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Managing project investments irreversibility by accounting relations

Antonio Focacci

University of Bologna, School of Economics, Management and Statistics, Piazza Scaravilli, 2-40126 Bologna, Italy

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Abstract

Analytical techniques usually employed in making project selection decisions are of strictly financial origin and, traditionally, tend to consider projects as separate entities from undertaking organizations. This fact underestimates potential negative (and pervasive) outcomes considering that binding constraints affect the whole organization in further additional developments. This paper proposes a methodological algorithm to analyze, model and quantify *irreversibility* aspects to integrate and support traditional financial techniques. The goal is pursued by considering widespread well-known accounting indexes, and assuming *reversibility rate* as time needed to return to the "optimal original state" (as defined in accounting literature) prior project investment decisions. An illustrative case is proposed to explain how the methodology can be applied since the pre-feasibility step of the management of project framework. As calculations show, such a *reversibility* rate can be usefully implemented to improve effectiveness of planning processes within project cost management knowledge area.
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Keywords: Project irreversibility; Cost-benefit analysis; Project cost management; Project appraisal

1. Introduction

The present era of global competition and renewed increasing markets' turbulence is driving all firms to reconsider their consolidated business models and their well-defined management styles. This is a strategic issue, especially in project management framework where decisions on new products development and new technological projects are characterized by increasing *uncertainty* rates. Faster and faster technological change is the leading factor influencing obsolescence among processes and products (Woodruff, 2007). Generally, technological change issues are featuring the trade-off dilemmas between taking advantages from the latest available technology or, at the contrary, to postpone such choices waiting for a more efficient subsequent one. Thus, managerial criticalities are focused on the "adoption or wait" option trying to guess futures evolutions and subsequent impacts. More in general, it can be pointed out that all capital expenditures related to project implementations are crucial factors supporting the durable value creation process of the firm and its competitive market overall position (Slagmulder et al., 1995). As far as technological investments are specifically concerned, cost-benefit evaluations within project management framework are not always able to perform an effective project assessment as a result both of different multiple emerging technological opportunities and of the dynamics of technology coupled with the induced shorter economic life-cycle of products (Barbiroli and Focacci, 2003, 2004; Focacci, 2006). What is considered inherently implicit in the new project/investment decision—a certain *irreversibility* rate of the choice—amplifies *uncertainty* and *complexity* in the whole flow of project management activities. Investment *reversibility/irreversibility* issues are emphasized by the fact that capital-goods are generally firm- or industry-specific and overwhelmingly efforts and resources (costs) are often needed to reversing (if possible) the adopted decision (Guariglia et al., 2012). To complete the picture, it must be highlighted that both for larger corporation and for Small Medium Enterprises (SME), it is not always possible to gather all relevant information needed to decrease *uncertainty* pertaining ongoing business choices. In such

E-mail address: antonio.focacci@unibo.it.

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circumstances, the primary (often the unique, rapidly accessible and inexpensive) source of information is the internal accounting system (further to some additional information retrievable from the publicly available balance sheet data collected by national specific Bodies). An additional aspect lies in the intrinsic economic sensitivity of the business. Especially, this is a concern for those firms not having appropriate dimensional variables (revenues, cash, equity or whatsoever representative financial statement or balance sheet item) allowing to successfully survive reiterate project failures. Stated a different way, internal knowledge, skills, appropriate organization or (simply) opportunity to access efficiently information become increasingly the strategic variables to manage for successful continuous project development.

Starting from these premises, according to the rising demand for effective performance measurement, the paper develops an accounting based algorithm to enhance current project management attributes. The objectives of the article are twofold: (1) to propose a quantitative measure to the *reversibility/irreversibility* concept able to provide decision support to top management, and (2) to illustrate a real case with a complete numerical elaboration in order to show its pragmatic application. Through this paper, we are contributing to the cost management body of knowledge within project management framework by addressing the following research questions (RQ):

RQ1: Is reversibility/irreversibility concept applicable in a quantitative manner to the project cost management?
RQ2: Is this concept absolute or relative to the firm/organization? Moreover, how can we capture/express such a (possible) relativity?

The paper is organized as follows. The next section focuses the importance of a tailored approach in project appropriateness and reviews literature concerning various interrelated (and often reciprocally confused) aspects pertaining *uncertainty*, *risk* and *irreversibility*. Furthermore, common approaches usually proposed within the business context to taking such elements into account are briefly addressed. Section 3 introduces the model and related algorithm to measure *irreversibility* issues by adopting a specific tailored framework among project, organization and its accounting data. Section 4 proposes an example showing the implementation of the method and derived calculations. Conclusions are presented in Section 5.

2. *Uncertainty*, *risk* and *irreversibility* as critical factors to manage in a tailored approach

A great deal of efforts within the pragmatic project management field is generally devoted both to the prevention of potential failures in the pre-feasibility study (Davis (2016) and the analysis of project flexibility (Kreiner, 1995; Welling, 2016). Another strand connoting project studies involves the detection of common features pertaining successfully case-histories (Pinto and Slevin, 1988a, 1988b; Jugdev and Müller, 2005; Palacio-Marqués et al., 2013; Kaiser et al., 2015). Strictly deriving from the all above-mentioned perspectives, we would assume that projects could be conceived like entities -interacting with outside "world" (markets, macroeconomic conditions, technical constraints and so on)—but substantially incorporating their own successful (or unsuccessful) dimensions. The dominant paradigm—as well argued by Van der Hoorn and Whitty (2016)—is that projects are "*objects*" (i.e. separate activities or things to those undertaking or affecting by) with "*their own rights*". Once organized, projects will run ahead. Nonetheless, the archetype of a self-proceeding entity does not appear totally in line with IEC 62198 (adapted from ISO 31000) key principles listed for an effective project risk management. These guidelines advocate a more tailored approach between the nature of the project and all the sources of *uncertainty* to improve and standardize a more effective project implementation. From this perspective, project and the undertaking firm must be conceived as integrated entities and not as disentangled "objects" (an illustrative representation of the project-firm integration issue is portrayed within Figs. 1 and 2).

Uncertainty, *risk* and *irreversibility* are all interlinked concepts within project management framework to carefully match within such a more integrated approach.

According to positivistic paradigm proposed by literature, *uncertainty* can be assumed as: "*variability induced by the state of the nature*" (Saunders et al., 2015). Project *uncertainty* has received attention both for academic reasons and for practical purposes. On the first side, theoretical academic sophisticated efforts have been oriented toward refined real option valuation methods, trying to exploit some common features with financial options (Kim and Sunders, 2002). On the practical side, however, these formal and elegant methods are accompanied by several difficulties in effective implementation because of inherent differences pertaining their natural environments:

– financial products have standardized and regulated markets where trades are continuous and frequent (every minute thousands of transactions are closed in the Stock Market);

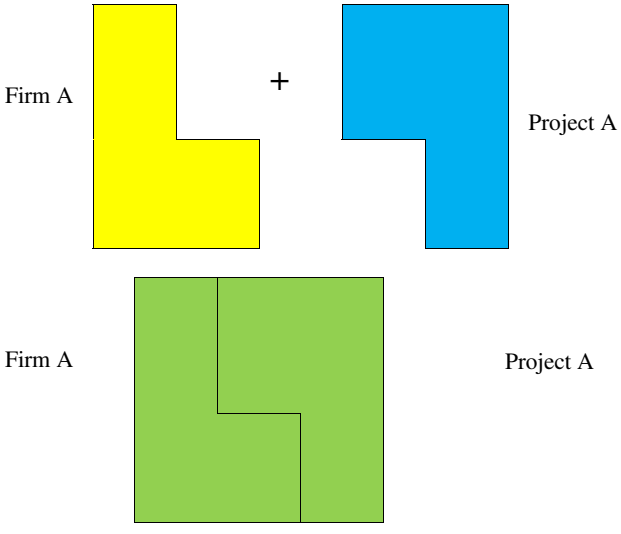

Fig. 1. Firm A and "its own" project.

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