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# MAKING SENSE OF THE MODERN PROJECT MANAGEMENT: A MULTI-LEVEL VIEW

## ABSTRACT

The aim of this paper is to make sense of the complexity of modern project management by proposing four hierarchical levels to categorize ‘projects’. It argues for emphasising interdisciplinary levels in order to address ‘higher level’ interdisciplinary issues such as social innovation, including sustainability and legacy. Besides the technical/operational and strategic (firm) levels, it calls for two interdisciplinary levels: one for the national government institutional level and another for inter-government level to address grand challenges such as climate change and energy transition to sustainability. At these interdisciplinary levels, broader issues related to social innovation, sustainability and legacy come to the fore. Also the paper proposes the terms project policy and project impact in order to broaden the scope of project management usually too much focused on project implementation. Project policy encompasses the whole lifecycle of the project, including the period before its implementation and after its termination. Also the paper calls for specific policies to address project impact (especially for the period after project termination) as this represents a major challenge for major projects at the higher levels to deliver sustainable outcomes.

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## 1. Introduction

This conceptual paper proposes four hierarchical levels to categorise modern projects as a way to make sense of the complexity of modern project management. It advocates for a higher level interdisciplinary ‘outside-in’ approach to (*major*) projects and their management, complementary to the predominantly ‘inside-out’ (*and more technical/operational*) approach. It comes from the realisation that a modern major project is not only a techno-economic entity, but also a socio-political apparatus. In this sense, the management of (*major*) projects cannot be addressed by ‘one size fits all’ approach (*Shenhar and Dvir, 2007a*) such as ‘planning & control’ as it is usually assumed by many textbooks and training courses in the area. Shenhar and Dvir (*2007a*) suggest a contingent approach to Project Management, where ‘project-environment’ should be the unit of analysis, not only the project itself. Engwall (*2003*) also argues that ‘no project is an island’, but history of project management shows

that ‘modern’ project management has been evolving from an inward-looking (*or inside-out*) approach focusing on specific problems such as: scheduling and resource allocation; time overruns, escalating resources; uncertainty and risk management; adapting project management to project differences; project leadership; and project strategy (*Shenhar and Dvir, 2007b*). It is interesting to note that the ‘evolution’ stops at project strategy, with strategic management as its underpinning theoretical basis. Therefore, the level of analysis for project management tends to limit itself to the level of firm (*to what happens inside the firm/organization*). Less attention (*and research*) seems to be dedicated to the level of institutions where, for example, government may be a major stakeholder and a balance of different organizations, firms and institutions needs to be considered.

In this line, historically, the Manhattan Project (*to develop the atomic bomb*) and the Apollo Project (*to put man on the moon*) are usually considered as landmark projects which initiated and shaped the practices of the so-called ‘modern’ project management that has been diffusing to date. Those two (*major*) projects had to overcome major technical and organizational challenges and their goals were successfully achieved without (*much*) ambiguity. Much attention has been given to the quantitative (*instrumental, technical and organisational*) aspects of projects due to humanity yearning to certainty where a successful project is understood to be one that achieved a measurable goal (*or requirement*) within a measurable deadline and a measurable budget. In this way of thinking, projects are usually considered as problems to be solved (*with a high level of certainty*), not as processes to be managed (*with a high level of ambiguity and uncertainty*).

However, social challenges and social innovation have been relatively unattended due to the short-term perspective adopted in project management to consider projects up to the handover of the output. Project ‘impact’ defined as the long-term effect or impact of the project as a consequence of delivering its output (*i.e. projects delivering lasting change and lasting benefits*) is usually poorly considered.

Thus, historically, all this has led to an approach to project management that is predominantly focused on ‘planning & control’ which is very useful to a certain point (*especially for simpler projects*), but it fails to capture the complexity and diversity of projects, including their socio-political aspects and long-term effects.

This paper aims to develop a broader and higher level perspective on projects and their management, a so-called

interdisciplinary approach to project management, highlighting their social aspects, i.e. their social innovation. This is done in three parts:

- (i) briefly recollecting the evolution of modern project management, starting with the Manhattan Project and Apollo Project, highlighting the factors that influenced the development of project management at that time focusing more on the instrumental, technical, organizational and quantitative approaches;
- (ii) moving beyond the instrumental (or ‘traditional’) approach of ‘planning & control’ which, although useful for starting to organise projects, is very limited to address major projects and projects which are embedded in an environment of high uncertainty and high volatility. In order to deal with uncertainty, it is proposed three approaches which are translated into technical, socio-technical and interdisciplinary ways of approaching projects;
- (iii) finally, considerations on the ‘interdisciplinary’ approach to project management (more than a cross-function ‘endeavour’ within a firm), highlighting social innovation and other social aspects as an extension of the current approaches, offering pathways for the evolution of project management in terms of research and practice.

The paper concludes with considerations of technical, socio-technical and interdisciplinary levels of analysis for projects, pointing out that, for the higher interdisciplinary levels, issues such as social innovation, sustainability and legacy are important considerations for project success. Also, the paper suggests viewing projects as three intertwined processes: project policy, project implementation and project impact. By working on the overall project policy and on the specific project policies to assure project impact, project success can be addressed more sustainably by policy makers, project stakeholders and project managers.

## 2. The evolution of project management

This section provides a broad overview of the evolution of project management from a focus on scheduling in its origins to expanding its scope more recently to adaptive approaches, project leadership and project strategy (*Shenhar and Dvir, 2007b*).

Although the origins of modern project management are usually considered to be in the 1960’s, the Manhattan Project (*to develop the atomic bomb*) in the 1940’s is usually regarded as a landmark as a successful project whose tech-

nical and organisational lessons contributed to the development of modern project management (Morris, 1994).

The Manhattan Project was a complex project, employing thousands of people and costing billions of US dollars<sup>1</sup>. It had a huge ‘social’ impact as it was the realisation that humanity had the means (*i.e. the weapon*) to destroy itself, and its success shaped the long period of cold war between the USA and the Soviet Union. Nowadays (*in the 2010’s*), the danger of a nuclear war is increasing with the conflicts in the Middle East, putting again the USA and now Russia in opposite sides.

The Apollo project in the 1960’s was another landmark for the practices adopted in the modern project management<sup>2</sup>. The common thread with the Manhattan Project is that both were related to ‘national security’ issues of the USA, and their ‘power play’ with other countries. This power play seems to continue in the 21st century, but in different shapes and forms.

Both projects were huge landmarks in terms of their technical and organisational developments which influenced scientific endeavours and business management theories and practices. Historically, the USA defence/military sector had a huge influence on the way of thinking in business management. The traditional concepts of ‘strategy’ and ‘deadline’, and considering business competition as a type of ‘war’ have its military influence.

After the 1960’s the scope of dimensions to be considered in evaluating project performance has been expanding in an inside-out fashion (*see, for example, Shenhar and Dvir (2007b)*). In its origins, a focus on scheduling was given as the management of time and deadlines were supposed to be the most important feature of projects as temporary endeavours (*or temporary organizations*). The main concern was to determine the right tasks and sequence of tasks that should be planned and executed in order to deliver the project successfully. Success understood as being able to deliver ‘within deadline’.

The subsequent years experienced a substantial development of project management theory and practice moving beyond the scheduling focus. The following is a brief account of the evolution

based on various authors such as Shenhar and Dvir (2005), Shenhar and Dvir (2007b) and Soderlund (2004):

- ➊ A subsequent focus was placed on teamwork deemed as important as projects depended upon the cooperation between participants who could come from different ‘functions’: the so-called ‘cross-functional’ team. Although this is important, teamwork tended to be frequently limited to groups within the project and limited to the short-term perspective of delivering the project output.
- ➋ Another major focus in the evolution process was given to uncertainty reduction which is related to the decision-making process considering risks and their management. At this time, computational advancement helped to develop more quantitative approaches to risk management in particular and to project management in general.
- ➌ More recently, by the end of the 20th century, the concept of ‘simultaneity’ or ‘simultaneous engineering’ kicked in in order to ‘orchestrate contending demands’. Issues about integration came to the fore in order to address the complexity of projects and to accelerate their pace of execution.
- ➍ In the 21st century, the traditional project management approach based on ‘planning & control’, one size fits all, focusing on the ‘measurable’ and generalizable started to be questioned with more emphasis. Concepts such as adaptation, strategic focus and globalisation started to gain momentum due to developments in the wider market and society. Software projects, highly dependent on ‘people’ required more adaptive approaches (e.g. scrum and extreme programming) while firms started to emphasize the use of projects in order to deliver their business strategy. Project strategy aligned with corporate strategy (e.g. Morris and Jamieson (2005) ) came to the fore.

Globalisation, a concept that is mentioned as important in the 2000’s, continues to be relevant in the 2010’s and probably beyond that. Globalisation means that the number of international projects tended to increase and gain more prominence. International projects raise further issues such as cultural, legal and institutional ones.

Historically, modern project management was conceived as an Anglo-American invention, i.e. mostly conceived by the USA and, to a certain extent, by the UK. When projects cross borders, the Anglo-American mentality and the institutional arrangement under which good practices of project management work may not work in more challenging environments, such as developing countries, for example. Institutional issues such as those related to policies, politics, collusion, corruption may represent major barriers for the

successful delivery of projects and for their long-term value capturing. With globalisation taking place, Anglo-American firms applying management techniques developed with Anglo-American mentality and institutional arrangements may face difficult challenges when undertaking projects in developing countries or other countries less amenable to such mentality and techniques.

After this brief account of the evolution of project management until recent days (2010’s), next section goes into more details about the current understanding (*in the 2010’s*) of project management, setting out the idea of viewing projects and their management through multiple hierarchical levels in order to capture the complexities and nuances which characterise the reality of project management.

### 3. Moving beyond ‘planning & control’: identifying multiple hierarchical levels of analysis

Projects are mental constructs designed to deal with uncertainty. This implies a significant degree of novelty/innovation in circumstances that are new to the project team (*or even new to the world*). Allaire and Firsirotu (1989) point out three ways of dealing with uncertainty which are derived from ways of perceiving and dealing with uncertainty:

- ➊ **First:** through predicting and planning, i.e. planning and control. This is backed up by the classical approach, where agents/stakeholders are supposed to predict the best course of action to ‘solve a problem’ presented by a project. This approach assumes a well-defined process and output of the project: to be delivered within a budget, within a deadline and within requirements all defined in advance with a good degree of certainty. Some authors such as Kerzner (2013) go to the extent of discussing if the output of a project is a point or a ‘cube’ (meaning that that are tolerances or acceptable ‘ranges’ within which the project is still successful.
- ➋ **Second:** restructuring for flexibility, i.e. built-in flexibility to adapt to the environment. This approach is backed up by the Contingency theory and it is much used by Shenhar and Dvir (2007a), among others to argue against the classical approach of ‘one size fits all’. Here, a unit of analysis comprising project-environment would be more appropriate. The diamond model suggests some contextual dimensions (NTCP: novelty, technology, complexity

and pace) under which the project is categorised. And once the intensity of such dimensions are identified and the project is categorised, certain procedures are recommended to better manage the project. It is a clever model, although it has limitations and needs further development.

- ➌ **Third:** to control/manipulate the environment. At this level, the institutional arrangements and other ‘mechanisms’ to safeguard the project and the vested interests of the stakeholders are taken into account. This includes some of the mal-practices that may occur in (major) projects where there are major political issues involved, and where the markets are thin (i.e. the existence of oligopoly, monopoly and monopsony). In order words, situations where some few stakeholders concentrate power which may give rise to mal-practices such as collusion and corruption with the aim of controlling and manipulating the project environment. This may happen, for example, when government is a major stakeholder in the project. At this level, project ‘policy’ and project ‘impact’ should be major concerns for project sponsors and project managers.

In line with the three ways of dealing with uncertainty above, Morris and Geraldi (2011) present three levels of ‘looking at’ projects: technical, strategic and institutional. The technical (*or operational*) level is well suited to ‘planning and control’ as a way to deal with uncertainty as it searches for ways to maximise efficiency and to focus on measurable and general criteria for project success (*i.e. within time, within budget and to specification*).

The strategic level is supposed to look at projects embedded into firms and their strategy. Alignment of projects with business strategy become important as part of their ‘success’ criteria. Some projects might be investment projects where there might not be profit, but they are strategically important to support or make feasible other projects and to contribute to achieving the overall strategy of the organisation. This level still tends to be at the organisation/firm level, hence having limitations when the project is to be delivered by multiple firms and having the government as major stakeholder. Concepts such as capabilities or organisational capabilities become important in order to give the flexibility for the organisation to respond to changing (*sometimes turbulent*) environment.

Then the institutional level deals with the network of firms comprising the ‘undertakers’ of the project but usually subject to the policies and politics of one or several countries. Large infrastructure projects are types of projects where

<sup>1</sup> More information about the Manhattan Project can be found in, for example, Morris (1994) and Kerzner (2013).  
<sup>2</sup> Idem.



the institutional level becomes more prominent, usually undertaken in a highly politicised environment.

Based on the defined levels and approaches to uncertainty above, project success can be defined at different levels as well. For the first level, the notion of the iron triangle or triple constraints (*time, cost and quality/requirements*) as criteria for success make sense as they are measurable, agreeable/generalizable and account for the operational aspect of the project. It accounts for the success of the management of the project (*efficiency*) but not much for the success of the project outcome (*effectiveness*) over an extended period of time after the project delivery. A drawback of this approach is that it tends to treat a project as a certainty, i.e. as a linear trajectory from point A to point B, where point B is actually treated as a point or a predictable state whereas in practice it is a wiggly entity with sometimes ambiguous results: sometimes a 'project does not finish but it is abandoned'<sup>3</sup>.

For the second (*i.e. strategic*) level, usually having the firm as a unit of analysis, Shenhar and Dvir (2007a) suggests an extended criteria for success comprising: (a) efficiency; (b) impact on customer; (c) impact on team; (d) business and

direct success; (e) preparation for future. These are indeed important dimensions for project success but they are still from the point of view of the firm, failing to capture the dimensions usually associated to large-scale / complex projects such as large infrastructure projects (*e.g. construction of dams, of high-speed train railways, and the organisation of large events such as the Olympic Games and the World Cup*). For these, the third level of analysis is more adequate. Shenhar and Dvir (2007a) use the contingency approach to 'situate' projects and recommend certain procedures according to their 'classification' in the NTCP (*Novelty, Technology, Complexity and Pace*) model. This is in line with the second way of Allaire and Firsirotu (1989) for dealing with uncertainty. Here, (*organisational*) capabilities play a more significant role (*compared to the planning and control approach*) for embedding flexibility within the project to cope with changing and turbulent environments. The capabilities approach is also developed by Davies and Hobday (2005), Brady and Davies (2004) and Maylor (2010). The planning & control approach tends to be more rigid in terms of establishing the right path from the very beginning for the project to be executed whereas the contingency approach tends to be more flexible and more reliant on the development of

capabilities in order to cope with the changing environment.

The third level addresses the institutional level and the possible control and manipulation of the environment that influential and powerful stakeholders may exercise over the project. This third level comprises the environment outside the boundaries of any single firm. The environment is highly politicised and a significant amount of effort is spent in institutional arrangements and mechanisms which may both help and hinder the project. At this level, business strategy is subordinated to government policy and regulation. Multiple firms with multiple interests are interacting to find ways to maximise the benefits for themselves sometimes at the expense of others. Also, at this level, issues such as legacy, sustainability, (*regional or national*) economic development become prominent. More recently, the application of project management has been suggested in order to address grand challenges or complex social problems such as climate change (*see, for example, Morris and Teerikangas (2015)*). Other complex social problems include energy transition to sustainability, food and water crises, biodiversity collapse and emerging threats to public health. These problems require 'inter-government' action and are subject to a higher degree of abstraction and policy making.

After the discussion above about the various levels in which projects can be categorised into, next section aims at formalising the hierarchical levels, embedding the social and political aspects at the higher levels. The first level usually limits itself to the operational and efficiency issues based on the traditional approach of planning & control.

third level (*for controlling/manipulating the environment*) may be further divided into two levels: one for projects/programmes within a national government, and another level for projects/programmes which require inter-government articulation for addressing grand challenges. **Figure 1** shows this scenario of multiple hierarchical levels where project success is evaluated by emphasising different criteria.

This discussion moves the concept of 'project' from a technical problem to be solved to a socio-technical process to be managed. This means that frequently it is necessary to cope with a situation which is considered to be a 'minimum viable output' that allows the project to be delivered, considering non-ideal but acceptable conditions of satisfaction of the stakeholders.

At the third and fourth levels, not only the project output itself is regarded as important, but also the project outcome affecting 'society'. Project 'impact' can be defined as the long-term effect of project due to its output and outcome. A major issue for project impact is to consider that, once the project is delivered, a 'positive' project impact is going to happen 'automatically' without specific policies to address it. This is a major flaw in current thinking as it is illustrated by many projects such as the Athens Olympic Games and the 2014 World Cup in Brazil. The projects associated to these events delivered the event itself, but the long-term benefits were below expectations.

At the third and fourth levels, instead of defining projects as temporary 'endeavours' (*focusing on tasks/activities*) or as temporary organisations (*focusing on intra-organisational processes and business strategy*), projects are viewed as the expression of human ambition and human potential. Human ambition can be translated into a sense of purpose and directionality which are usually associated to such 'endeavours'. And human potential can be associated to the vast array of human capabilities and sensibilities that make possible those ambitions to materialise. In this expanded scenario, social innovation and the social issues in general are highly regarded. Social innovation can be translated into initiatives such as sustainability and legacy which are important dimensions for large and polemic projects.

Especially at the third and fourth levels, there is a major concern to deliver innovative projects with sustainable outcomes. This means that projects have different degrees of novelty which are supposed to be treated in different ways. And

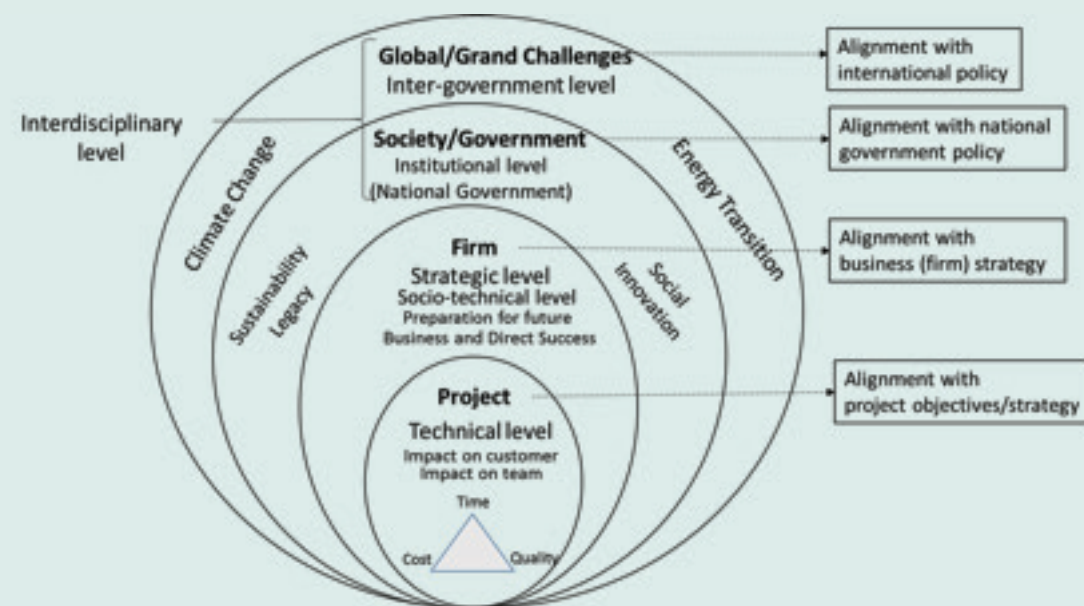


FIGURE 1. Multiple hierarchical levels for considering project success criteria

## 4. A Multi-Level View of Projects

### Project success considering multiple levels

The discussion in the previous section pointed out to the consideration of at least three different levels when analysing projects. These levels are based on the suggestion of three ways of coping with uncertainty (*Allaire and Firsirotu, 1989*) which match with the hierarchical levels within which a project can be treated depending on its complexity (*technical, strategic and institutional*) as proposed by Morris and Geraldi (2011). The

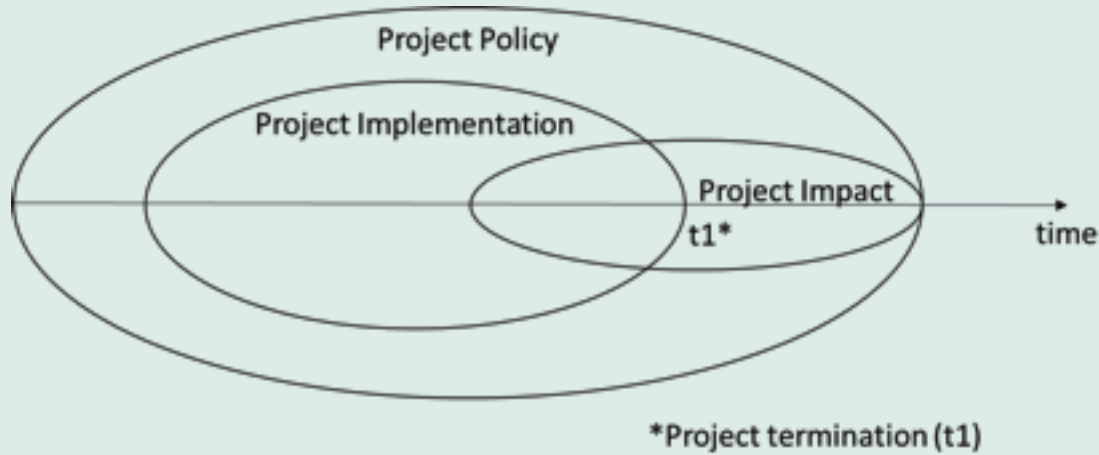


FIGURE 2. Relationship among Project Policy, Project Implementation and Project Impact

their outputs are supposed to provide lasting beneficial change (*in the longer term after the project delivery*).

### Interdisciplinary approach to Project Management

At the third and fourth levels, an interdisciplinary approach to project management is required, where issues such as innovation, sustainability and economic development are considered.

Innovation and sustainability are less present in the instrumental approach to Project Management because they are not actually the focus at the operational level. At this (*operational*) level, the definition and metrics of projects are usually less concerned with the longer term effects of the output and the outcomes of the project. At the second level, these issues start to be addressed but usually due to the self-centric view of 'for-profit' firms to improve their competitiveness and profitability in the longer term.

The first and second levels are much more concerned with project implementation or execution. Therefore, the third level of project management invites the formalisation of two concepts (*complementary and intertwined with project execution*) that could enter the jargon of project management with more impetus (*shown in figure 2*):

- **Project 'impact':** this could be a 'metric' for the project to be assessed and for designing specific policies in order to increase the success of the project outcome in delivering sustaining and lasting benefits and changes.

- **Project 'policy':** this would comprise both the front-end of (major) projects as well as the specific policies after project delivery (project termination) to deal with project 'impact'.

Figure 2 shows that project policy, project implementation and project impact are intertwined. It calls for the consideration of project impact (*also after the 'official' project termination*) when defining project success criteria.

## 5. Conclusion

The evolution of project management started with a focus on scheduling in the 1960's and in the 2010's has a concern with globalisation and its impact on the way projects are conceptualised and managed.

In the context of globalisation, projects may be viewed at the higher interdisciplinary level where issues such as sustainability, legacy and economic development are of predominant importance. The higher interdisciplinary level (*third level*) matches with the institutional level as suggested by Morris and Geraldi (2011).

One contribution of the paper is about project success criteria when considering the interdisciplinary level. At the national government/institutional and inter-government levels, projects may be highly politicised, and the project success criteria can be extended to social innovation, sustainabili-

ty, legacy and economic development. This is shown in Figure 1.

Another contribution is to introduce the jargon of interdisciplinary studies into project management studies, opening up new avenues of research in project management in a more complementary outside-in or top-down approach. For this, project 'policy' and project 'impact' were defined and related to project 'implementation'. This is shown in Figure 2. This way, a higher level interdisciplinary approach to Project Management is emphasised, not just as a cross-functional team, but addressing issues such as sustainability, innovation and economic development which are, by themselves, interdisciplinary.

Therefore, future research could be directed not only to project 'policy' at the front-end of projects, but also to specific policies that could improve the

conditions of adequate project impact. For example, sustainability issues could be embedded in project policy, project implementation and project impact.

If projects are supposed to reflect reality (*and, to a certain extent, the nature of reality*), it is reasonable to assume that it needs to be approached through multiple maps (*i.e. mental models, having in mind that 'the map is not the territory'*<sup>4</sup>), multiple levels and multiple narratives in order to understand the nuances and to cope with the chaotic nature of projects. Thus, addressing projects through multiple levels, it becomes more evident the importance of interdisciplinary issues such as social innovation, including sustainability and legacy when managing projects taking into account long-term perspectives, i.e. aiming at sustainable outcomes.

<sup>4</sup> This dictum is usually attributed to Alfred Korzybski.



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