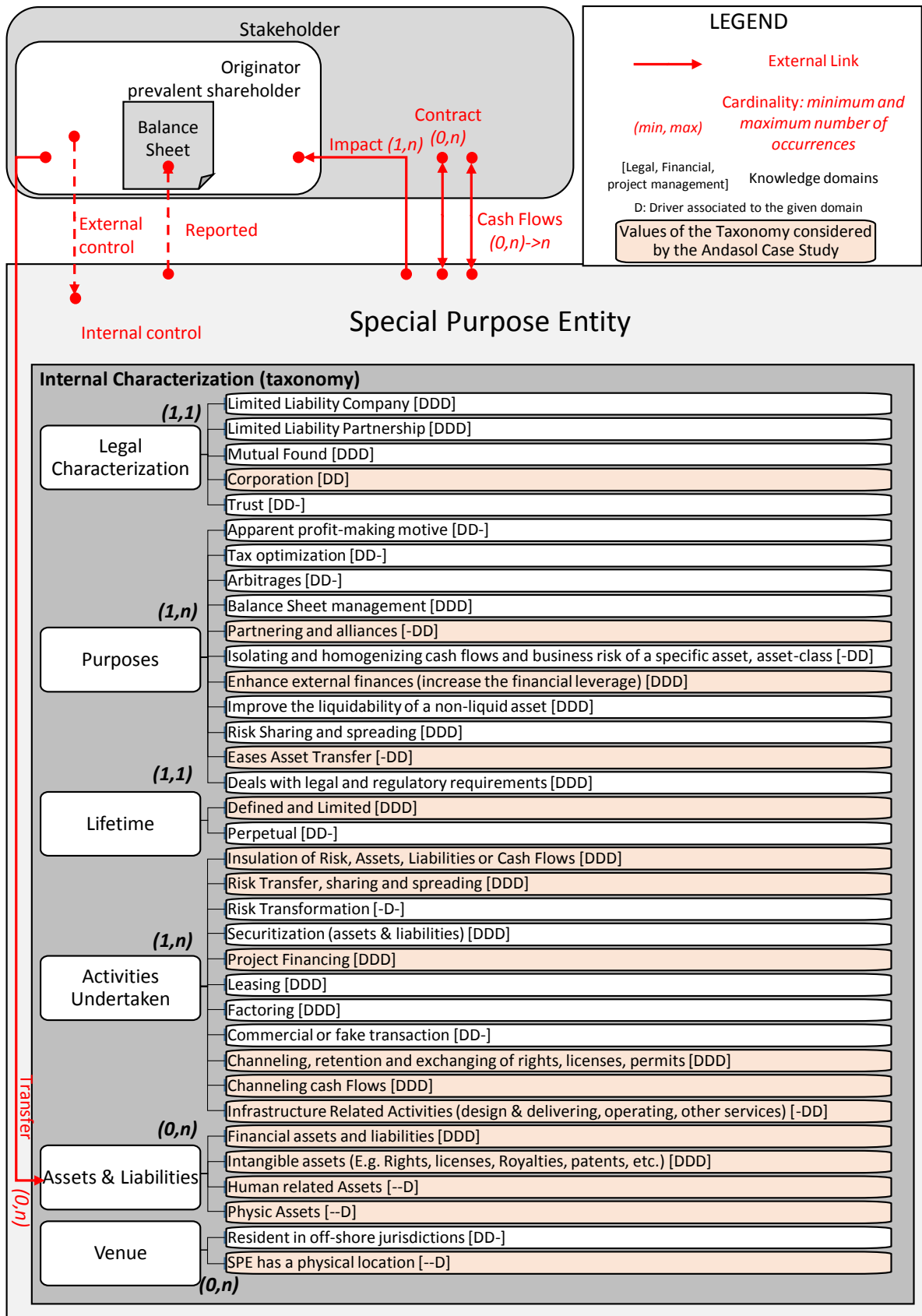


Fig. 6: Ontological framework applied to the Andasol case study