

Value Management in Project Portfolios: Identifying and Assessing Strategic Value

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ABSTRACT ■

Projects are expected to bring value to their constituents. Value management in project portfolios has centered on the maximization of commercial value and identification of future business prospects. In this study, the goal is increased understanding of the identification and assessment of strategic, non-commercial value in project portfolios. We map the relevant dimensions of strategic value and supplement previous frameworks with the non-commercial aspects. Ecological, societal, and learning values have only been studied conceptually and qualitatively in earlier research. We propose future research on these values in quantitative settings and exploring collective sensemaking as part of project portfolio value management.

KEYWORDS: value management; project portfolio management; strategic value

INTRODUCTION ■

Value management has been proposed as an appropriate way to enhance the benefits from projects, particularly when the involvement of multiple stakeholders causes complexity through their varied value expectations (Thiry, 2001). Where project-based management has often been focused on well-defined problems and their rational analysis and solution, Thiry (2001) emphasizes that value management in real life requires sensemaking that is both individual and collective, and, therefore, is an interpretive activity grounded in the social processes of projects. When complexity increases, such as when decisions must be made for portfolios or programs, the need to comprehensively understand value triggers sensemaking. The literature highlights the need for guidance on understanding and measuring value—in particular strategic value—in order to manage project portfolio value. Collaborative sensemaking processes are integral to such value management.

Project portfolio management presents a complex set of challenges to decision makers; multiple projects must be configured and managed in a way to enhance the long-term strategic value of the portfolio while considering multiple criteria and interdependencies. However, the literature on project portfolio management has paid scant attention to value management concepts. Increasingly, the need to widen the definitions of portfolio value is being proposed (Kopmann, 2013; Sanchez & Robert, 2010) and more comprehensive definitions of portfolio value are starting to be applied in empirical research (Teller & Kock, 2013; Voss & Kock, 2013; Killen, Hunt, & Kleinschmidt, 2006, 2008). Although these studies provide an important start in the recognition of the multiple dimensions of strategic value expected from a project portfolio, there is a need to delve deeper and continue to find better ways to comprehensively identify and measure strategic value.

Empirical research on project portfolio management has traditionally focused on measuring three main aspects of the portfolio to evaluate portfolio success levels; value maximization, balance, and strategic alignment, following Cooper, Edgett, and Kleinschmidt (1999). Most project portfolio management frameworks, as well as recent research studies, have emphasized the dimension of “strategic alignment” in terms of how the projects collectively fulfill the firm strategy, and “portfolio balance” among the different types of projects as a reflection of strategic priorities, risk management, and exploitation of synergies (Martinsuo & Lehtonen, 2007; Killen & Hunt, 2010; Jonas, Kock, & Gemünden, 2013; Teller, Unger, Kock, & Gemünden, 2012; Unger, Kock, Gemünden, & Jonas, 2012). The measure of “value maximization”

is almost always interpreted in terms of financial and business success (see for example, Cooper et al., 1999; Killen et al., 2008; Voss & Kock, 2013) and value for the customer (Voss & Kock, 2013).

Commercial environments, particularly R&D units developing new products and services for future business, corporate IT units, and business units engaged in strategic and organizational change, have been the focus of most empirical research on project portfolio management. Various private sector industries, ranging from manufacturing and engineering to services, have been covered broadly. Studies have found that in the commercial product and service development context, a strong or exclusive focus on financial measures is associated with weaker portfolio value creation (Killen et al., 2008; Cooper et al., 1999); however, recent research indicates that different aspects of value (or business case) are relevant at the different stages of projects (Kopmann, Kock, Killen, & Gemünden, 2014). By focusing only on the financial value of the project portfolio, organizations may not be allocating and developing their resources with a long-term vision and may be missing out on strategic opportunities; hence, there is a need to complement financial dimensions of value with other, non-commercial aspects.

To date, project portfolio management research has largely ignored the non-profit or 'public good' project environments, which are faced with portfolio decision-making challenges as they seek to gain the best value from project investments. In these environments, financial value is rarely relevant and there is a pressing need for better value management methods (Killen, Young, & du Plessis, 2012; du Plessis & Killen, 2013). At the same time, project-based management is beginning to encompass ecological, social, health and safety, and other non-commercial aspects of strategic value, at least on the single project level (Abidin & Pasquire, 2007; Eskerod & Huemann, 2013). Both com-

mercial and non-commercial organizations stand to benefit from increased understanding of value and improved value management. In particular, it is the measures of strategic value that are important for long-term value creation.

Research Gap and Goals

In this study, we are particularly interested in the non-commercial and long-term dimensions of value and how they are addressed in project portfolio management. Ecological, social, health and safety, societal influence, future business capability building, learning and knowledge development, and other non-financial dimensions of value are emerging as increasingly relevant topics in project-based management (Abidin & Pasquire, 2007; Edum-Fotwe & Price, 2009; Eweje, Turner, & Müller, 2012; Eskerod & Huemann, 2013) and product development management (Eppinger, 2011; Luchs, Brower, & Chitturi, 2012).

We use the term strategic value as the key concept in this study, referring to ecological, social, health and safety, societal influence, learning and knowledge development, and longer term business value. Thus far, few studies have explicitly covered how strategic value should be assessed when managing a project portfolio. Some studies include synergy (Jonas et al., 2013; Teller et al., 2012; Voss & Kock, 2013), sustainability (Luchs et al., 2012), future preparedness (Meskendahl, 2010; Martinsuo & Poskela, 2011; Voss & Kock, 2013) and other related aspects as criteria for portfolio selection, balance or success; however, there is little guidance on practical project portfolio coordination and control mechanisms for promoting such values further.

In this study, our intent is to increase the understanding of how strategic value is identified and assessed in project portfolio management. We focus on two research questions:

1. How and through what kinds of dimensions is strategic value assessed as part of project portfolio management frameworks?

2. How should project portfolio management frameworks be modified to comprehensively account for strategic value?

This is a conceptual study, and we aim to develop understanding of the issues based on a review of the previous conceptual and empirical research associated with strategic value in projects and portfolios. We first explore the concept of value in project portfolio management, and how strategic value and particularly its non-commercial dimensions, are incorporated on the single project level. We review project portfolio management studies broadly, to develop comprehensive knowledge on how strategic value has been studied both from commercial and non-commercial perspectives. No new empirical data are presented. We have scoured the literature for articles that consider the dimensions of non-economic value in product development projects and public/non-profit projects, as well as in project portfolio management in general; we then identify relevant areas for further empirical studies.

A number of studies have explored the "value of project management" from an organizational perspective (Eskerod & Riis, 2009; Thomas, Delisle, Jugdev, & Buckle, 2002; Thomas & Mullaly, 2007; Mullaly & Thomas, 2009). These studies look at the "value" of the project management function in terms of organizational performance, and in the role of project management in the development of value through organizational measures, such as knowledge development and sharing and employee satisfaction. Our approach is somewhat different: we focus on the value that is generated as an outcome of the projects in a firm's portfolio.

Value in Project Portfolio Management

Value maximization has been stated as one of the key goals in project portfolio management. The starting point for value measurement is often through

Value Management in Project Portfolios: Identifying and Assessing Strategic Value

the firm's objective of long-term profit, return on investment, likelihood of success, or some other strategic goal (Cooper, Edgett, & Kleinschmidt, 1997a, 1997b). Some later studies by Cooper et al. (e.g., 1999, 2004a, 2004b) have then contrasted the high-performing firms with others in terms of revenues and profits from new products, rate of new product successes, time to market, and meeting of goals, with an intent to identify the best practices typical to high performers. Mikkola (2001) emphasizes that it is quite important for firms to be able to connect their competitive advantages with the customer benefits pursued through new products.

Table 1 summarizes some examples of studies that cover dimensions of value in project portfolio management, primarily in connection with strategic fit and balance. Although the focus is clearly on commercial value, the studies indicate the growing need to include non-commercial and future-oriented issues that may be more difficult to measure.

According to Cooper et al. (1997a, 1997b), a number of project portfolio management indexes and scoring and evaluation methods have been developed with value maximization in mind, but they may fail in the balancing and strategic orientation of the portfolio, unless additional criteria and, for example, visual balancing tools are used as support (see also Mikkola, 2001). In fact, the majority of recent empirical project portfolio management research has focused on strategic alignment and balance as the primary dependent variables in models concerning project portfolio management success. For example, strategic alignment (or fit) is regularly discussed in terms of aligning projects with strategy (Martinsuo & Lehtonen, 2007; Killen et al., 2008; Jonas et al., 2012; Teller et al., 2012; Unger et al., 2012; Voss & Kock, 2013). These studies consider the projects' contribution to business strategy at a portfolio level perspective and investigate whether the resource allocation reflects strategic

priorities; however, only generic terms are used and the nature of the strategies and how strategic value is measured are not discussed.

Portfolio balance, one of the goals for project portfolio management (Cooper et al., 1999), is also discussed in broad categories in extant research. It is often noted that strategic values generated by projects should be balanced to best reflect the importance and range of strategies. Portfolio balancing may also cover financial, commercial, and technical issues. For example, Teller et al.'s (2012) questionnaire study explored balance in terms of new and old application areas and balance between opportunities and risks (see also Voss & Kock, 2013). Voss and Kock's (2013) questionnaire included dimensions concerning portfolio balance in technology novelty, different project phases, and continuity of cash flow (see also Jonas et al., 2013).

From a portfolio perspective, strategic value has primarily been tackled in the form of long-term business success measures; in particular, Meskendahl (2010, largely referring to Shenhar, Dvir, Levy, & Maltz, 2001) has proposed that immediate portfolio management success must be separated from measures of business success, and business success should cover both economic value and preparing for the future. The conceptual frameworks by Voss (2012), Kopmann (2013), and Meskendahl (2010) acknowledge the need for including 'preparing for the future' or 'future preparedness' as a measure of portfolio value creation. The empirical, questionnaire-based study of Voss and Kock (2013) included the dimension of future preparedness as a measure of project portfolio management. Also, Killen et al. (2006, 2008) look into perceptions of new opportunity development through the portfolio, particularly in terms of new competencies and emergence of new product arenas or markets. Due to the long-term pursuits of project portfolios, Sanchez and Robert (2010) assert that all performance of project portfolios cannot be assessed in

terms of immediate financial measures because many of the expected benefits are intangible and evolve over time.

Strategic Value in Projects

Winter and Szczepanek (2008) have proposed that projects and programs be considered as value-creating processes (instead of merely product-creating processes), and that researchers should take a more strategic approach to projects to understand their role in business (also Artto, Martinsuo, Dietrich, & Kujala, 2008). In particular, Winter and Szczepanek (2008) call attention to how an organization can mobilize its customers to create their own value from the project or program's various offerings.

While the definition of project value is not universally agreed upon, the traditional measure of value is the return on investment in financial terms. Financial measures are attractive due to the ease of generation and comparison of data; however, it is well recognized that financial benefits are only a part of project value (e.g., Atkinson, 1999; Shenhar et al., 2001). According to the critical project management view, a notable shift is underway from project management success measures (the 'iron triangle' of cost, time, and scope) to project success (project outcomes and benefits realization) (Cicmil, Williams, Thomas, & Hodgson, 2006).

Strategic measures of value that have been investigated at the level of single projects include, for example, incorporation of sustainability principles in projects, assessing the long-term benefits in projects, and consideration of societal and stakeholder influence on projects. Table 2 summarizes some single-project level research that has considered various dimensions of strategic value, particularly emphasizing the non-commercial issues.

Ecological, environmental, and social values are becoming increasingly relevant, as part of studies concerning the value of single projects. Currently, many studies look at sustainability or social sustainability holistically, including

Authors	Methodology and Context	Ways of Identifying and Assessing Strategic Value	Findings for This Study
Cooper et al., 1997a, 1997b; Cooper et al., 1999	Qualitative study of 35 portfolios; quantitative—data on 205 portfolios (new product development, North America).	Investigates the promotion of strategic value through methods that evaluate strategic fit and spending breakdown according to strategic goals.	Although strategic alignment methods correlate to portfolio success measures (including reported strategic alignment), specific measures of strategic value are not included in this study.
Dietrich and Lehtonen, 2005	Quantitative study with 288 survey responses (Finland/Europe).	Successfulness in managing strategic intentions through alignment of project objectives with strategy.	Some findings on the linkages between the projects and strategy formulation (revision of objectives of ongoing projects with strategy formulation, revision of portfolio composition with strategy follow-up).
Killen et al., 2008; Killen et al., 2006	Quantitative—data on 60 portfolios (new product and service development, Australia).	Perception measures of ‘opportunity’ development through the portfolio—how well it develops existing technological competencies; brings new technologies to the organization; leads the organization into new product arenas; or enables the organization to enter new markets.	Findings support the use of strategic alignment criteria to improve strategic opportunity value. These value measures correlate with hard measures of portfolio success, in addition, organizations that used strategic methods for portfolio evaluation reported higher performance on these opportunity measures.
Kopmann, 2013	Conceptual paper based on literature.	Project portfolio success comprising of four sub-constructs: average project success, future preparedness, strategy integration, synergy exploitation.	Conceptual model proposes linkages between the use of value-oriented goals and value-based metrics and project portfolio success. Also proposes the link between project portfolio success and firm success.
Kopmann et al., 2014	Quantitative, dual informant study of 184 firms (Europe).	Project portfolio success as a second-order construct with five sub-dimensions: strategy implementation, future preparedness, portfolio balance, average project outcome, synergy exploitation.	Business case control (existence, monitoring, tracking) is positively associated with project portfolio success; accountability for benefits, incentives, and external contingencies as moderators.
Kock, Meskendahl, and Gemünden, 2013	Quantitative—dual informant study of 200 firms (Europe)—building on conceptual paper by Meskendahl (2010).	Portfolio performance is a second-order construct that includes four sub-dimensions: average project success, portfolio balance, strategic fit, synergies.	Antecedents and strategic orientation as a potential moderator of portfolio performance.
Sanchez and Robert, 2010	Conceptual paper describes an approach for developing indicators to measure strategic performance.	Key performance indicators are developed based on strategic goals. A method is outlined and a few examples provided, such as compliance with environmental regulation or measuring the rate of delivery of new capabilities.	Highlights that strategic benefits are usually intangible, not realized immediately, and cannot be expressed in an adequate way using financial measures. In addition, the interdependencies between strategies and measures must be considered for portfolio management. Also highlighted is the need for continual validation of strategic value measures.
Teller and Kock, 2013	Quantitative—dual informant study of 176 firms (Europe).	Project portfolio success comprising six sub-constructs: average project success, average product success, strategic fit, portfolio balance, preparing for the future, and economic success.	Using the multi-dimensional construct of project portfolio success, this study provides evidence of the positive relationship between risk management and portfolio success.
Voss and Kock, 2013	Quantitative—dual informant study of 174 firms (Europe)—building on conceptual paper by Voss (2012).	Portfolio success as a second-order construct includes six sub-dimensions: overall business success, average project success, future preparedness, portfolio balance, strategic fit, use of synergies.	The creation of relationship value between the customer and the project is found to correlate positively with portfolio success (which includes financial and strategic dimensions).

Table 1: Examples of studies covering value generally in project portfolio management.

Value Management in Project Portfolios: Identifying and Assessing Strategic Value

Authors	Methodology and Context	Dimensions of Value	Findings for This Study
Abidin and Pasquire, 2007	Qualitative; eleven interviews: construction projects in the United Kingdom.	Economic benefit, environmental protection, social well-being.	Need for understanding the value drivers of stakeholders, in deciding about sustainability value. Need to include sustainability as part of projects' value management. Process for value management at the project level.
Atkinson, 1999	Conceptual study from IT/IS perspective.	The iron triangle (time, cost, quality, or scope), the information system (reliability, quality, use), benefit to the organization (improved efficiency, profits, organizational learning, reduce waste), and benefits to stakeholders (social and environmental impacts, user satisfaction and learning, community benefits).	Proposes that the iron triangle measures, while relevant, miss many opportunities and do not reflect project value sufficiently. Promotes involvement of stakeholders and team members with adequate authority and responsibility in the development of value criteria.
Edum-Fotwe and Price, 2009	Qualitative; Delphi workshops in a small team and modeling; construction projects in the United Kingdom.	Sustainable development: economic, social, environmental.	Mapping of categories relevant in assessing social sustainability.
Eslerod and Huemann, 2013	Conceptual study, based on standards and other literature.	Sustainable development: economic, social, environmental; short-term, medium-term, long-term.	Stakeholder issues are treated superficially in project management standards, including sustainability. Sustainable development is not, yet, explicitly covered in project management standards, but it does place new demands on project-based management.
Eweje et al., 2012	Quantitative; survey with 69 respondents, oil and gas industry, geographically spread broadly.	Strategic value: influence in the society; health, safety, security and environmental responsibility; economic profitability; stakeholder admiration.	Information feed (particularly external) during project execution contributes significantly to strategic value. Risk management better positions the manager to make value-creating decisions. Managers may easily prioritize efficiency over other values, such as health and environmental issues.
Klakegg et al., 2009; Klakegg, 2010	Qualitative and quantitative—79 surveys on project governance, interviews, and 4 cases.	Public and non-profit project governance explored on many dimensions (social, strategic, sustainability, legislation, ethics), but without detail of specific indicators for value measurement.	Highlights that there are projects where the main purpose is for environmental benefit, to meet social needs, or to improve sustainability, and financial indicators are often not relevant. In such environments value must be measured in other ways: funding bodies require accountability and transparent reporting to demonstrate the value achieved from each dollar of investment from limited resources.
Luchs et al., 2012	Quantitative; student sample of 119 and a U.S. sample of 308 respondents; online survey with decision scenarios in consumer businesses.	Sustainable as socially and environmentally responsible (vs. functional performance).	Consumers tend to prioritize the functional performance of the product over sustainable, but such priorities depend on the consumers' values as well as the product aesthetics.
Martinsuo et al., 2013	Quantitative; survey with 126 respondents in R&D organizations in Finland.	Managers' perceptions of product development projects' organizational impacts, in terms of financial, market, technology value.	Managers prioritize financial value over market and technology value. Managers' assessment of the projects' organizational impact decreases during the project.
Martinsuo and Poskela, 2011	Quantitative; survey with 107 respondents in R&D portfolios in Finland.	Competitive potential and future business potential as measures of strategic opportunity (new product development front end success).	The use of different criteria is differently associated with the two measures of strategic opportunity pursued in the front end of new product development. Assessment formality is not significant in the model.

Table 2: Examples of studies on strategic value in single projects. (Continues on the following page)

Authors	Methodology and Context	Dimensions of Value	Findings for This Study
Poskela and Martinsuo, 2009	Quantitative; survey with 133 managers in R&D organizations in Finland.	Strategic renewal as the measure of future orientation (new product development front end success).	Input control and the project team's intrinsic task motivation are the key mechanisms of management control promoting strategic renewal at the front end of innovation. Technology and market uncertainty are important too.
Shenhar et al., 2001	Qualitative 17 cases and quantitative findings for 126 projects in a range of industries.	Four dimensions representing increasing time frames: project efficiency, impact on the customer, business success, and preparing for the future.	The study confirmed the first three measures and the fourth (preparing for the future) emerged and included: creating a new market or product line and developing a new technology.

Table 2: Examples of studies on strategic value in single projects.

ecological, social, health, and safety values together (Edum-Fotwe & Price, 2009; Klakegg, 2010; Klakegg, Williams, & Magnussen, 2009; Eskerod & Huemann, 2013). Eppinger (2011) pointed out that the practice of including environmental sustainability into product designs is “largely in the dark ages” and that product design practices must evolve more toward design for environment. In a review of project management standards using a stakeholder and sustainability lens, Eskerod and Huemann (2013) noted that sustainability is not sufficiently covered in the practices and standards that guide project-based management. To feature ecological issues as part of the project, research has suggested that the value drivers of different stakeholders must be mapped and understood (Abidin & Pasquire, 2007), and that the various dimensions of sustainability must be mapped thoroughly to include their relevant components as part of each project (Edum-Fotwe & Price, 2009). Eweje et al. (2012), however, note that managers easily prioritize financial and efficiency issues over those concerning environmental and social issues.

Long-term business benefits are increasingly considered as factors to be pursued and assessed in project decision making. Shenhar et al. (2001) have included customer satisfaction, organizational benefits, and preparing for the future among the success criteria in projects. Similarly, Atkinson (1999) emphasizes the importance of measuring organizational benefits and

stakeholder satisfaction to understanding project success. Concepts such as strategic opportunity (Martinsuo & Poskela, 2011) and strategic renewal (Poskela & Martinsuo, 2009) have been used as measures of longer term strategic benefit, particularly at the front end of innovation in which new product concepts are selected for project implementation. Strategic opportunity is defined by Martinsuo and Poskela (2011) as a combination of competitive potential (creation of competitive advantage, offering unique features, and customer satisfaction) and future business potential (access to new markets, creation of new technical, and market know-how). Martinsuo, Suomala, and Kanninen (2013) studied managers' perceptions of organizational impacts as part of R&D project evaluations and discovered that managers' assessments at the front end are strongly linked with their assessments after project completion, even though there is a slight reduction in criterion ratings.

Societal and stakeholder influence measures demonstrate that many projects aim for a positive impact on the public and society, in addition to providing benefits for the firms and their customers. Some of the environmentally oriented studies also emphasize societal and stakeholder issues (Abidin & Pasquire, 2007; Eskerod & Huemann, 2013) in the sense that stakeholders communicate their ecological needs and interests and thereby represent the institutional and societal goals for projects. Projects in the public and

non-profit sectors face particular pressures to find ways to adequately identify, assess, and deliver non-commercial benefits to society (e.g., Klakegg, 2010; Klakegg et al., 2009).

Identifying and Assessing Strategic Value in Project Portfolio Management

The above analysis shows that project portfolio management studies in the mainstream research have primarily incorporated future-oriented business benefits and customer benefits as a long-term oriented view to strategic value. Thiry (2002) argues that multi-project program management may feature more strategic aspects of value and account for strategic objectives, broader methodological approaches, and project interdependencies, but only if fundamental organization-wide and long-term implications are considered. Although many of the ‘best practice’ studies investigate the use of strategic measures during the project portfolio management process (Cooper et al., 1999), these studies do not include measures of the strategic value created through the portfolios.

At the single project level, the review shows that economical, ecological, and social values as well as societal and stakeholder influences are already being discussed. We, therefore, deepened our analysis and sought research examples that feature such dimensions at the project portfolio and business levels. We discovered some conceptual and qualitative studies, which include

Value Management in Project Portfolios: Identifying and Assessing Strategic Value

prospects for identifying and assessing strategic value at the portfolio level, as summarized in Table 3. Although some of the articles discuss organizational business, programs, or R&D investments in general (instead of project portfolios), we have included all these multi-project views in our analysis. We discuss four main issues below, namely: the ways that sustainability principles are considered in project portfolio management; learning and knowledge development as intangible values in project portfolio management; the need to embed stakeholders and their needs and desires in the prioritization and selection of projects; and, the emphasis on customized criteria for firm-specific needs.

Some studies have proposed improvements in the ways that sustainability, environmental, ecological, social, and other related values are incorporated into frameworks of project selection and project portfolio prioritization. For example, the conceptual study by Andersson and Rydén (2006) suggests that project portfolios in the urban development context require specific criteria and methods of assessment and note that traditional project portfolio management frameworks do not include urban sustainability issues. In their case study, Meade and Presley (2002) propose that environmental and safety considerations should be taken into account in selecting new R&D projects. The Delphi study of Abbassi, Ashrafi, and Tashnizi (2014) indicates that various environmental, safety, and social issues could well be included in the criteria for assessing R&D investments. Cunha, Ferreira, Araújo, and Ares (2012) conducted a qualitative study in the maritime industry and call for better methods to take the social impact of R&D investments into account in project selection decisions. Furthermore, based on their review, Figge, Hahn, Schaltegger, and Wagner (2002) propose methods for the inclusion of environmental and social sustainability in the control systems of the organization

through widening existing frameworks, such as the balanced scorecard. Brook and Pagnanelli (forthcoming) report that managers in an automotive firm expressed the need to include environmental sustainability along with social and economic sustainability in portfolio management; however, the effectiveness of their developed framework is not discussed, and the framework only includes one sustainability measure.

Another aspect of strategic value, documented in the literature, deals with the learning and knowledge development that takes place across projects and, more broadly, from the portfolio to the parent organization. Some value measurement frameworks include the dimension of learning, innovation, and growth, with detailed measures for specific environments (Barclay & Osei-Bryson, 2009; Papalexandris, Ioannou, Prastacos, & Soderquist, 2005). In addition, policy requirements may call attention to value dimensions of learning (Wu, Wang, & Huang, 2012). A study of government research programs finds the strong use of bibliometric measures of research output, along with other measures of benefits to society, such as the creation of spin-offs, technology spillovers to other applications, and the number of scientists and students educated (Cozzarin, 2006). Particularly in technology development, the learning requirements may be quite significant. For example, measures of outcomes of government-sponsored R&D consortia in Japan include items such as the acceleration of technological development, increased awareness of R&D, and the increase in spillover effects (Sakakibara, 1997). Salter and Martin (2001, p. 528) suggest that “support for basic research should be seen as an investment in a society’s learning capabilities.” In fact, the more basic the research, the more difficult and the more questionable are the assumptions that are required to estimate financial return (Salter & Martin, 2001).

Many of the above studies clearly suggest that the point of influence is

project assessment and prioritization in the front end, which must cover new dimensions (e.g., ecological and social) if strategic value is to be featured as part of the projects. The front end value definition of projects and programs is emphasized, for example, by Winter and Szczepanek (2008) and Barclay and Osei-Bryson (2009) whose studies indicate that customer and stakeholder perspectives need to be included in the assessment and decision frameworks of projects and programs. The dominant understanding is that strategic value can be developed into indicators and criteria that can be used to assess projects. To ensure consistency in scoring projects, clear definitions of the dimensions of strategic value must be developed for each performance level (Wu et al., 2012). To address similar goals, a guide for determining Social Return on Investment Network (SROI) was commissioned by the UK Cabinet Office to create a common language and consistency in the application of criteria for evaluating social value. The SROI framework provides guidance on initial investment as well as on measuring performance and progress over time (SROI Network, 2012). The study by Unger et al. (2012) emphasizes that top managers have an important influence on portfolio performance also later on in the portfolio management process, when they terminate projects.

It is repeatedly recognized that each industry and each firm will need to develop a customized set of criteria to measure strategic value, although they may use similar kinds of processes and procedures to develop the criteria. Several publications aim to guide practitioners in the development of tailored strategic value measures and portfolio management frameworks. Papalexandris et al. (2005) propose stages through which strategic value can be included into the control systems: Prepare, understand (including understanding strategic directions), identify (including identification of strategic objectives), select (including

Authors	Methodology and Context	Ways of Identifying and Assessing Strategic Value	Findings for This Study
Abbassi et al., 2014	Delphi questionnaire of about 20 experts in technical R&D management, followed by mathematical model creation (model not tested)—Iran.	Endogenous: fit with strategy, capability of research team, impact on innovation, project timing, employee learning; Exogenous: technology life cycle stage, environmental and safety, international sanctions, public support, barriers to imitation, benefits to human life.	The study proposes a mathematical model for applying the criteria to select the portfolio of projects. The model considers the weighting of the criteria (also including financial criteria), the project types and their interdependencies. The main contribution to the understanding of strategic value is the Delphi-generated list of criteria that represent a holistic view of value for technology R&D projects.
Andersson and Rydén, 2006	Proposed project portfolio management framework for urban sustainability initiatives. No empirical findings.	Examples of tailored criteria to meet sustainability strategies include metrics, such as the percentage of users of public transport or measures of the level of polluting chemicals in emissions.	Multiple strategies are used to develop value indicators—such as strategies for urban space and flow; and human resource strategies. An approach is outlined. The approach suggests using cluster analysis to group projects when setting priorities for urban sustainability.
Barclay and Osei-Bryson, 2009	Proposed framework for measuring value—program level perspective for IT/IS.	Framework outlines several dimensions of value including learning and innovation (number of patents, measure of lessons learned from projects).	Highlights importance of stakeholders in defining value, and suggests the active involvement of stakeholders. The paper outlines a structure for defining and measuring benefits including: Identifying stakeholders, defining objectives, measures, priorities, analysis, and realization.
Brook and Paganelli (forthcoming)	Single case example of design and implementation of project portfolio management framework (automotive industry).	Framework includes eight measures—four are market/profit-oriented; others are strategic fit, CO2 emission/biomaterials, leveraging or strengthening technology capabilities, leveraging alliances.	Framework designed and implemented through consultation with managers. It is purported to be designed to include economic, social, and environmental sustainability measures; however, there is no discussion on the effectiveness of the framework. It does not include any social sustainability measures and includes only one environmental measure.
Cozzarin, 2006	Qualitative—analysis of 11 government programs aimed at supporting research (Canada).	Measures of knowledge development through measures such as publications, patents, citations, numbers of scientists and students educated.	Notes the long-term nature of many measures of strategic value, emphasizes that research (basic research especially) requires broad measures in order to evaluate long-term socio-economic impact.
Cunha et al., 2012	Qualitative primarily. Exploratory study—two cases in the private sector in the Portuguese maritime industry.	Investigates the social impact of R&D investments and how to assess social return.	Criteria and indicators were identified; the most important social measures in a technology research environment were employment, learning and growth, environmental impact, and social return vs. financial return.
Figge et al., 2002; Papalexandris et al., 2005	Methodologies based on the balanced score card (BSC) drawing upon experience and existing research.	Figge et al. (2002) augment the balanced score card approach with a 'non-market' perspective to include environmental and social sustainability factors. Papalexandris et al. (2005) provide possible measures for the 'learning and growth' perspective such as employee turnover, knowledge sharing, and adoption of corporate values.	These are examples of approaches to extend the traditional balanced score card (BSC) to include further criteria (often long-term strategic criteria). The non-market perspective proposed by Figge et al. (2002) aims to offer a method for placing value on aspects that are not currently regulated by the market system but reflect strategies and values of the stakeholders.
Meade and Presley, 2002	Qualitative—single case application of a decision model for R&D project selection.	Specific measures include technical measures such as the probability of technical success and the existence of required competencies as well as measures such as environmental considerations and workplace safety.	The model incorporates multiple factors and interactions for decision making at the R&D level—the paper suggests that a similar approach could be developed for decision making at the portfolio level.

Table 3: Examples of studies on (non-commercial) strategic value in project portfolios. (Continues on the following page)

Value Management in Project Portfolios: Identifying and Assessing Strategic Value

Authors	Methodology and Context	Ways of Identifying and Assessing Strategic Value	Findings for This Study
Sakakibara, 1997	Data from 226 U.S. and Japanese technology firms and statistical and econometric analysis.	Evaluation of items such as the acceleration of technological development, increased awareness of R&D, and the increase in spillover effects.	This study of high technology consortia is focused at the level of the firm rather than at the portfolio, and the measures have not been tested at the portfolio level. The measures of strategic value are not used as dependent variables.
Winter and Szczepanek, 2008	Case study in food industry outlining a comprehensive strategic review and strategy implementation program.	Value creation perspectives identifying first-level and second-level relationships. The first level looks at the project/product output and the second-level looks at value creation from a shareholder or customer perspective.	Case findings suggest the need for strategic focus on value creation and the second-level relationship. The front-end definition of projects and programs needs to take a higher perspective and consider the customer and shareholder value.
Wu et al., 2012	Proposed project portfolio management framework based on the energy project selection challenge in the Chinese power industry (not empirically tested).	Non-financial evaluation criteria include energy improvement effects, implementation of risk reduction, production efficiency, user satisfaction, improved power availability, and an extended scope of the energy market.	The study posits that financial methods are appropriate for some energy projects, such as the construction of a new energy generation facility, but others such as projects for national energy security, the development of policy, and energy trading require the development of weighted non-financial criteria to determine the project's contribution to strategic goals.

Table 3: Examples of studies on (non-commercial) strategic value in project portfolios.

design of performance measures), operationalize, and implement. Similarly, Barclay and Osei-Bryson (2009) outline a four-stage process: Identify stakeholders, definition process (including design and confirmation of value measurement criteria), analysis and monitoring, and assessment of the realization of the end objectives. Some studies promote the development of mathematical models to assist with portfolio management. Abbassi et al. (2014) used a Delphi study for the development of suitable criteria before constructing a mathematical model to construct the portfolio.

These studies on identifying and assessing strategic value in project portfolios provide a wide range of information. The only statistically strong study (Sakakibara, 1997) provides findings on measures of strategic value in high technology consortia. Although the study is focused on the level of the firm rather than at the portfolio level, it is included here because it is one of the few studies that illustrate the use of strategic value measurements in a multi-project environment. The study of 11 programs by Cozzarin (2006) is exploratory in nature

and concluded (p. 68) that: "There is no academic consensus as to how benefits either social or economic should be measured." There is also a lack of consensus on the measurement of other types of strategic value such as that for environmental sustainability. The other studies are conceptual or limited to a single case (or two exploratory cases for Cunha et al., 2012). Although each example adds to our understanding, and may provide guidance for others, there is a lack of coherent empirical evidence that the case experiences outlined may be transferable.

Discussion

Value management in project-based organizations represents an attempt to see beyond the immediate results and a way to bring stakeholder input into defining project and program scope. This orientation toward broader benefits has already been considered at the level of single projects, through the inclusion of customer benefits, organizational benefits, and future business benefits among project success criteria (e.g., Atkinson 1999; Shenhar et al.,

2001). Although project portfolio goals are considered to include value maximization (e.g., Cooper et al., 1999), surprisingly little research deals with what that value actually is and how it should be assessed. The emphasis of empirical studies has been on strategic alignment and portfolio balance as key success dimensions, and for these factors, fairly robust measures have been developed and shared in the portfolio researcher community. Due to the long-term orientation of many project investments, it is understandable that financial value can be measured only over time and, therefore, it is difficult or even impossible to link with project portfolio management at a given time. Our review shows that the future benefits and long-term views are currently being included in the success criteria through which the performance of project portfolio management is studied.

In this study, our intent has been to increase understanding on how strategic value is identified and assessed in project portfolio management. Although we reviewed project portfolio management research more broadly, our focus was

on the non-commercial dimensions of strategic value that have already been investigated to some degree in single project studies. Our findings at the single project level showed that various conceptual, qualitative, and quantitative studies have been conducted, and that they feature strategic value through the dimensions of ecological, environmental, and social values (or sustainability); long-term business benefits; and societal and stakeholder influence.

Identifying and Assessing Strategic Value in Project Portfolios

The first research question explored the dimensions through which strategic value is assessed as part of project portfolio management frameworks. In addition to the value of “preparing for the future” that was mentioned above both at the single project (e.g., Atkinson 1999; Shenhar et al., 2001) and the portfolio levels (Meskendahl, 2010; Voss, 2012; Voss & Kock, 2013), we outline some studies that have covered environmental and social values (or sustainability) and learning and knowledge development as prospective strategic value dimensions in project portfolios. Although many of the studies are conceptual or qualitative in their methodologies and limited in their data, we have contributed by compiling such studies and showing the growing support for the consideration of these new value dimensions as part of project portfolio management frameworks. We have shown that firms’ strategies increasingly feature long-term and stakeholder-oriented interests of sustainability, societal influence, and knowledge diffusion and state them as part of single project goals; therefore, it is also necessary to include these strategic value measurements as part of project portfolio management.

Our results reveal how the various dimensions of strategic value are currently being proposed as assessment and prioritization criteria at the front ends of projects, in an approach similar to that used for commercial and

technical criteria. In particular, the input of customers and stakeholders has been emphasized. Customer and stakeholder cooperation (Voss, 2012; Voss & Kock, 2013; Beringer, Jonas, & Kock, 2013) as well as consequent uncertainties (Petit, 2012; Petit & Hobbs, 2010) have only recently been included among project portfolio management studies. This track of research deserves further attention as the focus has largely been on data from within the R&D unit, instead of the stakeholders directly. Also, the focus in previous research on project portfolio selection and its assessment criteria indicates that research has not been conducted sufficiently concerning the deployment of strategic value over time as the project portfolio evolves.

The earlier studies that we reviewed featured different frameworks, practical measures, and even balanced scorecards as means to assessing strategic value in project portfolios. In contrast to research that highlights the role of sensemaking in translating rules to practice and collectively defining value (Christiansen & Varnes, 2009; Thiry, 2001), project portfolio management research generally assumes that rather formal and rational means are used to incorporate these measures of strategic value, along with the more traditional values of financial, commercial and business benefits, strategic alignment, and balance. This may be in part because much of the empirical research on project portfolio management has relied on single or two-respondent questionnaire responses, where the idea of “value” has been reduced to single or a few items, primarily covering financial and customer value. However, as qualitative research on the decision making in project portfolio management boards suggests (e.g., Blichfeldt & Eskerod, 2008; Christiansen & Varnes, 2008), the practice of project portfolio management is much more interactive, political, and path dependent than anticipated (Martinsuo, 2013). In line with Thiry’s (2001) arguments for sensemaking concerning strategic value in

complex settings, we wonder if there are alternative ways to negotiate and bargain strategic value between the organization and its stakeholders, beside the rational and formal frameworks.

Including Strategic Value in Frameworks of Project Portfolio Management

As a second research question, we inquired how project portfolio management frameworks should be modified to account for strategic value properly. Our results have suggested that, in general, the non-commercial dimensions of strategic value should be included more broadly into the frameworks of project portfolio selection and success. Both managers and researchers should investigate the ecological, social, and learning dimensions of value, particularly if they are included as part of firm strategy. Where previous studies point out ways in which strategic value criteria can be embedded into assessment models, research on the negotiated aspects of strategic value, and strategic value dimensions as project portfolio performance criteria is quite limited.

According to Thiry (2001, 2002), value management is about sensemaking that requires interaction and negotiation. The involvement of top managers has been noticed as important when projects are terminated to enhance project portfolio performance (Unger et al., 2012), and the credibility and value orientations of decision makers are likely to have a significant implication on project portfolio decisions. Discussions held in portfolio meetings portray managers’ value orientations that may not always be unanimous (Christiansen & Varnes, 2008). Martinsuo (2013) proposed that more research is needed on the issues that managers negotiate and bargain during project portfolio management. Particularly when considering the dimensions of value that are difficult to measure (ambiguous) and when there are multiple stakeholders (complexity), this implies the need for new kinds of approaches in project portfolio

Value Management in Project Portfolios: Identifying and Assessing Strategic Value

management (Thiry, 2001, 2002). Further empirical research is needed to explore the sensemaking processes associated with deriving, assessing, and prioritizing the non-commercial dimensions of strategic value.

None of the studies we found covers environmental or social value dimensions among project portfolio criteria. In fact, the research suggests that firms direct scant attention to the consequences of project portfolio choices in general, particularly how the project portfolio is controlled after project selection. Although some studies pay attention to project portfolio control practices (Müller, Martinsuo, & Blomquist, 2008), to different forms of business case control at the different stages of projects (Kopmann et al., 2014) and to changes required once uncertainties in the project portfolio context are realized (Petit, 2012; Petit & Hobbs, 2010), there is much room for further studies to explore project portfolio deployment and control incorporating comprehensive measures of all value dimensions in project portfolio management. As our study centered on the non-commercial strategic value in project portfolios, we particularly encourage further studies that would explain why and how certain organizations succeed in building environmental and social values into their R&D portfolios. In line with traditional studies that highlight the importance of strategic fit, the studies on non-commercial value also highlight the importance of strategic fit. Importantly, some of these studies provide initial guidance on how to ensure strategic fit from a holistic 'value' perspective. Stakeholder involvement is emphasized in several of the studies. The stakeholders are shown to drive the identification of value and the development and monitoring of evaluation criteria for strategic value (Klakegg, 2010; Abidin & Pasquire, 2007; Andersson & Rydén, 2006; Atkinson, 1999; Barclay & Osei-Bryson, 2009; Figge et al., 2002). Stakeholder input and commitment are proposed

to be important aspects of defining and applying strategic value criteria. The strong impact of stakeholder input is highlighted by Klakegg's (2010) finding from a single project perspective—that the most important reason for lack of sustainability was the lack of commitment to sustainability issues by stakeholders.

Despite this emphasis on stakeholders as partners in defining value, Eskerod and Huemann (2013) find that the project portfolio standards are superficial in their approach to stakeholder input. They propose that the inclusion of sustainability factors in project management approaches will require a radical change in underpinning values. Similarly, underpinning values will need to change for project and portfolio management to embrace holistic strategic value measurement.

Achievement of such change could be enabled through purposeful sensemaking activities, (Thiry, 2001, 2002), and could build upon some of the approaches outlined in the literature. For example, the identification and confirmation of the involvement of the relevant stakeholders are the first steps in a structure for defining benefits proposed by Barclay and Osei-Bryson (2009). The identified stakeholders take a central role to ensure that the developed process will deliver the expected benefits to stakeholders. Winter and Szczepanek (2008) see customers as the most important stakeholder group and illustrate how value creation (in contrast with product creation) involves stakeholders in the creation of the value. Figge et al. (2002) take a wide perspective on stakeholders and promote the exploration of all potentially relevant stakeholder groups before obtaining input from the pertinent stakeholders. Abbassi et al. (2014) emphasize the requirement that stakeholders' needs and desires must be integrated into the project portfolio selection process. Their model draws upon stakeholder input to classify projects and to determine evaluation criteria.

Conclusions

Contribution

This study has directed attention to strategic value in project portfolio management, including ecological, social, health and safety, societal influence, learning and knowledge development, and longer term business value. The study has contributed by integrating knowledge from conceptual and qualitative studies conducted at the single project level with studies on measures and criteria for portfolio evaluation and success assessment. The results have revealed that project portfolios may have strategic value beyond financial benefits, but such value is not sufficiently accounted for in project portfolio evaluation frameworks and decision makers' collective sensemaking. Directing attention toward non-commercial value may cause loss or destruction in the commercial aspects of value, thereby creating evident challenges for sensemaking, negotiation, prioritization, and portfolio control. As the measurement of strategic value includes more uncertainty than financial and commercial measures, new approaches may need to be developed for project portfolio frameworks to enable the sensemaking and negotiation needed in assessing strategic value.

Managerial Implications and Limitations

This research highlights the momentum among project and portfolio management communities in the strengthening of the understanding of project portfolio value and its measurement. This momentum is influenced by the increasing complexity and turbulence that managers face. Project and portfolio managers are increasingly expected to be able to articulate value comprehensively; a focus on financial measures is not sufficient for long-term strategic decisions. Although the literature on non-commercial strategic value does not offer statistically significant findings for portfolio-level applications, the examples may serve to provide some

guidance for managers in their quests to improve the identification and assessment of strategic portfolio value. In particular, this research has identified the relevant dimensions of non-commercial value both at the single project and portfolio levels; highlighted the importance of stakeholder identification and involvement; and, identified how stakeholders are incorporated into some portfolio frameworks. In addition, this research highlights the relevant role of sensemaking processes in truly understanding project and portfolio value; the managerial implications point to the use of collaborative sensemaking processes to truly and holistically understand and assess strategic value. Managers may be inspired to move beyond rational and rigid perspectives on portfolio value and to embrace processes of dialogue, interplay, and negotiation between stakeholders to best manage strategic value in project portfolios.

This study has been limited through its choice of conceptual approach. We used a snowball strategy in identifying relevant literatures, which may have caused disparate perspectives and neglect of some publication channels. Although we have attempted to find research relevant to the research question, it was slightly difficult to identify all relevant studies on multi-project and portfolio management because they can be spread across multiple literature fields. Our attempt was to draw together a range of literature previously not compiled, and highlight the trends and research gaps that would direct us and other researchers toward empirical research. We are, therefore, proposing new research avenues both on the non-commercial evaluation and performance criteria for project portfolio management and the sensemaking processes needed for value management among stakeholders.

Ideas for Further Research

We propose future research to include strategic value more broadly into the frameworks of project portfolio selec-

tion and success. The following ideas are suggested as potential starting points for further research:

- Quantitative studies on the use of sustainability; environmental, ecological, social, and other related measures of strategic value of project portfolios; and analysis of their potential linkages with financial value.
- Quantitative studies on the use of various measures of learning and knowledge development in project portfolios, and analysis of their potential linkages with financial value.
- Development of strategic value criteria for project assessment and prioritization for project selection, and the study of their use and consequences in different contexts.
- Qualitative research on the processes and practices of value identification and legitimization as part of managers' work, and credibility of managers in decision making.
- Qualitative research on the customization and use of portfolio evaluation and selection criteria in different contexts, particularly concerning strategic value.
- Exploratory research on the collective sensemaking among stakeholders as part of project portfolio value management.
- Exploratory research on the loss and destruction of commercial value, when non-commercial aspects of value are being considered.

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Value Management in Project Portfolios: Identifying and Assessing Strategic Value

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Value Management in Project Portfolios: Identifying and Assessing Strategic Value

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